For greener future

NIETZ

POWER MODULES

Inverters /EV /Solar /wind Power

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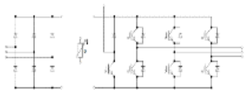
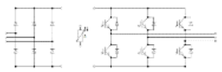
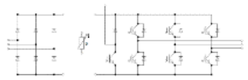
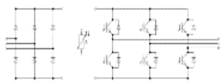
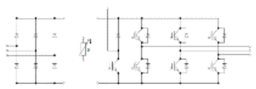
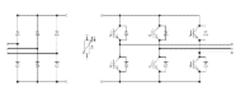
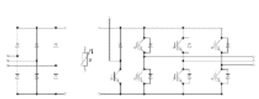
PRODUCT SELECTION GUIDE

NIETZ

IGBT Module Profile

產品型號 Device	晶片特性 chip characteristics	V_{CES} (v)	Ic @Tc=100℃	$V_{CES(sat)}$ @Tj=25 ℃ typ(V)	$E_{on}+E_{off}$ @Tj=25 ℃typ(V)	$R_{th(J-C)}$ K/W	封裝類型 Package	Outline	Configuration	拓樸電路 Circuit	應用場景 Application
PA050G120N0AJEAJ	低損快速 Low loss, fast	1200	50	2.31	9.76@Rg=15Ω	0.54	EconoPIM2		PIM with Brake		小功率工業變頻 Low Power Industrial Inverter 馬達驅動 Motor Drives 伺服驅動 Servo Drives
PB050G120N0AJE00	低損快速 Low loss, fast	1200	50	2.31	9.76@Rg=15Ω	0.54	EconoPIM2		PIM w/o Brake		小功率工業變頻 Low Power Industrial Inverter 馬達驅動 Motor Drives 伺服驅動 Servo Drives
PA75G120K0ASEAS	低損快速 Low loss, fast	1200	75	1.85	14.25@Rg=10Ω	0.48	EconoPIM3		PIM with Brake		中功率工業變頻 Medium Power Industrial Inverter 馬達驅動 Motor Drives 伺服驅動 Servo Drives
PB075G120K0ASE00	低損快速 Low loss, fast	1200	75	1.85	14.25@Rg=10Ω	0.48	EconoPIM3		PIM w/o Brake		中功率工業變頻 Medium Power Industrial Inverter 馬達驅動 Motor Drives 伺服驅動 Servo Drives
PA100G120K0AUEAS	低損快速 Low loss, fast	1200	100	2.35	18.17@Rg=6.8Ω	0.26	EconoPIM3		PIM with Brake		中功率工業變頻 Medium Power Industrial Inverter 馬達驅動 Motor Drives 伺服驅動 Servo Drives
PB100G120K0AUE00	低損快速 Low loss, fast	1200	100	2.35	18.17@Rg=6.8Ω	0.26	EconoPIM3		PIM w/o Brake		中功率工業變頻 Medium Power Industrial Inverter 馬達驅動 Motor Drives 伺服驅動 Servo Drives
PA150G120K1AUEAU	低損快速 Low loss, fast	1200	150	2.15	32.08@Rg=6.8Ω	0.25	EconoPIM3		PIM with Brake		中功率工業變頻 Medium Power Industrial Inverter 馬達驅動 Motor Drives 伺服驅動 Servo Drives

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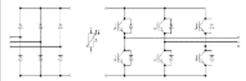
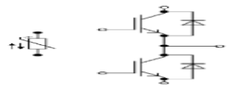
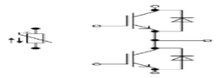
IGBT Module Profile

產品型號 Device	晶片特性 chip characteristics	V_{CES} (v)	Ic @Tc=100℃	$V_{CES(sat)}$ @Tj=25 ℃ typ(V)	$E_{on}+E_{off}$ @Tj=25 ℃typ(V)	$R_{th(J-C)}$ K/W	封裝類型 Package	Outline	Configuration	拓樸電路 Circuit	應用場景 Application
PB150G120K1AUE00	低損快速 Low loss, fast	1200	150	2.15	32.08@Rg=6.8Ω	0.25	EconoPIM3		PIM w/o Brake		中功率工業變頻 Medium Power Industrial Inverter 馬達驅動 Motor Drives 伺服驅動 Servo Drives
DA300G120M0AU000	低損快速 Low loss, fast	1200	300	2.1	32.08@Rg=10Ω	0.3	EconoDual3		Half Bridge		大功率工業變頻 High Power Industrial Inverter 馬達驅動 Motor Drives 伺服驅動 Servo Drives
DA450G120M0AU000	低損快速 Low loss, fast	1200	450	1.6	105@Rg=2Ω	0.0875	EconoDual3		Half Bridge		大功率工業變頻 High Power Industrial Inverter 馬達驅動 Motor Drives 伺服驅動 Servo Drives
DB300G120T0AU000	低損快速 Low loss, fast	1200	300	1.9	@Rg=5.5 Ω	0.093	62mm		Half Bridge		大功率工業變頻 High Power Industrial

PA050G120N0AJEAJ

1200V50A EconoPIM2 IGBT Module

IGBT, Inverter

Maximum Rated Values

Collector-emitter voltage	T_{vj} = 25°C	V_{CES}	1200	V
Continuous DC collector current	T_C = 100°C, T_{vj} max = 150°C	$I_{C\ nom}$	50	A
Repetitive peak collector current	t_P = 1 ms	I_{CRM}	100	A
Total power dissipation	T_C = 25°C, T_{vj} max = 150	P_{tot}	210	W
Gate-emitter peak voltage		V_{GES}	+/- 20	V

Characteristic value

				min.	typ.	max.	
Collector-emitter saturation voltage	I_C = 50 A, V_{GE} = 15 V	T_{vj} = 25°C	$V_{CE,sat}$	1.7	2.1	2.3	V
	I_C = 50 A, V_{GE} = 15 V	T_{vj} = 125°C					V
	I_C = 50 A, V_{GE} = 15 V	T_{vj} = 150°C			2.6		V
Gate threshold voltage	I_C = 1mA, V_{CE} = V_{GE}, T_{vj} = 25°C		$V_{GE,th}$	5.3	6.0	6.3	V
Gate charge	V_{GE} = -15 V ... +15 V		Q_G		0.44		µC
Internal gate resistor	T_{vj} = 25°C		R_{Gint}				Ω
Input capacitance	f=1MHz, T_{vj}=25°C, V_{CE}=25V, V_{GE}=0V		C_{ies}				nF
Reverse transfer capacitance	f=1MHz, T_{vj}=25°C, V_{CE}=25V, V_{GE}=0V		C_{res}				nF
Collector-emitter cut-off current	V_{CE} = 1200 V, V_{GE} = 0 V, T_{vj} = 25°C		I_{CES}			1	mA
Gate-emitter leakage current	V_{CE} = 0 V, V_{GE} = 20 V, T_{vj} = 25°C		I_{GES}			100	nA
Turn-on delay time, inductive load	I_C = 50A, V_{CE} = 600V	T_{vj} = 25°C	$T_{d,on}$		0.32		us
	V_{GE} = +15/-15V	T_{vj} = 125°C					us
	$R_{G,on}$ = 15Ω	T_{vj} = 150°C					us
Rise time, inductive load	I_C = 50A, V_{CE} = 600V	T_{vj} = 25°C	T_r		0.08		us
	V_{GE} = +15/-15V	T_{vj} = 125°C					us
	$R_{G,on}$ = 15Ω	T_{vj} = 150°C					us
Turn-off delay time, inductive load	I_C = 50A, V_{CE} = 600V	T_{vj} = 25°C	$T_{d,off}$		0.20		us
	V_{GE} = +15/-15V	T_{vj} = 125°C					us
	R_{Goff} = 15Ω	T_{vj} = 150°C					us
Fall time, inductive load	I_C = 50A, V_{CE} = 600V	T_{vj} = 25°C	T_f		0.28		us
	V_{GE} = +15/-15V	T_{vj} = 125°C					us
	R_{Goff} = 15Ω	T_{vj} = 150°C					us
Turn-on energy loss per pulse	I_C =50A, V_{CE} = 600V, L_S =20 nH	T_{vj} = 25°C	E_{on}		4.5		mJ
	V_{GE} = +15/-15V, di/dt =570A/µs	T_{vj} = 125°C					mJ
	R_{Gon} = 15Ω	T_{vj} = 150°C					mJ
Turn-off energy loss per pulse	I_C = 50A, V_{CE} = 600V, L_S = 20nH	T_{vj} = 25°C	E_{off}		3.2		mJ
	V_{GE} =+15/-15V, dv/dt =5400V/µs	T_{vj} = 125°C					mJ
	R_{Goff} = 15Ω	T_{vj} = 150°C					mJ
SC data	V_{GE} ≤15V, V_{CC} =600 V, t_P ≤ 8 µs, T_{vj} = 25°C , R_G =10Ω , C_{GE} = 0.0uF , V_{CEmax} = V_{CES} -L_{sCE} ·di/dt		I_{SC}		340		A

Thermal resistance, junction to case	per IGBT, grease = 1.3 W/(m·K)	$R_{th,JC}$			0.589	K/W

Diode, Inverter

Maximum Rated Values

Repetitive peak reverse voltage	T_{vj} = 25°C	V_{RRM}	1200	V
Continuous DC forward current		I_F	50	A
Repetitive peak forward current	t_P = 1 ms	I_{FRM}	100	A

Characteristic value

				min.	typ.	max.	
Forward voltage	I_F = 50 A, V_{GE} = 0 V	T_{vj} = 25°C	V_F	2.0	2.4	2.5	V
	I_F = 50 A, V_{GE} = 0 V	T_{vj} = 125°C					V
	I_F = 50 A, V_{GE} = 0 V	T_{vj} = 150°C			1.8		V
Peak reverse recovery current	I_F = 50A, V_R = 600V	T_{vj} = 25°C	I_{RM}		50		A
	V_{GE} = -15V	T_{vj} = 125°C					
		T_{vj} = 150°C					
Recovered charge	I_F = 50A, V_R = 600V	T_{vj} = 25°C	Q_r		5.5		μC
	V_{GE} = -15V	T_{vj} = 125°C					
		T_{vj} = 150°C					
Reverse recovery energy	I_F = 50A, V_R = 600V	T_{vj} = 25°C	E_{rec}		1.5		mJ
	V_{GE} = -15V	T_{vj} = 125°C					
		T_{vj} = 150°C					
Thermal resistance, junction to case	Per diode, grease = 1.3 W/(m·K)		$R_{th,JC}$			0.69	K/W

Diode, Rectifier

Maximum Rated Values

Repetitive peak reverse voltage	T_{vj} = 25°C	V_{RRM}	1600	V
Average Rectified Output current	V_F = 1.2, T_{vj} = 150°C	I_F	50	A
Surge forward current	t_p = 10 ms, Tvj = 150°C	I_{FSM}	320	A
I^2t - value	t_p = 10 ms, Tvj = 150°C	I^2t	510	A^2s

Characteristic value

			min.	typ.	max.	
Forward voltage	T_{vj} = 150°C, I_F = 50 A	V_F		1.2		V
Reverse current	T_{vj} = 150°C, V_R = 1600 V	I_R		1		mA
Thermal resistance, junction to case	per Diode	R_{thJC}			0.74	K/W
Thermal resistance, junction to heatsink	per Diode, λ grease = 1.3 W/(m·K)	R_{thJH}				K/W

IGBT, Brake-Chopper

Maximum Rated Values

Collector-emitter voltage	T_{vj} = 25°C	V_{CES}	1200	V
Continuous DC collector current	T_C = 100°C, T_{vj} max = 150°C	$I_{C\ nom}$	50	A
Repetitive peak collector current	t_P = 1 ms	I_{CRM}	100	A
Total power dissipation	T_C = 25°C, T_{vj} max = 150	P_{tot}	210	W
Gate-emitter peak voltage		V_{GES}	+/- 20	V

Characteristic value

				min.	typ.	max.	
Collector-emitter saturation voltage	I_C = 50 A, V_{GE} = 15 V	T_{vj} = 25°C	$V_{CE,sat}$	1.7	2.1	2.3	V
	I_C = 50 A, V_{GE} = 15 V	T_{vj} = 125°C					V
	I_C = 50 A, V_{GE} = 15 V	T_{vj} = 150°C			2.6		V
Gate threshold voltage	I_C = 1mA, V_{CE} = V_{GE}, T_{vj} = 25°C		$V_{GE,th}$	5.3	6.0	6.3	V
Gate charge	V_{GE} = -15 V ... +15 V		Q_G		0.44		μC
Internal gate resistor	T_{vj} = 25°C		R_{Gint}				Ω
Input capacitance	f=1MHz, T_{vj}=25°C,V_{CE}=25V, V_{GE}=0V		C_{ies}				nF
Reverse transfer capacitance	f=1MHz, T_{vj}=25°C,V_{CE}=25V, V_{GE}=0V		C_{res}				nF
Collector-emitter cut-off current	V_{CE} = 1200 V, V_{GE} = 0 V, T_{vj} = 25°C		I_{CES}			1	mA
Gate-emitter leakage current	V_{CE} = 0 V, V_{GE} = 20 V, T_{vj} = 25°C		I_{GES}			100	nA
Turn-on delay time, inductive load	I_C = 50A, V_{CE} = 600V	T_{vj} = 25°C	$T_{d,on}$		0.32		us
	V_{GE} = +15/-15V	T_{vj} = 125°C					us
	$R_{G,on}$ = 15Ω	T_{vj} = 150°C					us
Rise time, inductive load	I_C = 50A, V_{CE} = 600V	T_{vj} = 25°C	T_r		0.08		us
	V_{GE} = +15/-15V	T_{vj} = 125°C					us
	$R_{G,on}$ = 15Ω	T_{vj} = 150°C					us
Turn-off delay time, inductive load	I_C = 50A, V_{CE} = 600V	T_{vj} = 25°C	$T_{d,off}$		0.20		us
	V_{GE} = +15/-15V	T_{vj} = 125°C					us
	R_{Goff} = 15Ω	T_{vj} = 150°C					us
Fall time, inductive load	I_C = 50A, V_{CE} = 600V	T_{vj} = 25°C	T_f		0.28		us
	V_{GE} = +15/-15V	T_{vj} = 125°C					us
	R_{Goff} = 15Ω	T_{vj} = 150°C					us
Turn-on energy loss per pulse	I_C =50A, V_{CE} = 600V, L_S =20 nH	T_{vj} = 25°C	E_{on}		4.5		mJ
	V_{GE} = +15/-15V, di/dt =570A/μs	T_{vj} = 125°C					mJ
	R_{Gon} = 15Ω	T_{vj} = 150°C					mJ
Turn-off energy loss per pulse	I_C = 50A, V_{CE} = 600V, L_S = 20nH	T_{vj} = 25°C	E_{off}		3.2		mJ
	V_{GE} =+15/-15V, dv/dt =5400V/μs	T_{vj} = 125°C					mJ
	R_{Goff} = 15Ω	T_{vj} = 150°C					mJ
SC data	V_{GE} ≤15V, V_{CC} =600 V, t_P ≤ 8 μs, T_{vj} = 25°C , R_G =10Ω , C_{GE} = 0.0uF , V_{CEmax} = V_{CES} -L_{sCE} ·di/dt		I_{SC}		340		A

Thermal resistance, junction to case	per IGBT, grease = 1.3 W/(m·K)	$R_{th,JC}$			0.589	K/W

Diode, Brake-Chopper

Maximum Rated Values

Repetitive peak reverse voltage	T_{vj} = 25°C	V_{RRM}	1200	V
Continuous DC forward current		I_F	50	A
Repetitive peak forward current	t_P = 1 ms	I_{FRM}	100	A

Characteristic value

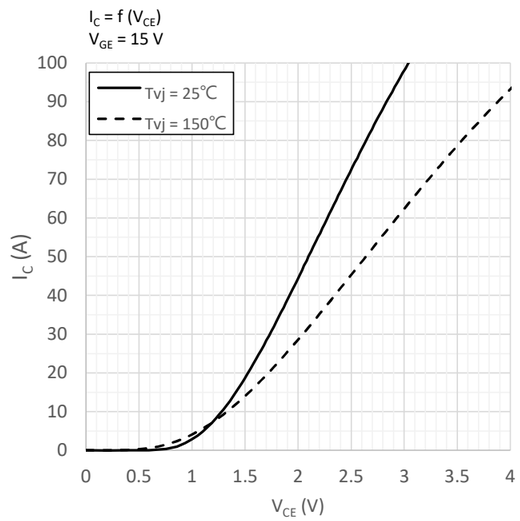
				min.	typ.	max.	
Forward voltage	I_F = 50 A, V_{GE} = 0 V	T_{vj} = 25°C	V_F	2	2.4	2.5	V
	I_F = 50 A, V_{GE} = 0 V	T_{vj} = 125°C					V
	I_F = 50 A, V_{GE} = 0 V	T_{vj} = 150°C			1.8		V
Peak reverse recovery current	I_F = 50A, V_R = 600V	T_{vj} = 25°C	I_{RM}		50		A
	V_{GE} = -15V	T_{vj} = 125°C					
		T_{vj} = 150°C					
Recovered charge	I_F = 50A, V_R = 600V	T_{vj} = 25°C	Q_r		5.5		μC
	V_{GE} = -15V	T_{vj} = 125°C					
		T_{vj} = 150°C					
Reverse recovery energy	I_F = 50A, V_R = 600V	T_{vj} = 25°C	E_{rec}		1.5		mJ
	V_{GE} = -15V	T_{vj} = 125°C					
		T_{vj} = 150°C					
Thermal resistance, junction to case	Per diode, grease = 1.3 W/(m·K)		$R_{th,JC}$			0.69	K/W

NTC-Thermistor

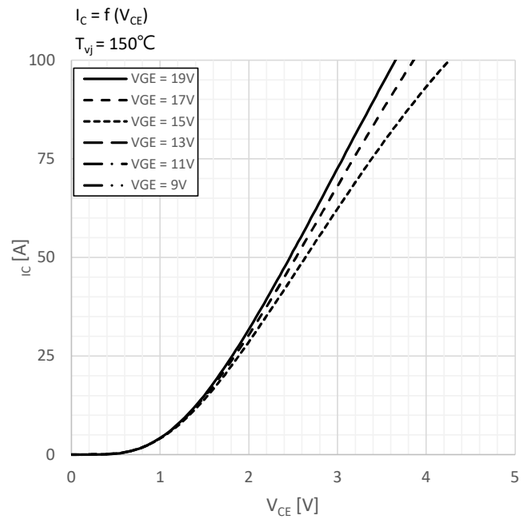
Characteristic value

			min.	typ.	max.	
Rated resistance	Tc = 25°C	R_{25}		5.07		KΩ
Power dissipation	Tc = 25°C	P_{25}			240	mW
B-value	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298, 15K))]$	B_{25}/B_{50}		3412.7		K
B-value	$R_2=R_{25}\exp[B_{25/75}(1/T_2-1/(298, 15K))]$	B_{25}/B_{75}		3454.8		K
B-value	$R_2=R_{25}\exp[B_{25/100}(1/T_2-1/(298, 15K))]$	B_{25}/B_{100}		3442.2		K

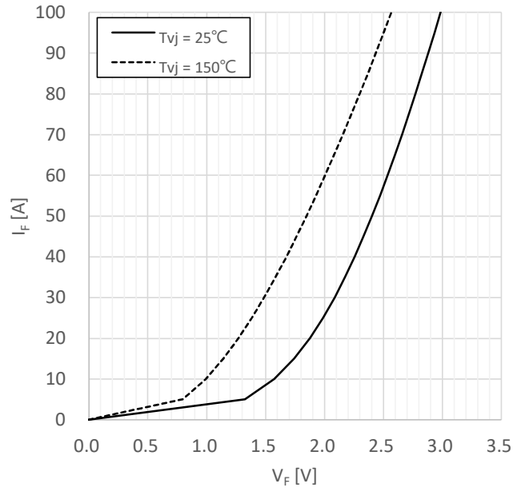
Output characteristic IGBT, Inverter (typical)



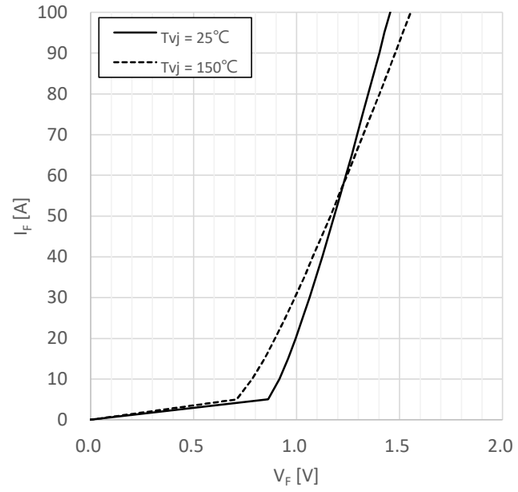
Output characteristic IGBT, Inverter (typical)



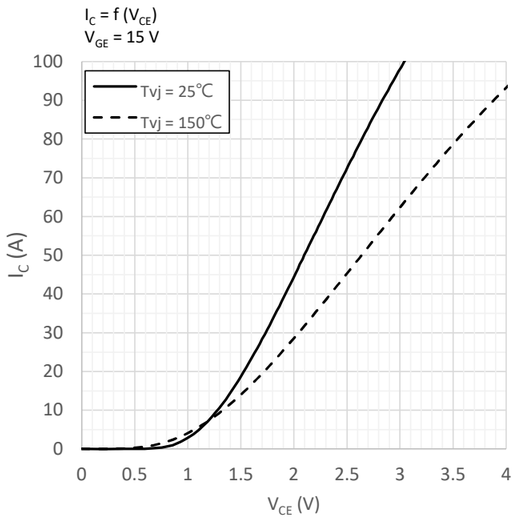
Forward characteristic of Diode, Inverter (typical)
$I_F = f(V_F)$



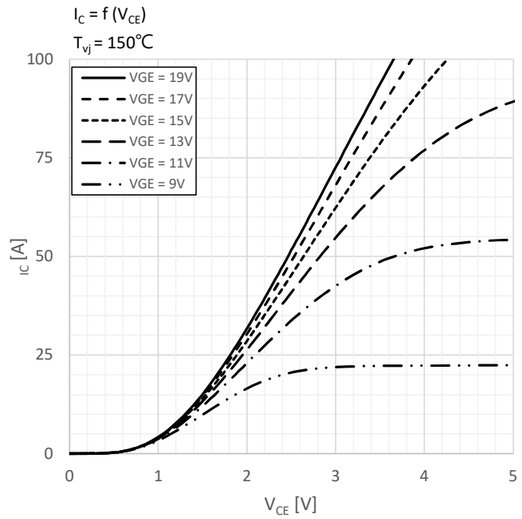
Forward characteristic of Diode, Rectifier (typical)
$I_F = f(V_F)$



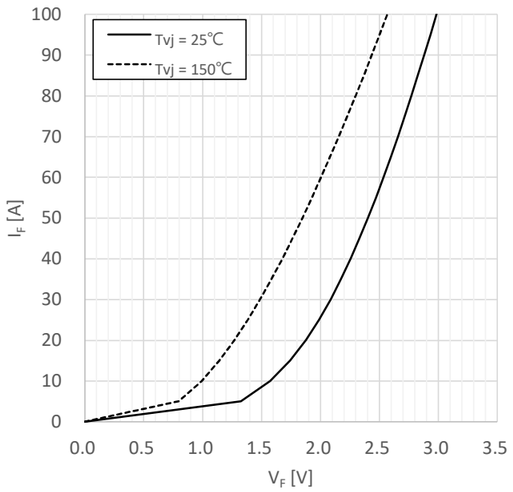
Output characteristic IGBT, Brake-Chopper (typical)



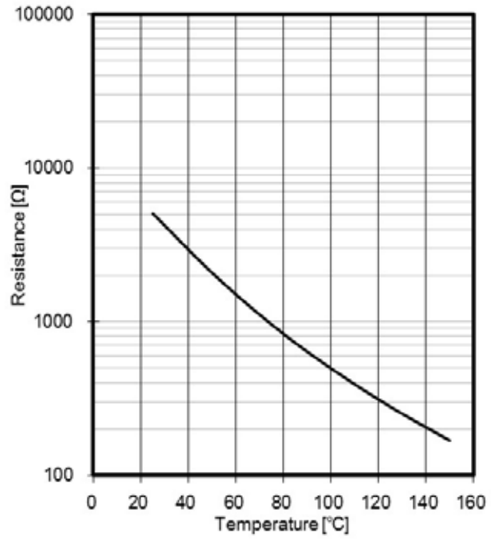
Output characteristic IGBT, Brake-Chopper (typical)



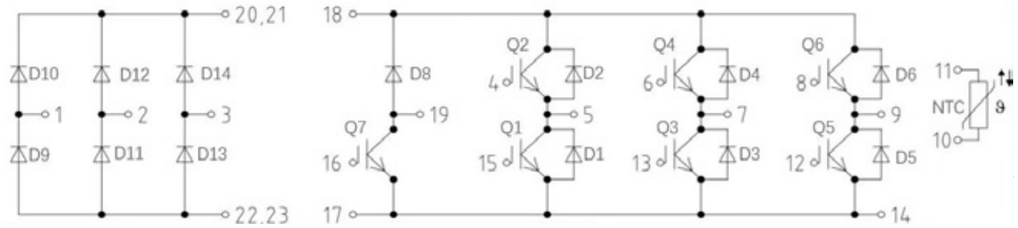
Forward characteristic of Diode, Brake-Chopper (typical)
$I_F = f(V_F)$



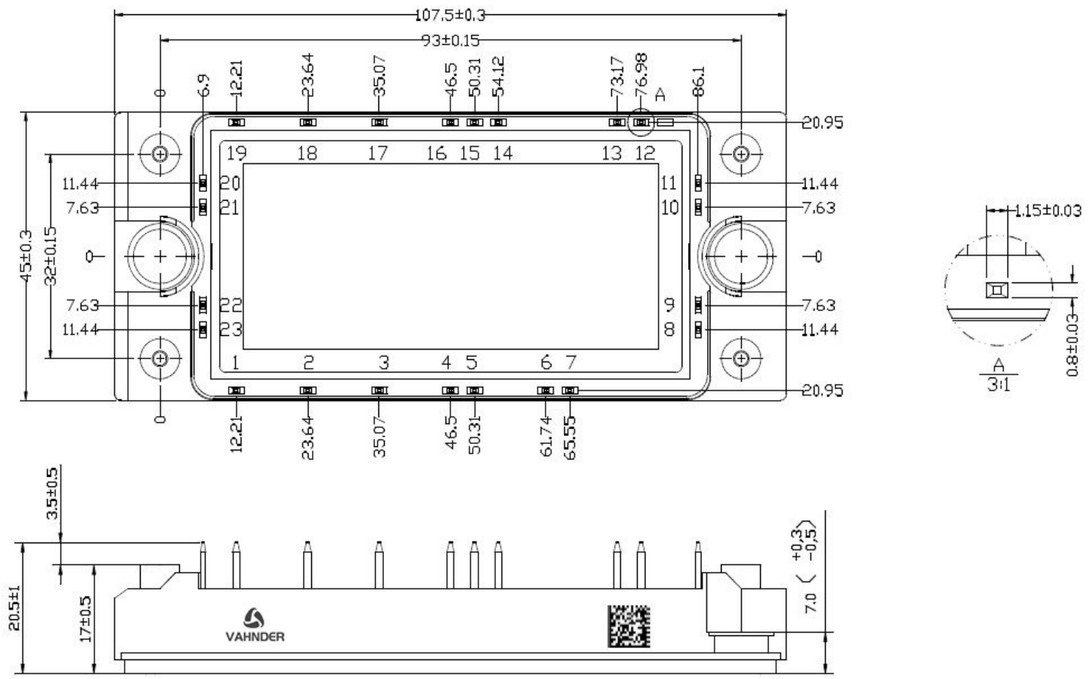
NTC-Thermistor-temperature characteristic (typical) R=f(T)



Circuit Diagram



Package outlines



PB050G120N0AJE00

1200V50A EconoPIM2 IGBT Module

IGBT, Inverter

Maximum Rated Values

Collector-emitter voltage	T_{vj} = 25°C	V_{CES}	1200	V
Continuous DC collector current	T_C = 100°C, T_{vj} max = 150°C	$I_{C\ nom}$	50	A
Repetitive peak collector current	t_P = 1 ms	I_{CRM}	100	A
Total power dissipation	T_C = 25°C, T_{vj} max = 150	P_{tot}	210	W
Gate-emitter peak voltage		V_{GES}	+/- 20	V

Characteristic value

				min.	typ.	max.	
Collector-emitter saturation voltage	I_C = 50 A, V_{GE} = 15 V	T_{vj} = 25°C	$V_{CE,sat}$	1.7	2.1	2.3	V
	I_C = 50 A, V_{GE} = 15 V	T_{vj} = 125°C					V
	I_C = 50 A, V_{GE} = 15 V	T_{vj} = 150°C			2.6		V
Gate threshold voltage	I_C = 1mA, V_{CE} = V_{GE}, T_{vj} = 25°C		$V_{GE,th}$	5.3	6.0	6.3	V
Gate charge	V_{GE} = -15 V ... +15 V		Q_G		0.44		µC
Internal gate resistor	T_{vj} = 25°C		R_{Gint}				Ω
Input capacitance	f=1MHz, T_{vj}=25°C, V_{CE}=25V, V_{GE}=0V		C_{ies}				nF
Reverse transfer capacitance	f=1MHz, T_{vj}=25°C, V_{CE}=25V, V_{GE}=0V		C_{res}				nF
Collector-emitter cut-off current	V_{CE} = 1200 V, V_{GE} = 0 V, T_{vj} = 25°C		I_{CES}			1	mA
Gate-emitter leakage current	V_{CE} = 0 V, V_{GE} = 20 V, T_{vj} = 25°C		I_{GES}			100	nA
Turn-on delay time, inductive load	I_C = 50A, V_{CE} = 600V	T_{vj} = 25°C	$T_{d,on}$		0.32		us
	V_{GE} = +15/-15V	T_{vj} = 125°C					us
	$R_{G,on}$ = 15Ω	T_{vj} = 150°C					us
Rise time, inductive load	I_C = 50A, V_{CE} = 600V	T_{vj} = 25°C	T_r		0.08		us
	V_{GE} = +15/-15V	T_{vj} = 125°C					us
	$R_{G,on}$ = 15Ω	T_{vj} = 150°C					us
Turn-off delay time, inductive load	I_C = 50A, V_{CE} = 600V	T_{vj} = 25°C	$T_{d,off}$		0.20		us
	V_{GE} = +15/-15V	T_{vj} = 125°C					us
	R_{Goff} = 15Ω	T_{vj} = 150°C					us
Fall time, inductive load	I_C = 50A, V_{CE} = 600V	T_{vj} = 25°C	T_f		0.28		us
	V_{GE} = +15/-15V	T_{vj} = 125°C					us
	R_{Goff} = 15Ω	T_{vj} = 150°C					us
Turn-on energy loss per pulse	I_C =50A, V_{CE} = 600V, L_S =20 nH	T_{vj} = 25°C	E_{on}		4.5		mJ
	V_{GE} = +15/-15V, di/dt =570A/µs	T_{vj} = 125°C					mJ
	R_{Gon} = 15Ω	T_{vj} = 150°C					mJ
Turn-off energy loss per pulse	I_C = 50A, V_{CE} = 600V, L_S = 20nH	T_{vj} = 25°C	E_{off}		3.2		mJ
	V_{GE} =+15/-15V, dv/dt =5400V/µs	T_{vj} = 125°C					mJ
	R_{Goff} = 15Ω	T_{vj} = 150°C					mJ
SC data	V_{GE} ≤15V, V_{CC} =600 V, t_P ≤ 8 µs, T_{vj} = 25°C , R_G =10Ω , C_{GE} = 0.0uF , V_{CEmax} = V_{CES} -L_{sCE} ·di/dt		I_{SC}		340		A

Thermal resistance, junction to case	per IGBT, grease = 1.3 W/(m·K)	$R_{th,JC}$			0.589	K/W

Diode, Inverter

Maximum Rated Values

Repetitive peak reverse voltage	T_{vj} = 25°C	V_{RRM}	1200	V
Continuous DC forward current		I_F	50	A
Repetitive peak forward current	t_P = 1 ms	I_{FRM}	100	A

Characteristic value

				min.	typ.	max.	
Forward voltage	I_F = 50 A, V_{GE} = 0 V	T_{vj} = 25°C	V_F	2.0	2.4	2.5	V
	I_F = 50 A, V_{GE} = 0 V	T_{vj} = 125°C					V
	I_F = 50 A, V_{GE} = 0 V	T_{vj} = 150°C			1.8		V
Peak reverse recovery current	I_F = 50A, V_R = 600V	T_{vj} = 25°C	I_{RM}		50		A
	V_{GE} = -15V	T_{vj} = 125°C					
		T_{vj} = 150°C					
Recovered charge	I_F = 50A, V_R = 600V	T_{vj} = 25°C	Q_r		5.5		μC
	V_{GE} = -15V	T_{vj} = 125°C					
		T_{vj} = 150°C					
Reverse recovery energy	I_F = 50A, V_R = 600V	T_{vj} = 25°C	E_{rec}		1.5		mJ
	V_{GE} = -15V	T_{vj} = 125°C					
		T_{vj} = 150°C					
Thermal resistance, junction to case	Per diode, grease = 1.3 W/(m·K)		$R_{th,JC}$			0.69	K/W

Diode, Rectifier

Maximum Rated Values

Repetitive peak reverse voltage	T_{vj} = 25°C	V_{RRM}	1600	V
Average Rectified Output current	V_F = 1.2, T_{vj} = 150°C	I_F	50	A
Surge forward current	t_p = 10 ms, Tvj = 150°C	I_{FSM}	320	A
I^2t - value	t_p = 10 ms, Tvj = 150°C	I^2t	510	A^2s

Characteristic value

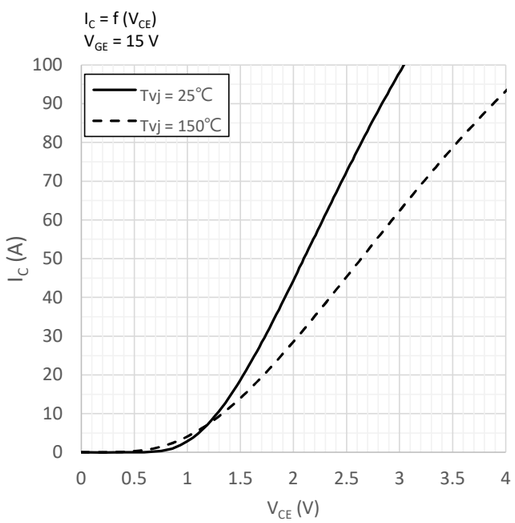
			min.	typ.	max.	
Forward voltage	T_{vj} = 150°C, I_F = 50 A	V_F		1.2		V
Reverse current	T_{vj} = 150°C, V_R = 1600 V	I_R		1		mA
Thermal resistance, junction to case	per Diode	R_{thJC}			0.74	K/W
Thermal resistance, junction to heatsink	per Diode, λ grease = 1.3 W/(m·K)	R_{thJH}				K/W

NTC-Thermistor

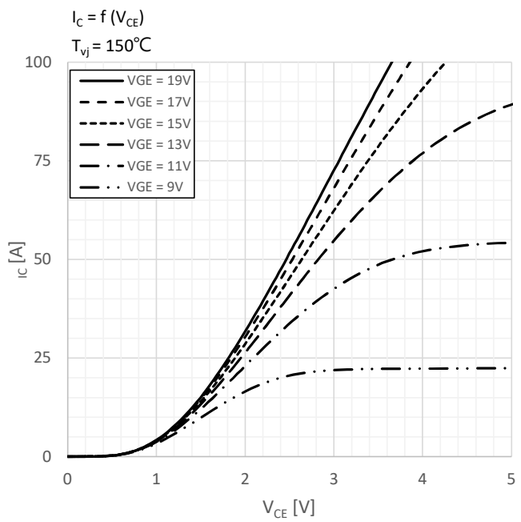
Characteristic value

			min.	typ.	max.	
Rated resistance	Tc = 25°C	R_{25}		5.07		KΩ
Power dissipation	Tc = 25°C	P_{25}			240	mW
B-value	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298, 15K))]$	B_{25}/B_{50}		3412.7		K
B-value	$R_2=R_{25}\exp[B_{25/75}(1/T_2-1/(298, 15K))]$	B_{25}/B_{75}		3454.8		K
B-value	$R_2=R_{25}\exp[B_{25/100}(1/T_2-1/(298, 15K))]$	B_{25}/B_{100}		3442.2		K

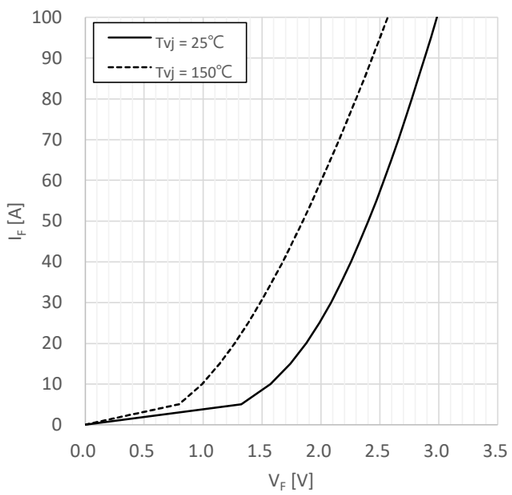
Output characteristic IGBT, Inverter (typical)



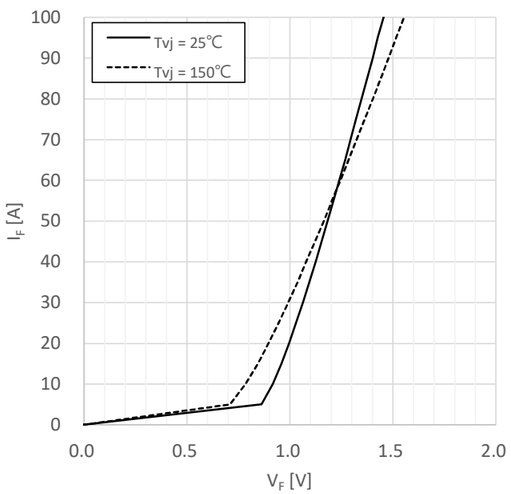
Output characteristic IGBT, Inverter (typical)



Forward characteristic of Diode, Inverter (typical)
$I_F = f(V_F)$



Forward characteristic of Diode, Rectifier (typical)
$I_F = f(V_F)$



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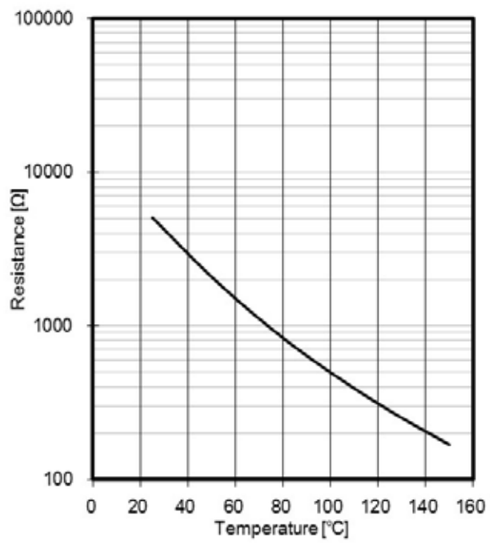
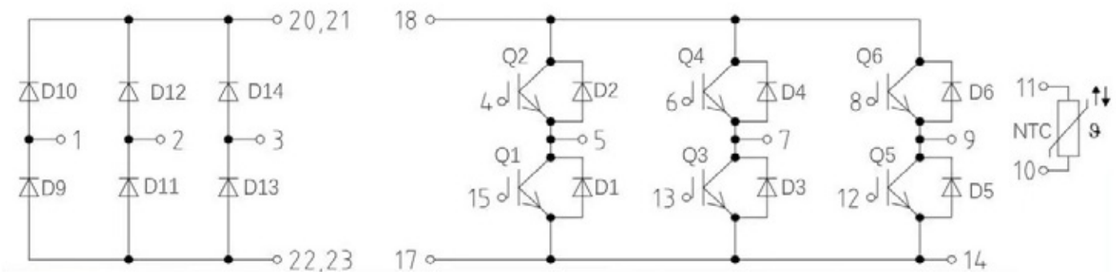
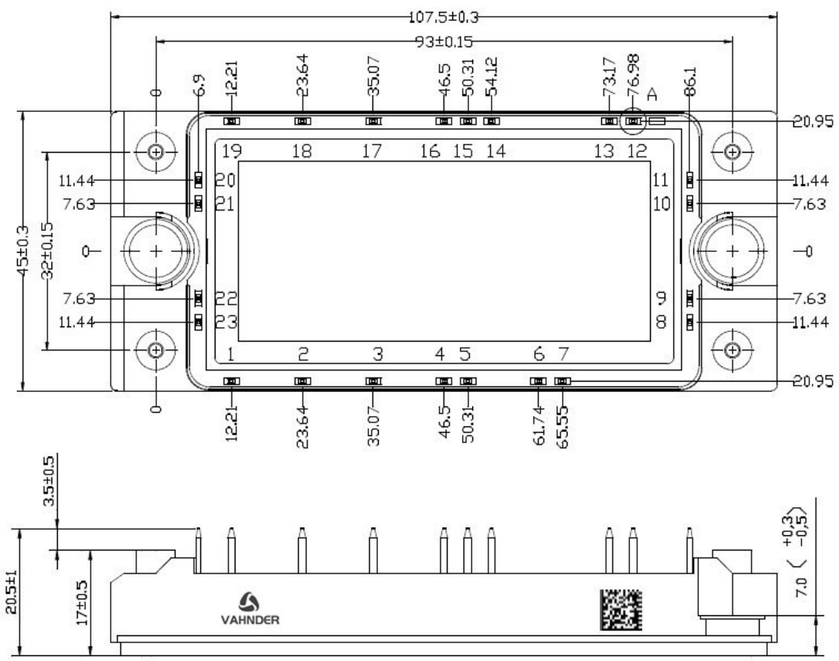
NTC-Thermistor-temperature characteristic (typical) R=f(T)

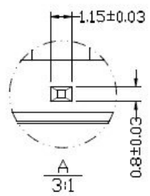


Circuit Diagram



Package outlines





IGBT, Brake-Chopper

Maximum Rated Values

Collector-emitter voltage	T_{vj} = 25°C	V_{CES}	1200	V
Continuous DC collector current	T_C = 100°C, T_{vj} max = 150°C	$I_{C\ nom}$	50	A
Repetitive peak collector current	t_P = 1 ms	I_{CRM}	100	A
Total power dissipation	T_C = 25°C, T_{vj} max = 150	P_{tot}	235	W
Gate-emitter peak voltage		V_{GES}	+/- 20	V

Characteristic value

				min.	typ.	max.	
Collector-emitter saturation voltage	I_C = 50 A, V_{GE} = 15 V	T_{vj} = 25°C	$V_{CE,sat}$		2.10		V
	I_C = 50 A, V_{GE} = 15 V	T_{vj} = 125°C			2.52		V
	I_C = 50 A, V_{GE} = 15 V	T_{vj} = 150°C			2.64		V
Gate threshold voltage	I_C = 1mA, V_{CE} = V_{GE}, T_{vj} = 25°C		$V_{GE,th}$	5.3	5.8	6.3	V
Gate charge	V_{GE} = -15 V ... +15 V		Q_G		0.47		µC
Internal gate resistor	T_{vj} = 25°C		R_{Gint}		2.2		Ω
Input capacitance	f=1MHz, T_{vj}=25°C,V_{CE}=25V, V_{GE}=0V		C_{ies}		0.62		nF
Reverse transfer capacitance	f=1MHz, T_{vj}=25°C,V_{CE}=25V, V_{GE}=0V		C_{res}		0.08		nF
Collector-emitter cut-off current	V_{CE} = 1200 V, V_{GE} = 0 V, T_{vj} = 25°C		I_{CES}			1	mA
Gate-emitter leakage current	V_{CE} = 0 V, V_{GE} = 20 V, T_{vj} = 25°C		I_{GES}			100	nA
Turn-on delay time, inductive load	I_C = 50A, V_{CE} = 600V	T_{vj} = 25°C	$T_{d,on}$		0.11		us
	V_{GE} = +15/-15V	T_{vj} = 125°C			0.12		us
	$R_{G,on}$ = 15Ω	T_{vj} = 150°C			0.12		us
Rise time, inductive load	I_C = 50A, V_{CE} = 600V	T_{vj} = 25°C	T_r		0.04		us
	V_{GE} = +15/-15V	T_{vj} = 125°C			0.05		us
	$R_{G,on}$ = 15Ω	T_{vj} = 150°C			0.05		us
Turn-off delay time, inductive load	I_C = 50A, V_{CE} = 600V	T_{vj} = 25°C	$T_{d,off}$		0.20		us
	V_{GE} = +15/-15V	T_{vj} = 125°C			0.22		us
	R_{Goff} = 15Ω	T_{vj} = 150°C			0.26		us
Fall time, inductive load	I_C = 50A, V_{CE} = 600V	T_{vj} = 25°C	T_f		0.15		us
	V_{GE} = +15/-15V	T_{vj} = 125°C			0.32		us
	R_{Goff} = 15Ω	T_{vj} = 150°C			0.36		us
Turn-on energy loss per pulse	I_C =50A, V_{CE} = 600V, L_S =20 nH	T_{vj} = 25°C	E_{on}		6.38		mJ
	V_{GE} = +15/-15V,	T_{vj} = 125°C			8.86		mJ
	R_{Gon} = 15Ω	T_{vj} = 150°C			11.28		mJ
Turn-off energy loss per pulse	I_C = 50A, V_{CE} = 600V, L_S = 20nH	T_{vj} = 25°C	E_{off}		3.89		mJ
	V_{GE} =+15/-15V,	T_{vj} = 125°C			4.68		mJ
	R_{Goff} = 15Ω	T_{vj} = 150°C			6.18		mJ
SC data	V_{GE} ≤15V, V_{CC} =600 V, t_P ≤ 8 µs, T_{vj} = 150°C , R_G =10Ω , C_{GE} = 0.0uF , V_{CEmax} = V_{CES} -L_{sCE} ·di/dt		I_{SC}		200		A

Thermal resistance, junction to case	Per IGBT	$R_{th,JC}$			0.53	K/W

Diode, Brake-Chopper

Maximum Rated Values

Repetitive peak reverse voltage	T_{vj} = 25°C	V_{RRM}	1200	V
Continuous DC forward current		I_F	50	A
Repetitive peak forward current	t_P = 1 ms	I_{FRM}	100	A

Characteristic value

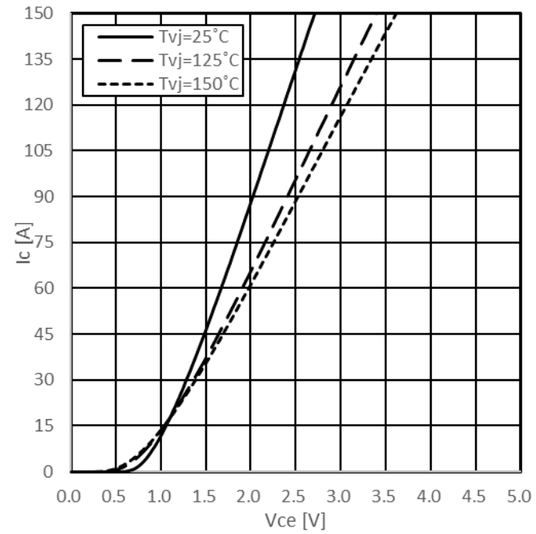
				min.	typ.	max.	
Forward voltage	I_F = 50 A, V_{GE} = 0 V	T_{vj} = 25°C	V_F		1.42		V
	I_F = 50 A, V_{GE} = 0 V	T_{vj} = 125°C			1.45		V
	I_F = 50 A, V_{GE} = 0 V	T_{vj} = 150°C			1.43		V
Peak reverse recovery current	I_F = 50A, V_R = 600V	T_{vj} = 25°C	I_{RM}		38.6		A
	V_{GE} = -15V	T_{vj} = 125°C			41.1		
		T_{vj} = 150°C			41.9		
Recovered charge	I_F = 50A, V_R = 600V	T_{vj} = 25°C	Q_r		7.46		μC
	V_{GE} = -15V	T_{vj} = 125°C			12.9		
		T_{vj} = 150°C			14.5		
Reverse recovery energy	I_F = 50A, V_R = 600V	T_{vj} = 25°C	E_{rec}		2.09		mJ
	V_{GE} = -15V	T_{vj} = 125°C			4.30		
		T_{vj} = 150°C			4.31		
Thermal resistance, junction to case	Per diode		$R_{th,JC}$			0.69	K/W

NTC-Thermistor

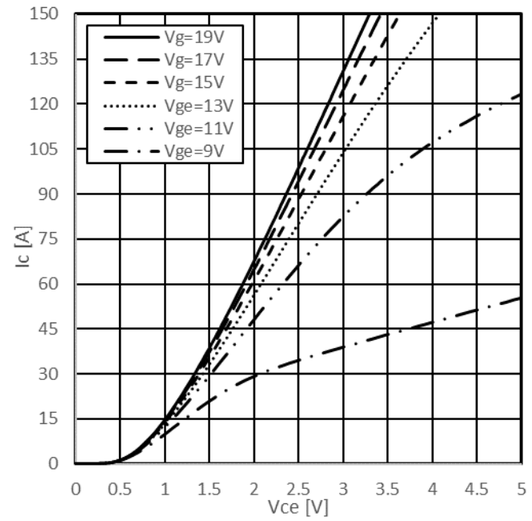
Characteristic value

			min.	typ.	max.	
Rated resistance	Tc = 25°C	R_{25}		5.07		KΩ
Power dissipation	Tc = 25°C	P_{25}			240	mW
B-value	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298, 15K))]$	B_{25}/B_{50}		3412.7		K
B-value	$R_2=R_{25}\exp[B_{25/75}(1/T_2-1/(298, 15K))]$	B_{25}/B_{75}		3454.8		K
B-value	$R_2=R_{25}\exp[B_{25/100}(1/T_2-1/(298, 15K))]$	B_{25}/B_{100}		3442.2		K

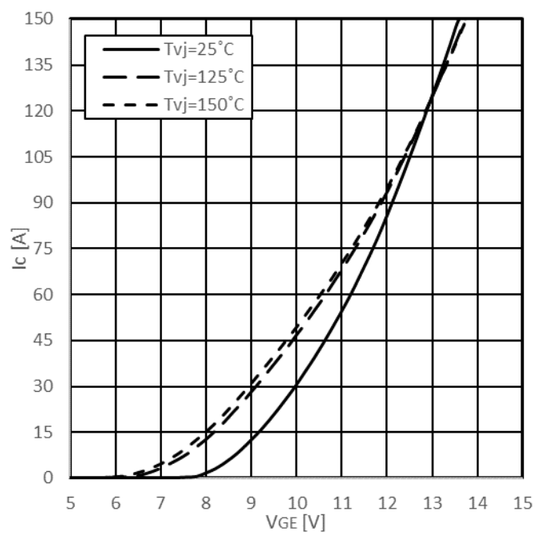
Output characteristic IGBT, Inverter (typical)
Ic=f(VCE)
VGE=15V



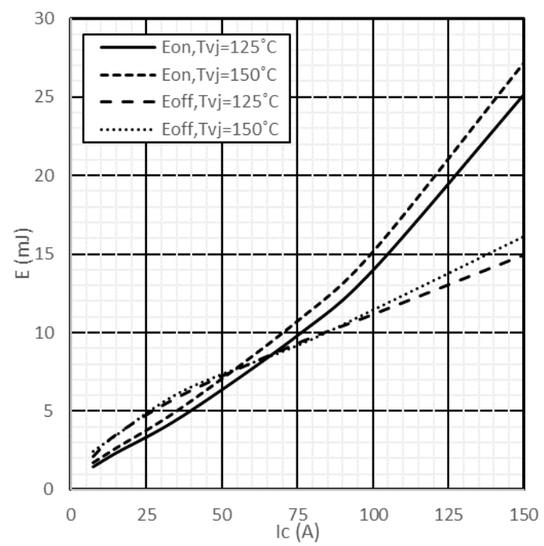
Output characteristic IGBT, Inverter (typical)
Ic=f(VCE)
Tvj=150˚C



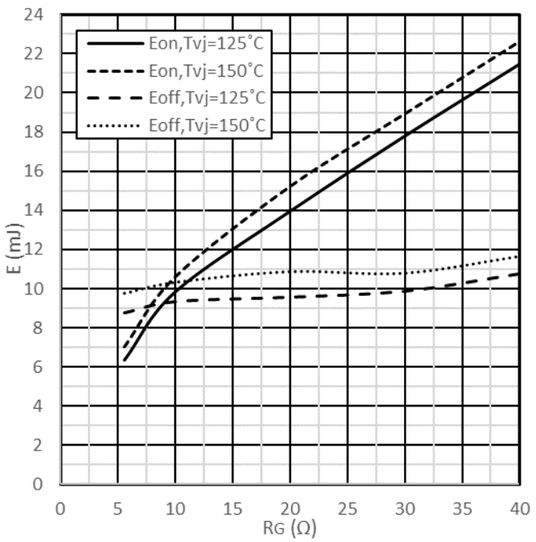
Transfer characteristic IGBT,Inverter (typical)
Ic=f(VGE)
VCE=20V



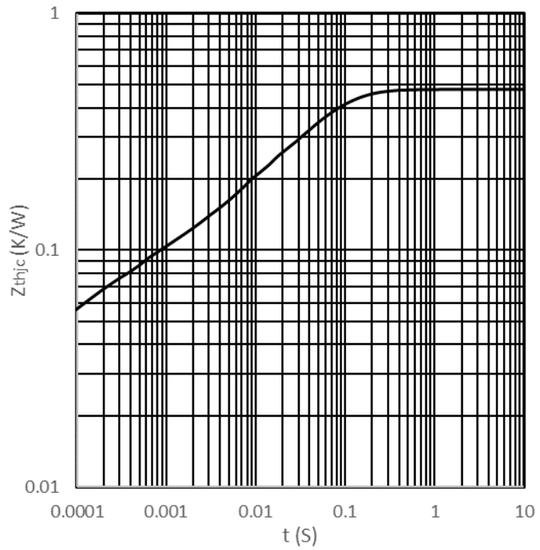
Switching losses IGBT,Inverter (typical)
Eon = f (IC), Eoff = f (IC)
VGE = ±15 V, RGon = 10Ω, RGoff = 10Ω, VCE = 600 V



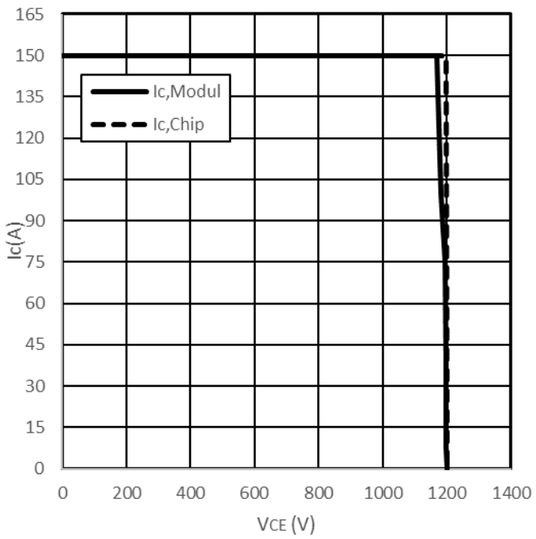
Switching losses IGBT,Inverter (typical)
Eon = f (R_G), Eoff = f (R_G)
V_{GE} = ±15 V, Ic=75A, V_{CE} = 600 V



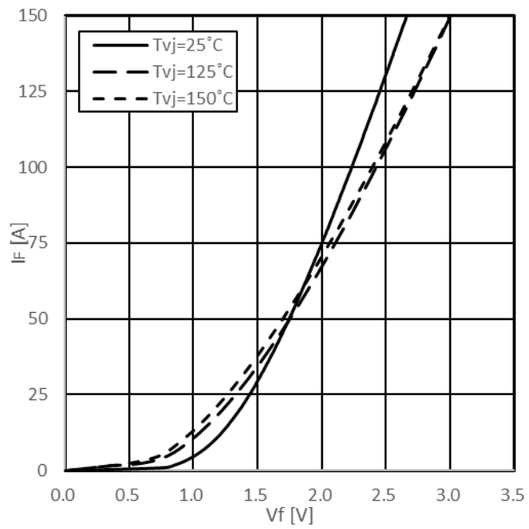
Transient thermal impedance IGBT,Inverter
Z_{thJC} = f (t)



Reverse bias safe operating area IGBT,Inverter (RBSOA)
I_C = f (V_{CE})
V_{GE} = ±15 V, R_{Goff} =10Ω, T_{vj} = 150°C



Forward characteristic of Diode, Inverter (typical)
I_F = f (V_F)



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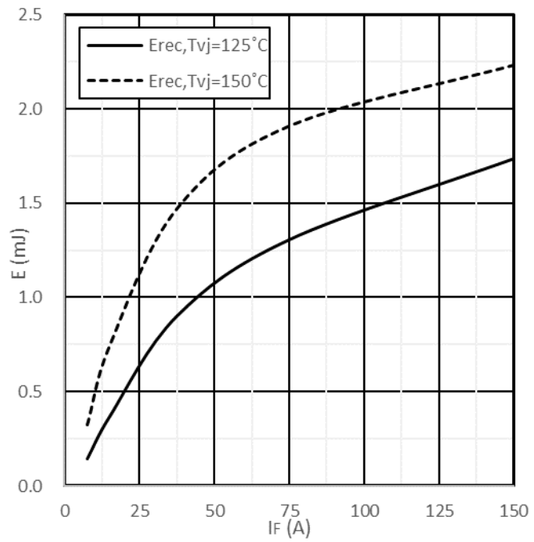
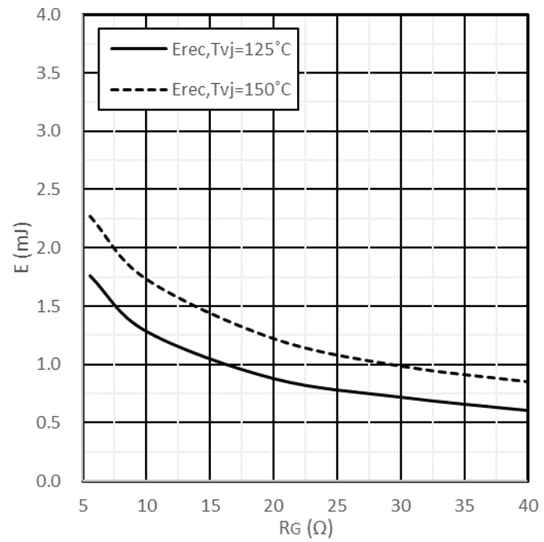
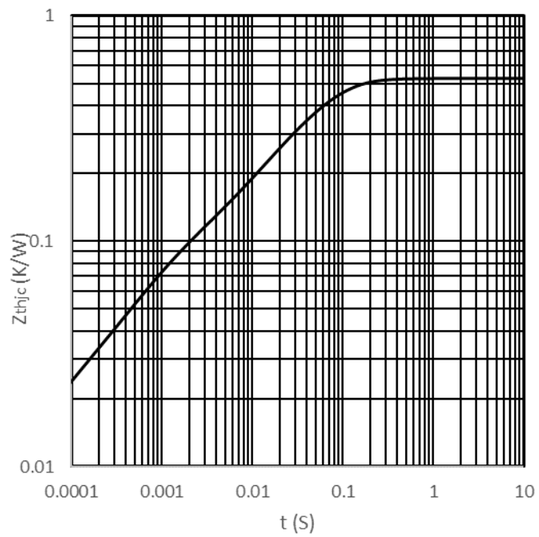
Switching losses Diode, Inverter (typical)
Erec = f (I_F)
R_{Gon} = 10Ω, V_{CE} = 600 V



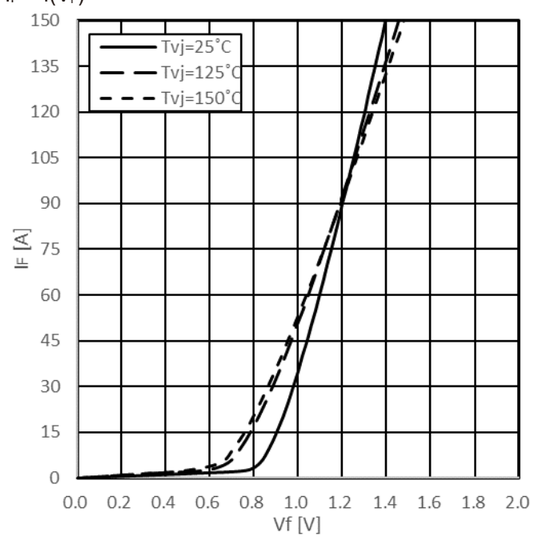
Switching losses Diode, Inverter (typical)
Erec = f (R_G)
I_F = 75 A, V_{CE} = 600 V



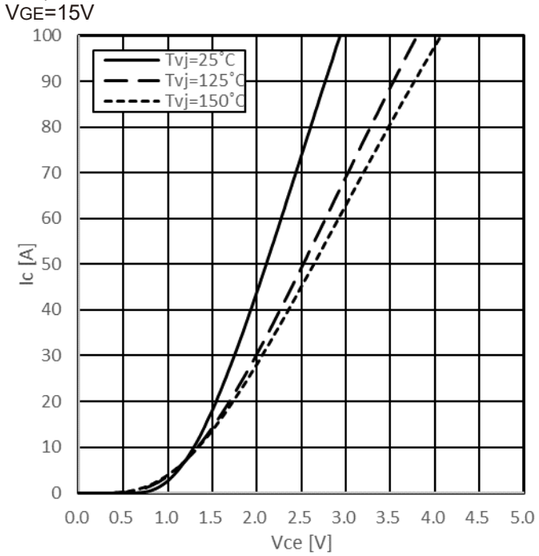
Transient thermal impedance Diode, Inverter
Z_{thJC} = f (t)



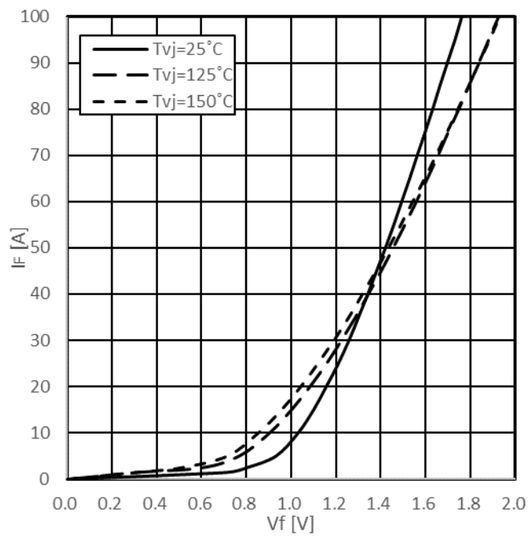
Forward characteristic of Diode, Rectifier (typical)
I_F = f(V_F)



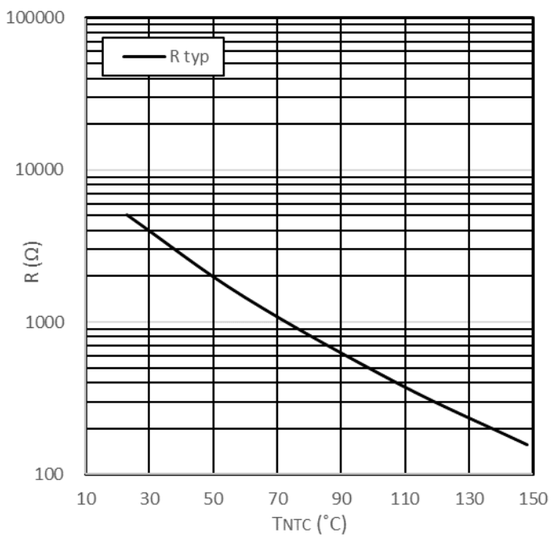
Output characteristic IGBT, Brake-Chopper (typical)
$I_C=f(V_{CE})$
$V_{GE}=15V$



Forward characteristic of Diode, Brake-Chopper (typical)
$I_F = f(V_F)$



NTC-Thermistor-temperature characteristic (typical)
R=f(T)



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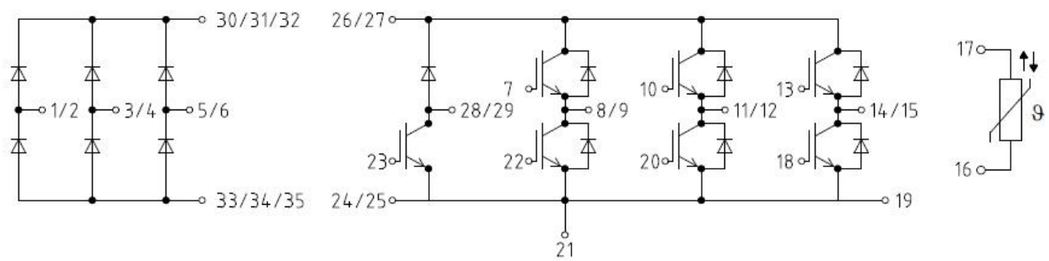
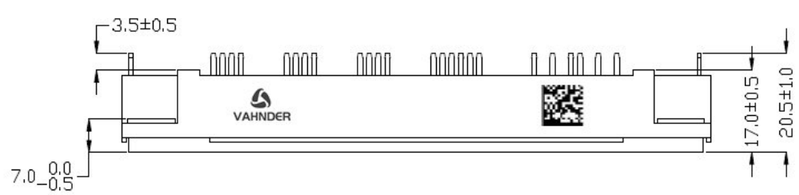
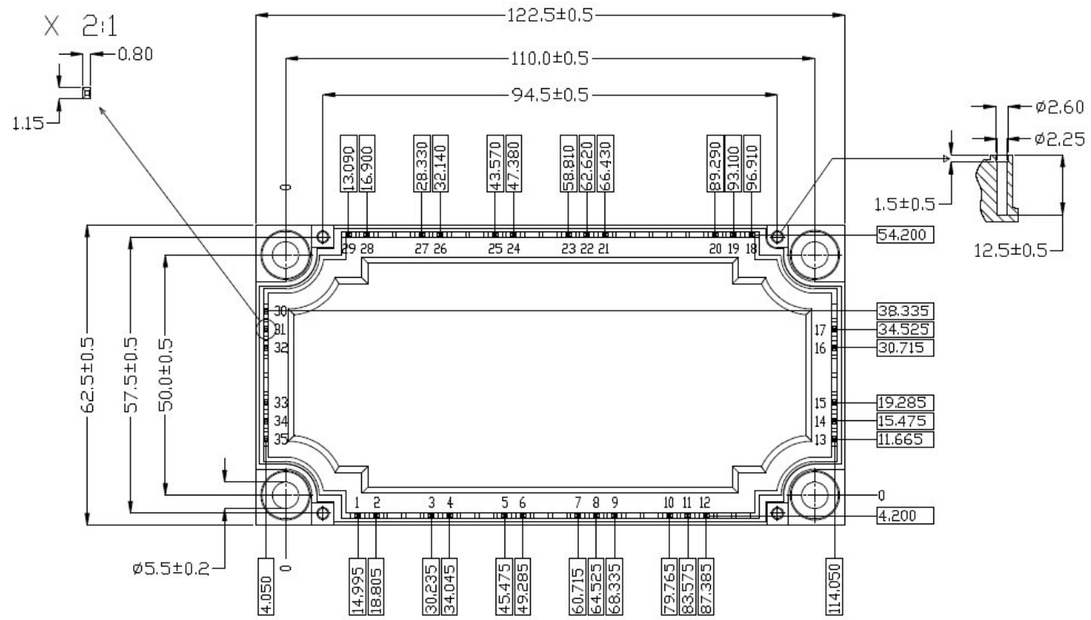
Circuit Diagram



Package outlines





PB075G120K0ASE00

1200V75A EconoPIM3 IGBT Module

IGBT, Inverter

Maximum Rated Values

Collector-emitter voltage	T_{vj} = 25°C	V_{CES}	1200	V
Continuous DC collector current	T_C = 100°C, T_{vj} max = 150°C	$I_{C\ nom}$	75	A
Repetitive peak collector current	t_P = 1 ms	I_{CRM}	150	A
Total power dissipation	T_C = 25°C, T_{vj} max = 150	P_{tot}	258	W
Gate-emitter peak voltage		V_{GES}	+/- 20	V

Characteristic value

				min.	typ.	max.	
Collector-emitter saturation voltage	I_C = 75 A, V_{GE} = 15 V	T_{vj} = 25°C	$V_{CE,sat}$		1.85		V
	I_C = 75 A, V_{GE} = 15 V	T_{vj} = 125°C			2.15		V
	I_C = 75 A, V_{GE} = 15 V	T_{vj} = 150°C			2.26		V
Gate threshold voltage	I_C = 2.8mA, V_{CE} = V_{GE}, T_{vj} = 25°C		$V_{GE,th}$	5.0	6.0	6.5	V
Gate charge	V_{GE} = -15 V ... +15 V		Q_G		0.81		µC
Internal gate resistor	T_{vj} = 25°C		R_{Gint}		2.7		Ω
Input capacitance	f=1MHz, T_{vj}=25°C, V_{CE}=25V, V_{GE}=0V		C_{ies}		9.80		nF
Reverse transfer capacitance	f=1MHz, T_{vj}=25°C, V_{CE}=25V, V_{GE}=0V		C_{res}		0.12		nF
Collector-emitter cut-off current	V_{CE} = 1200 V, V_{GE} = 0 V, T_{vj} = 25°C		I_{CES}			1	mA
Gate-emitter leakage current	V_{CE} = 0 V, V_{GE} = 20 V, T_{vj} = 25°C		I_{GES}			100	nA
Turn-on delay time, inductive load	I_C = 75A, V_{CE} = 600V	T_{vj} = 25°C	$T_{d,on}$		0.17		us
	V_{GE} = +15/-15V	T_{vj} = 125°C			0.18		us
	$R_{G,on}$ = 10Ω	T_{vj} = 150°C			0.18		us
Rise time, inductive load	I_C = 75A, V_{CE} = 600V	T_{vj} = 25°C	T_r		0.05		us
	V_{GE} = +15/-15V	T_{vj} = 125°C			0.06		us
	$R_{G,on}$ = 10Ω	T_{vj} = 150°C			0.07		us
Turn-off delay time, inductive load	I_C = 75A, V_{CE} = 600V	T_{vj} = 25°C	$T_{d,off}$		0.34		us
	V_{GE} = +15/-15V	T_{vj} = 125°C			0.39		us
	R_{Goff} = 10Ω	T_{vj} = 150°C			0.40		us
Fall time, inductive load	I_C = 75A, V_{CE} = 600V	T_{vj} = 25°C	T_f		0.15		us
	V_{GE} = +15/-15V	T_{vj} = 125°C			0.19		us
	R_{Goff} = 10Ω	T_{vj} = 150°C			0.38		us
Turn-on energy loss per pulse	I_C =75A, V_{CE} = 600V, L_S =35 nH	T_{vj} = 25°C	E_{on}		7.06		mJ
	V_{GE} = +15/-15V, di/dt =1100A/µs	T_{vj} = 125°C			9.82		mJ
	R_{Gon} = 10Ω	T_{vj} = 150°C			10.6		mJ
Turn-off energy loss per pulse	I_C = 75A, V_{CE} = 600V, L_S = 35nH	T_{vj} = 25°C	E_{off}		7.19		mJ
	V_{GE} =+15/-15V, dv/dt =4040V/µs	T_{vj} = 125°C			9.35		mJ

	R_{Goff} = 10Ω T_{vj} = 150°C			10.3		mJ
SC data	V_{GE} ≤15V, V_{CC} =600 V, t_P ≤ 8 µs, T_{vj} = 150°C , R_G =10Ω , C_{GE} = 0.0uF , V_{CEmax} = V_{CES} -L_{sCE} ·di/dt	I_{SC}		450		A
Thermal resistance, junction to case	Per IGBT	$R_{th,JC}$			0.48	K/W

Diode, Inverter

Maximum Rated Values

Repetitive peak reverse voltage	T_{vj} = 25°C	V_{RRM}	1200		V
Continuous DC forward current		I_F	75		A
Repetitive peak forward current	t_P = 1 ms	I_{FRM}	150		A

Characteristic value

				min.	typ.	max.	
Forward voltage	I_F = 75 A, V_{GE} = 0 V	T_{vj} = 25°C	V_F		1.99		V
	I_F = 75 A, V_{GE} = 0 V	T_{vj} = 125°C			2.10		V
	I_F = 75 A, V_{GE} = 0 V	T_{vj} = 150°C			2.05		V
Peak reverse recovery current	I_F = 75A, V_R = 600V	T_{vj} = 25°C	I_{RM}		50.2		A
	V_{GE} = -15V	T_{vj} = 125°C			53.5		
		T_{vj} = 150°C			56.1		
Recovered charge	I_F = 75A, V_R = 600V	T_{vj} = 25°C	Q_r		3.01		µC
	V_{GE} = -15V	T_{vj} = 125°C			6.96		
		T_{vj} = 150°C			8.50		
Reverse recovery energy	I_F = 75A, V_R = 600V	T_{vj} = 25°C	E_{rec}		0.14		mJ
	V_{GE} = -15V	T_{vj} = 125°C			1.28		
		T_{vj} = 150°C			1.71		
Thermal resistance, junction to case	Per diode		$R_{th,JC}$			0.53	K/W

Diode, Rectifier

Maximum Rated Values

Repetitive peak reverse voltage	T_{vj} = 25°C	V_{RRM}	1600	V
Average Rectified Output current	V_F = 1.2, T_{vj} = 150°C	I_F	75	A
Surge forward current	t_p = 10 ms, Tvj = 150°C	I_{FSM}	515	A
I^2t - value	t_p = 10 ms, Tvj = 150°C	I^2t	1330	A^2s

Characteristic value

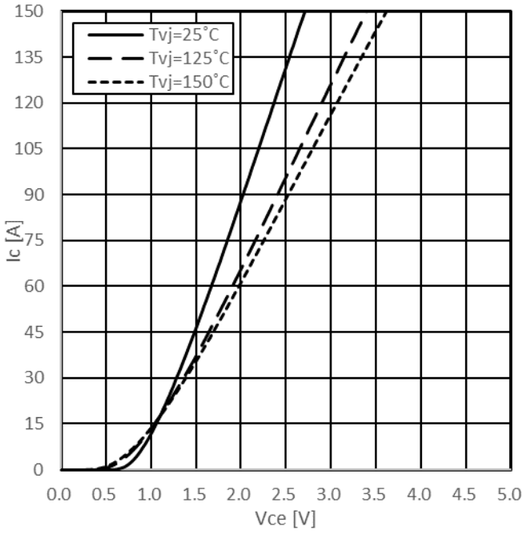
			min.	typ.	max.	
Forward voltage	T_{vj} = 150°C, I_F = 75 A	V_F		1.11		V
Reverse current	T_{vj} = 150°C, V_R = 1600 V	I_R		1		mA
Thermal resistance, junction to case	per Diode	R_{thJC}			0.55	K/W

NTC-Thermistor

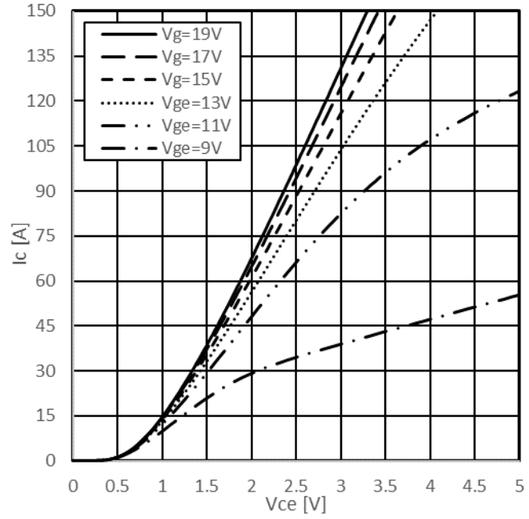
Characteristic value

			min.	typ.	max.	
Rated resistance	Tc = 25°C	R_{25}		5.07		KΩ
Power dissipation	Tc = 25°C	P_{25}			240	mW
B-value	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298, 15K))]$	B_{25}/B_{50}		3412.7		K
B-value	$R_2=R_{25}\exp[B_{25/75}(1/T_2-1/(298, 15K))]$	B_{25}/B_{75}		3454.8		K
B-value	$R_2=R_{25}\exp[B_{25/100}(1/T_2-1/(298, 15K))]$	B_{25}/B_{100}		3442.2		K

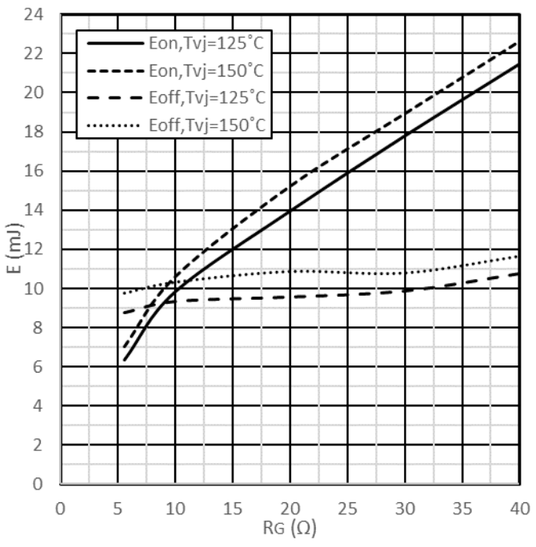
Output characteristic IGBT, Inverter (typical)
$I_C=f(V_{CE})$
$V_{GE}=15V$



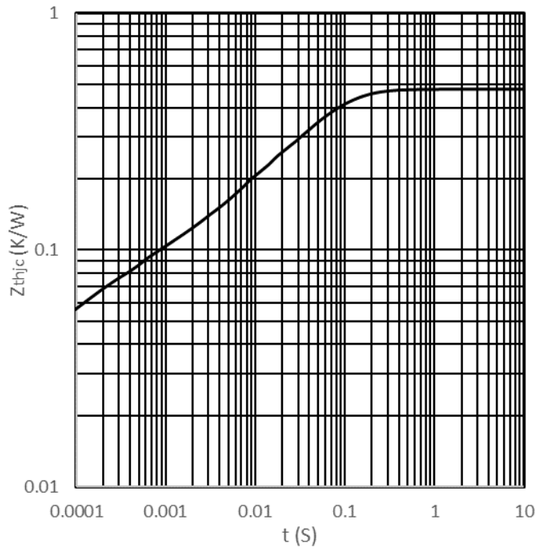
Output characteristic IGBT, Inverter (typical)
$I_C=f(V_{CE})$
Tvj=150˚C



Switching losses IGBT,Inverter (typical)
$E_{on} = f(R_G)$, $E_{off} = f(R_G)$
$V_{GE} = \pm 15$ V, Ic=75A, $V_{CE} = 600$ V



Transient thermal impedance IGBT,Inverter
$Z_{thJC} = f(t)$



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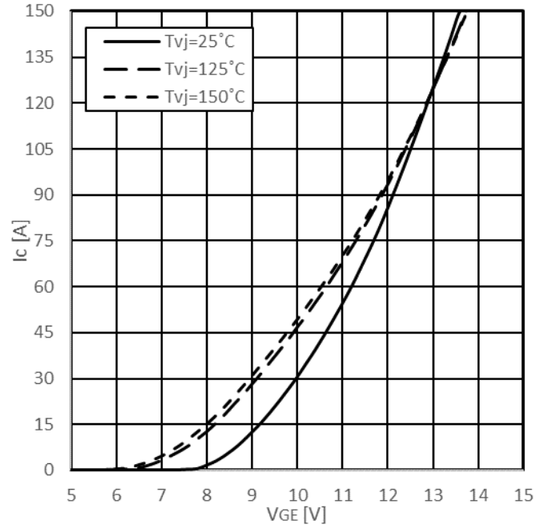
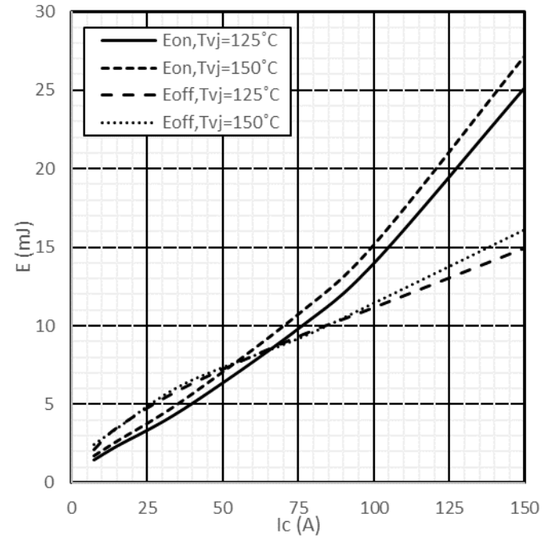
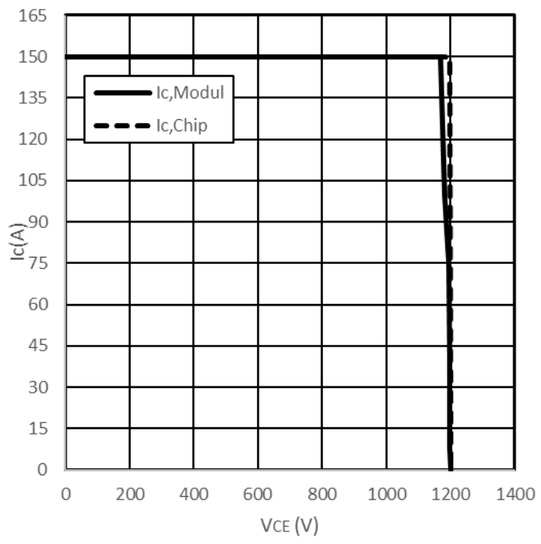
Transfer characteristic IGBT,Inverter (typical)
$I_C=f(V_{GE})$
$V_{CE}=20V$



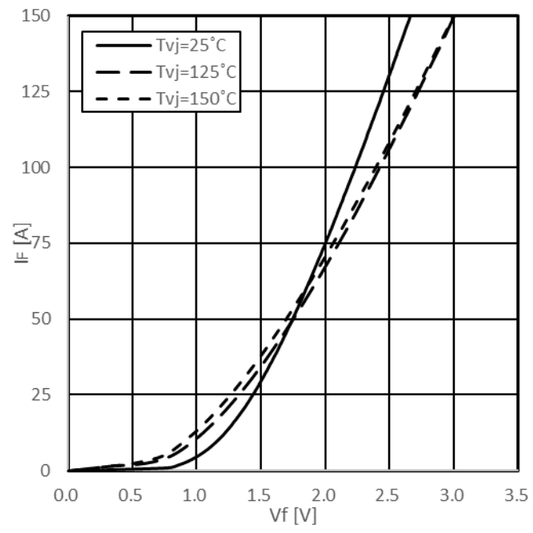
Switching losses IGBT,Inverter (typical)
$E_{on} = f(I_C)$, $E_{off} = f(I_C)$
$V_{GE} = \pm 15$ V, $R_{Gon} = 10\Omega$, $R_{Goff} = 10\Omega$, $V_{CE} = 600$ V



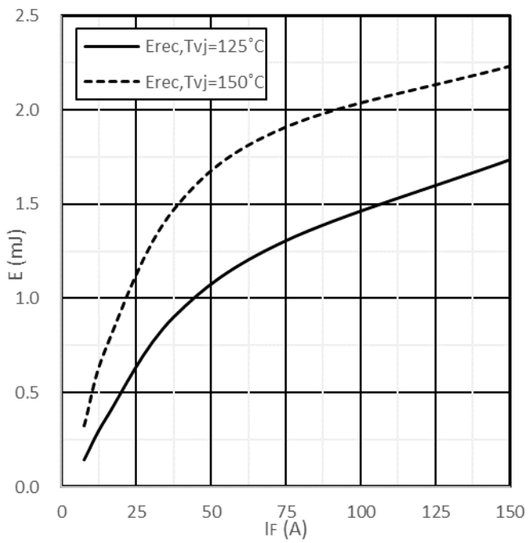
Reverse bias safe operating area IGBT,Inverter (RBSOA)
$I_C = f(V_{CE})$
$V_{GE} = \pm 15$ V, $R_{Goff} = 10\Omega$, $T_{vj} = 150°C$



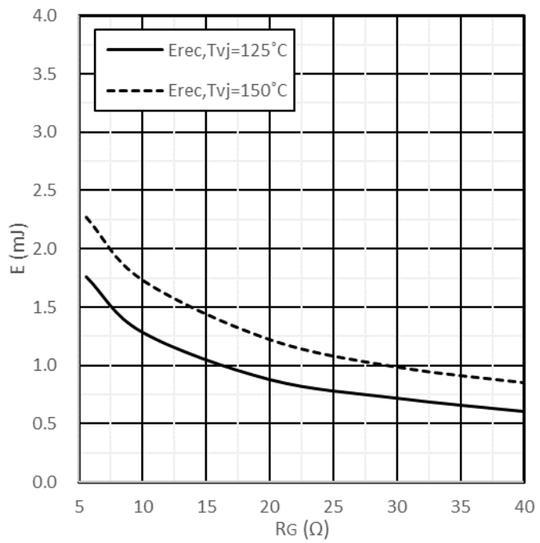
Forward characteristic of Diode, Inverter (typical)
$I_F = f(V_F)$



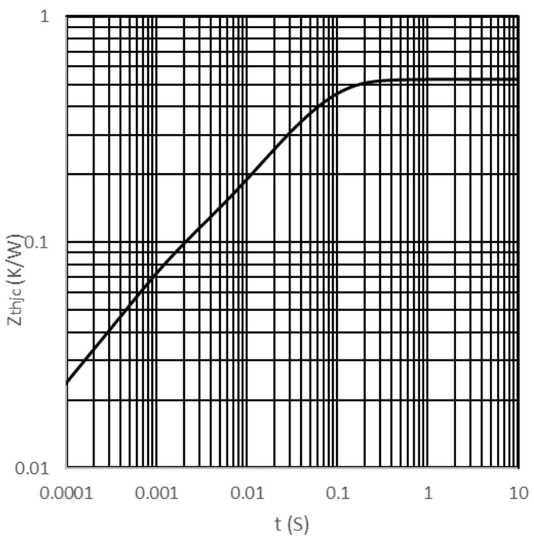
Switching losses Diode, Inverter (typical)
Erec = f (I_F)
R_{Gon} = 10Ω, V_{CE} = 600 V



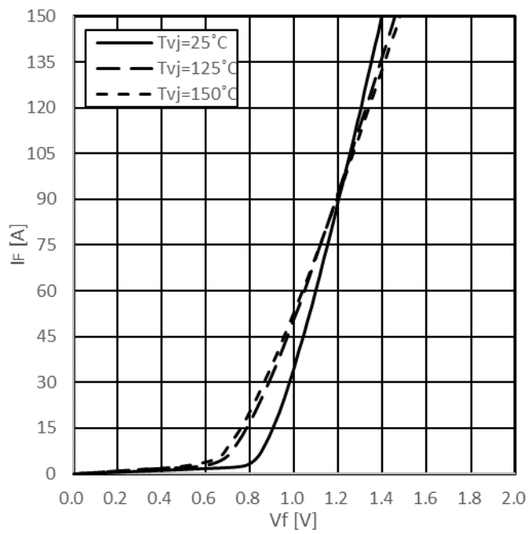
Switching losses Diode, Inverter (typical)
Erec = f (R_G)
I_F = 75 A, V_{CE} = 600 V



Transient thermal impedance Diode, Inverter
Z_{thJC} = f (t)



Forward characteristic of Diode, Rectifier (typical)
$I_F = f(V_F)$



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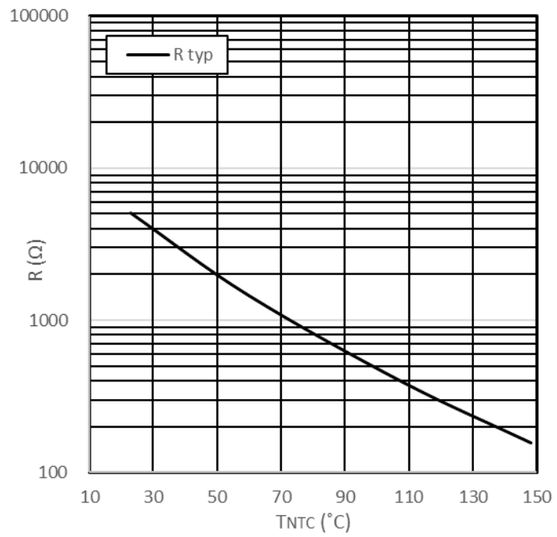
NTC-Thermistor-temperature characteristic (typical)
R=f(T)



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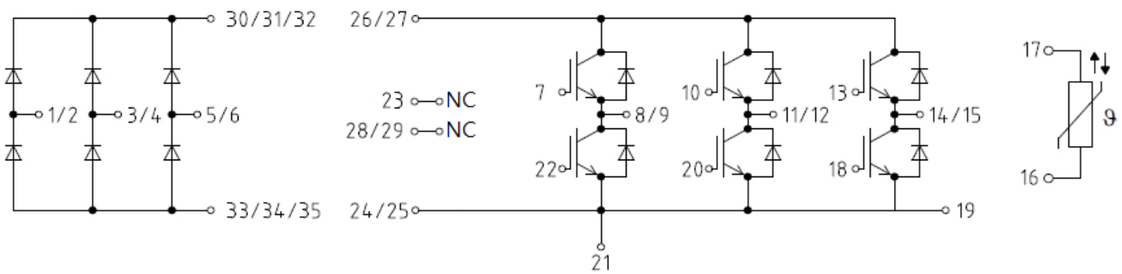
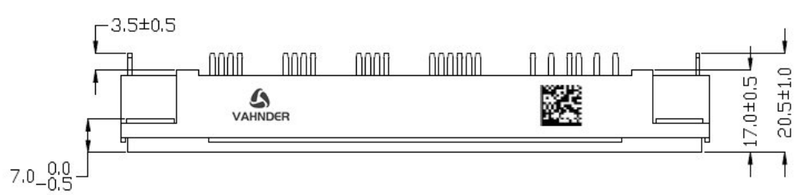
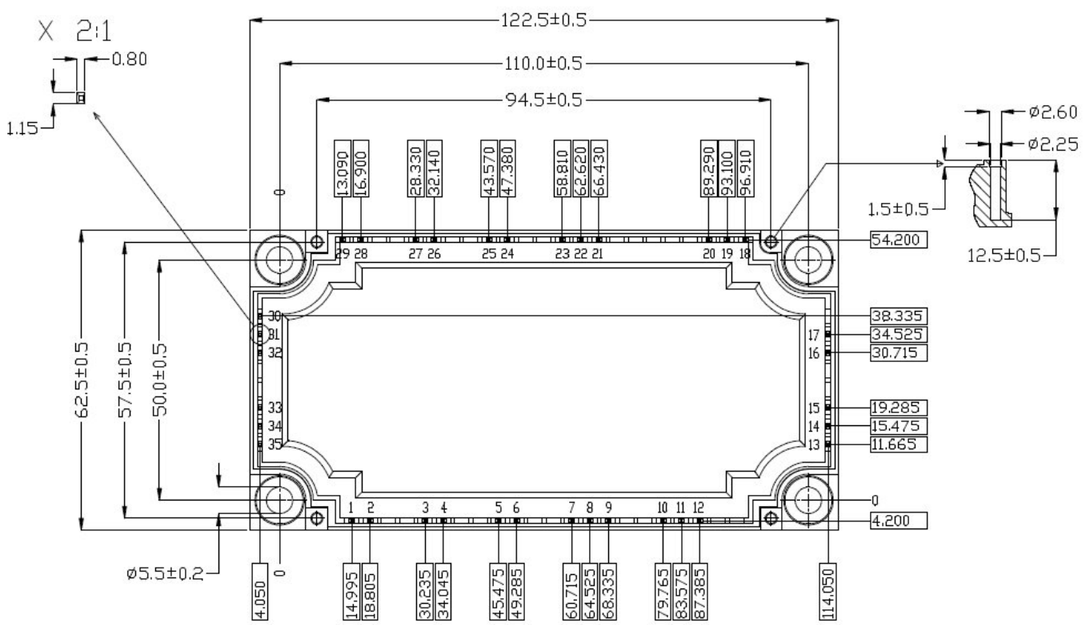
Circuit Diagram



Package outlines





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PA100G120K0AUEAS

1200V100A EconoPIM3 IGBT Module

IGBT, Inverter

Maximum Rated Values

Collector-emitter voltage	T_{vj} = 25°C	V_{CES}	1200		V
Continuous DC collector current	T_C = 100°C, T_{vj} max = 150°C	$I_{C\ nom}$	100		A
Repetitive peak collector current	t_P = 1 ms	I_{CRM}	200		A
Total power dissipation	T_C = 25°C, T_{vj} max = 150	P_{tot}	480		W
Gate-emitter peak voltage		V_{GES}	+/- 20		V

Characteristic value

				min.	typ.	max.	
Collector-emitter saturation voltage	I_C = 100 A, V_{GE} = 15 V	T_{vj} = 25°C	$V_{CE,sat}$		2.35		V
	I_C = 100 A, V_{GE} = 15 V	T_{vj} = 125°C			2.85		V
	I_C = 100 A, V_{GE} = 15 V	T_{vj} = 150°C			2.99		V
Gate threshold voltage	I_C = 1.0mA, V_{CE} = V_{GE}, T_{vj} = 25°C		$V_{GE,th}$	5.0	5.5	6.0	V
Gate charge	V_{GE} = -15 V ... +15 V		Q_G		0.98		µC
Internal gate resistor	T_{vj} = 25°C		R_{Gint}		3.0		Ω
Input capacitance	f=1MHz, T_{vj}=25°C, V_{CE}=25V, V_{GE}=0V		C_{ies}		27.6		nF
Reverse transfer capacitance	f=1MHz, T_{vj}=25°C, V_{CE}=25V, V_{GE}=0V		C_{res}				nF
Collector-emitter cut-off current	V_{CE} = 1200 V, V_{GE} = 0 V, T_{vj} = 25°C		I_{CES}			1	mA
Gate-emitter leakage current	V_{CE} = 0 V, V_{GE} = 20 V, T_{vj} = 25°C		I_{GES}			100	nA
Turn-on delay time, inductive load	I_C = 100A, V_{CE} = 600V	T_{vj} = 25°C	$T_{d,on}$		0.16		us
	V_{GE} = +15/-15V	T_{vj} = 125°C			0.18		us
	$R_{G,on}$ = 6.8Ω	T_{vj} = 150°C			0.21		us
Rise time, inductive load	I_C = 100A, V_{CE} = 600V	T_{vj} = 25°C	T_r		0.05		us
	V_{GE} = +15/-15V	T_{vj} = 125°C			0.06		us
	$R_{G,on}$ = 6.8Ω	T_{vj} = 150°C			0.08		us
Turn-off delay time, inductive load	I_C = 100A, V_{CE} = 600V	T_{vj} = 25°C	$T_{d,off}$		0.32		us
	V_{GE} = +15/-15V	T_{vj} = 125°C			0.34		us
	R_{Goff} = 6.8Ω	T_{vj} = 150°C			0.35		us
Fall time, inductive load	I_C = 100A, V_{CE} = 600V	T_{vj} = 25°C	T_f		0.12		us
	V_{GE} = +15/-15V	T_{vj} = 125°C			0.12		us
	R_{Goff} = 6.8Ω	T_{vj} = 150°C			0.12		us
Turn-on energy loss per pulse	I_C =100A, V_{CE} = 600V, L_S =20 nH	T_{vj} = 25°C	E_{on}		8.81		mJ
	V_{GE} = +15/-15V, di/dt =1300A/µs	T_{vj} = 125°C			14.1		mJ
	R_{Gon} = 6.8Ω, Tj=150°C	T_{vj} = 150°C			18.4		mJ
Turn-off energy loss per pulse	I_C = 100A, V_{CE} = 600V, L_S = 20nH	T_{vj} = 25°C	E_{off}		9.36		mJ
	V_{GE} =+15/-15V, dv/dt =5900V/µs	T_{vj} = 125°C			9.00		mJ

	R_{Goff} = 6.8Ω, Tj=150°C T_{vj} = 150°C			10.3		mJ
SC data	V_{GE} ≤15V, V_{CC} =600 V, t_P ≤ 8 μs, T_{vj} = 25°C , R_G =10Ω , C_{GE} = 0.0uF , V_{CEmax} = V_{CES} -L_{sCE} ・di/dt	I_{SC}		810		A
Thermal resistance, junction to case	Per IGBT	$R_{th,JC}$			0.26	K/W

Diode, Inverter

Maximum Rated Values

Repetitive peak reverse voltage	T_{vj} = 25°C	V_{RRM}	1200		V
Continuous DC forward current		I_F	100		A
Repetitive peak forward current	t_P = 1 ms	I_{FRM}	200		A

Characteristic value

				min.	typ.	max.	
Forward voltage	I_F = 100 A, V_{GE} = 0 V	T_{vj} = 25°C	V_F		2.16		V
	I_F = 100 A, V_{GE} = 0 V	T_{vj} = 125°C			2.01		V
	I_F = 100 A, V_{GE} = 0 V	T_{vj} = 150°C			1.96		V
Peak reverse recovery current	I_F = 100A, V_R = 600V	T_{vj} = 25°C	I_{RM}		81.9		A
	V_{GE} = -15V, -dif/dt =470A/μs	T_{vj} = 125°C			112.6		
	R_{Goff} = 6.8Ω, Tj=150°C	T_{vj} = 150°C			117.5		
Recovered charge	I_F = 100A, V_R = 600V	T_{vj} = 25°C	Q_r		5.75		μC
	V_{GE} = -15V, -dif/dt =470A/μs	T_{vj} = 125°C			18.8		
	R_{Goff} = 6.8Ω, Tj=150°C	T_{vj} = 150°C			22.4		
Reverse recovery energy	I_F = 100A, V_R = 600V	T_{vj} = 25°C	E_{rec}		1.29		mJ
	V_{GE} = -15V, -dif /dt =470A/μs	T_{vj} = 125°C			3.67		
	R_{Goff} = 6.8Ω, Tj=150°C	T_{vj} = 150°C			4.61		
Thermal resistance, junction to case	Per Diode		$R_{th,JC}$			0.44	K/W

Diode, Rectifier

Maximum Rated Values

Repetitive peak reverse voltage	T_{vj} = 25°C	V_{RRM}	1600	V
Average Rectified Output current	V_F = 1.2, T_{vj} = 150°C	I_F	100	A
Surge forward current	t_p = 10 ms, Tvj = 150°C	I_{FSM}	990	A
I^2t - value	t_p = 10 ms, Tvj = 150°C	I^2t	4950	A^2s

Characteristic value

			min.	typ.	max.	
Forward voltage	T_{vj} = 150°C, I_F = 100 A	V_F		1.15		V
Reverse current	T_{vj} = 150°C, V_R = 1600 V	I_R		1		mA
Thermal resistance, junction to case	Per Diode	R_{thJC}			0.44	K/W

IGBT, Brake-Chopper

Maximum Rated Values

Collector-emitter voltage	T_{vj} = 25°C	V_{CES}	1200	V
Continuous DC collector current	T_C = 100°C, T_{vj} max = 150°C	$I_{C\ nom}$	75	A
Repetitive peak collector current	t_P = 1 ms	I_{CRM}	150	A
Total power dissipation	T_C = 25°C, T_{vj} max = 150	P_{tot}	265	W
Gate-emitter peak voltage		V_{GES}	+/- 20	V

Characteristic value

				min.	typ.	max.	
Collector-emitter saturation voltage	I_C = 75 A, V_{GE} = 15 V	T_{vj} = 25°C	$V_{CE,sat}$		1.74		V
	I_C = 75 A, V_{GE} = 15 V	T_{vj} = 125°C			2.15		V
	I_C = 75 A, V_{GE} = 15 V	T_{vj} = 150°C			2.23		V
Gate threshold voltage	I_C = 2.8mA, V_{CE} = V_{GE}, T_{vj} = 25°C		$V_{GE,th}$	5.0	5.8	6.5	V
Gate charge	V_{GE} = -15 V ... +15 V		Q_G		0.8		μC
Internal gate resistor	T_{vj} = 25°C		R_{Gint}		2.7		Ω
Input capacitance	f=1MHz, T_{vj}=25°C,V_{CE}=25V, V_{GE}=0V		C_{ies}		9.80		nF
Reverse transfer capacitance	f=1MHz, T_{vj}=25°C,V_{CE}=25V, V_{GE}=0V		C_{res}		0.12		nF
Collector-emitter cut-off current	V_{CE} = 1200 V, V_{GE} = 0 V, T_{vj} = 25°C		I_{CES}			1	mA
Gate-emitter leakage current	V_{CE} = 0 V, V_{GE} = 20 V, T_{vj} = 25°C		I_{GES}			100	nA
Turn-on delay time, inductive load	I_C = 75A, V_{CE} = 600V	T_{vj} = 25°C	$T_{d,on}$		0.18		us
	V_{GE} = +15/-15V	T_{vj} = 125°C			0.19		us
	$R_{G,on}$ = 10Ω	T_{vj} = 150°C			0.19		us
Rise time, inductive load	I_C = 75A, V_{CE} = 600V	T_{vj} = 25°C	T_r		0.06		us
	V_{GE} = +15/-15V	T_{vj} = 125°C			0.07		us
	$R_{G,on}$ = 10Ω	T_{vj} = 150°C			0.07		us
Turn-off delay time, inductive load	I_C = 75A, V_{CE} = 600V	T_{vj} = 25°C	$T_{d,off}$		0.37		us
	V_{GE} = +15/-15V	T_{vj} = 125°C			0.41		us
	R_{Goff} = 10Ω	T_{vj} = 150°C			0.42		us
Fall time, inductive load	I_C = 75A, V_{CE} = 600V	T_{vj} = 25°C	T_f		0.26		us
	V_{GE} = +15/-15V	T_{vj} = 125°C			0.36		us
	R_{Goff} = 10Ω	T_{vj} = 150°C			0.44		us
Turn-on energy loss per pulse	I_C =75A, V_{CE} = 600V, L_S =20 nH	T_{vj} = 25°C	E_{on}		9.97		mJ
	V_{GE} = +15/-15V, di/dt =825A/μs	T_{vj} = 125°C			13.72		mJ
	R_{Gon} = 10Ω, Tj=150°C	T_{vj} = 150°C			14.73		mJ

Turn-off energy loss per pulse	I_C =75A, V_{CE} = 600V, L_S =20 nH	T_{vj} = 25°C	E_{off}		7.80		mJ
	V_{GE} = +15/-15V, dv/dt =4300V/µs	T_{vj} = 125°C			10.1		mJ
	R_{Gon} = 10Ω, Tj=150°C	T_{vj} = 150°C			10.6		mJ
SC data	V_{GE} ≤15V, V_{CC} =600 V, t_P ≤ 8 µs, T_{vj} = 25°C , R_G =10Ω , C_{GE} = 0.0uF , V_{CEmax} = V_{CES} -L_{sCE} ·di/dt		I_{SC}		322		A
Thermal resistance, junction to case	Per IGBT		$R_{th,JC}$			0.47	K/W

Diode, Brake-Chopper

Maximum Rated Values

Repetitive peak reverse voltage	T_{vj} = 25°C	V_{RRM}	1200	V
Continuous DC forward current		I_F	75	A
Repetitive peak forward current	t_P = 1 ms	I_{FRM}	150	A

Characteristic value

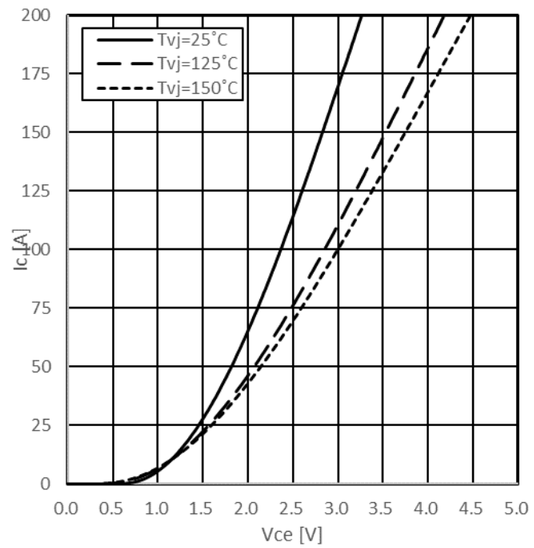
				min.	typ.	max.	
Forward voltage	I_F = 75 A, V_{GE} = 0 V	T_{vj} = 25°C	V_F		1.80		V
	I_F = 75 A, V_{GE} = 0 V	T_{vj} = 125°C			1.86		V
	I_F = 75 A, V_{GE} = 0 V	T_{vj} = 150°C			1.81		V
Peak reverse recovery current	I_F = 75A, V_R = 600V	T_{vj} = 25°C	I_{RM}		39.3		A
	V_{GE} = -15V	T_{vj} = 125°C			42.5		
		T_{vj} = 150°C			52.2		
Recovered charge	I_F = 75A, V_R = 600V	T_{vj} = 25°C	Q_r		1.96		µC
	V_{GE} = -15V, -dif /dt =215A/µs	T_{vj} = 125°C			6.31		
	R_{Goff} = 10Ω, Tj=150°C	T_{vj} = 150°C			8.86		
Reverse recovery energy	I_F = 75A, V_R = 600V	T_{vj} = 25°C	E_{rec}		0.30		mJ
	V_{GE} = -15V, -dif /dt =215A/µs	T_{vj} = 125°C			1.05		
	R_{Goff} = 10Ω, Tj=150°C	T_{vj} = 150°C			1.36		
Thermal resistance, junction to case	Per Diode		$R_{th,JC}$			0.56	K/W

NTC-Thermistor

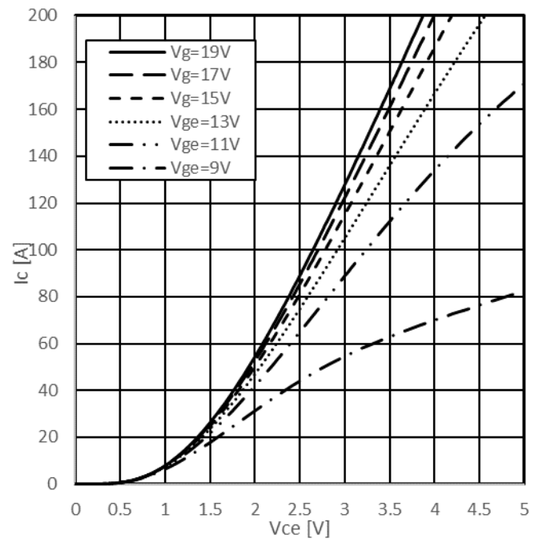
Characteristic value

			min.	typ.	max.	
Rated resistance	Tc = 25°C	R_{25}		5.07		KΩ
Power dissipation	Tc = 25°C	P_{25}			240	mW
B-value	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298, 15K))]$	B_{25}/B_{50}		3412.7		K
B-value	$R_2=R_{25}\exp[B_{25/75}(1/T_2-1/(298, 15K))]$	B_{25}/B_{75}		3454.8		K
B-value	$R_2=R_{25}\exp[B_{25/100}(1/T_2-1/(298, 15K))]$	B_{25}/B_{100}		3442.2		K

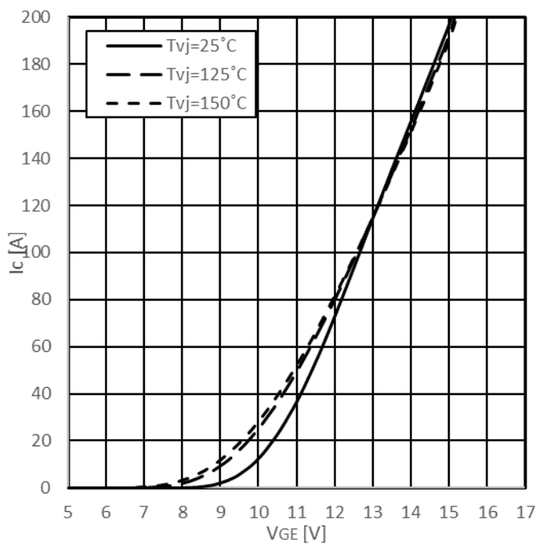
Output characteristic IGBT, Inverter (typical)
Ic=f(VCE)
VGE=15V



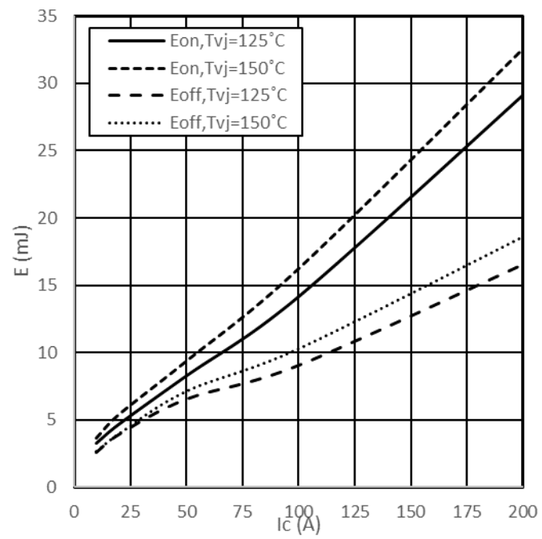
Output characteristic IGBT, Inverter (typical)
Ic=f(VCE)
Tvj=150˚C



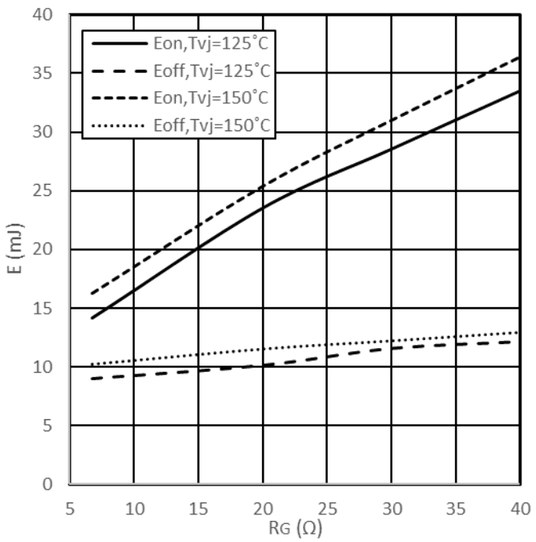
Transfer characteristic IGBT,Inverter (typical)
Ic=f(VGE)
VCE=20V



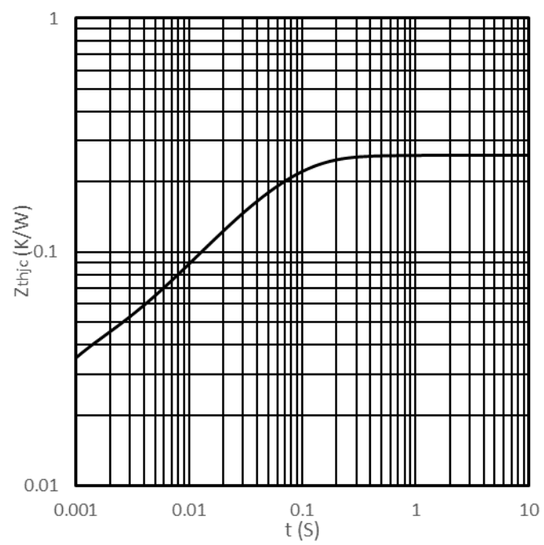
Switching losses IGBT,Inverter (typical)
Eon = f (IC), Eoff = f (IC)
VGE = ±15 V, RGon = 6.8Ω, RGoff = 10Ω, VCE = 600 V



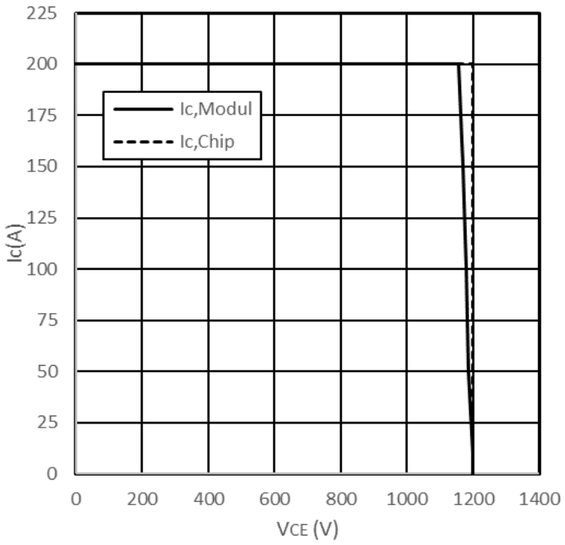
Switching losses IGBT,Inverter (typical)
Eon = f (R_G), Eoff = f (R_G)
V_{GE} = ±15 V, Ic=75A, V_{CE} = 600 V



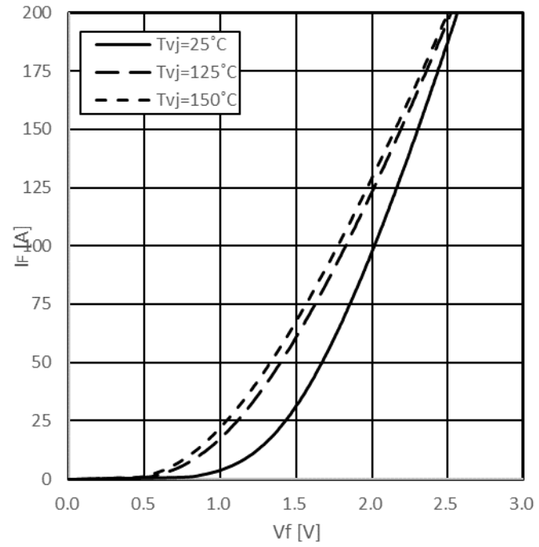
Transient thermal impedance IGBT,Inverter
Z_{thJC} = f (t)



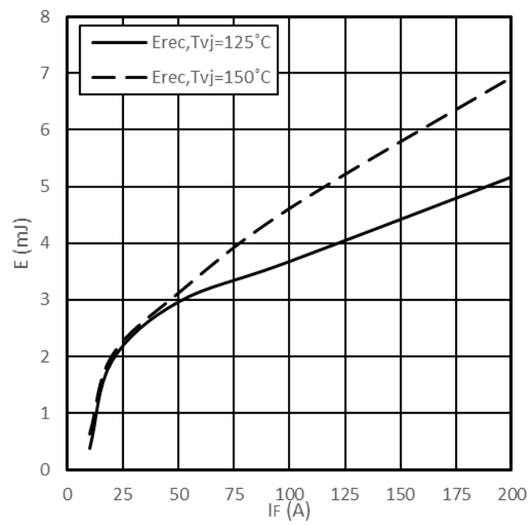
Reverse bias safe operating area IGBT,Inverter (RBSOA)
I_C = f (V_{CE})
V_{GE} = ±15 V, R_{Goff} =10Ω, T_{vj} = 150°C



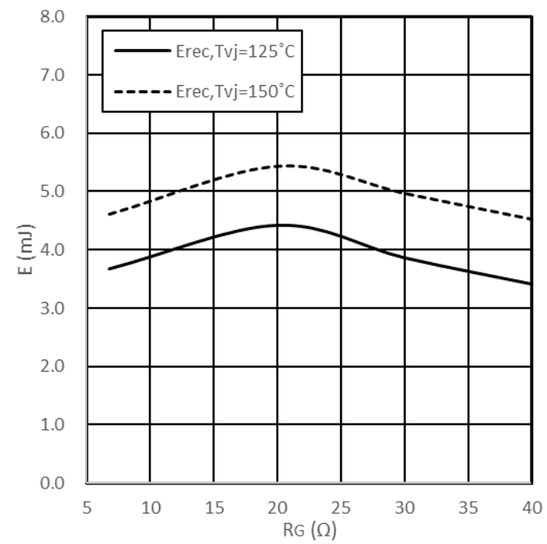
Forward characteristic of Diode, Inverter (typical)
I_F = f (V_F)



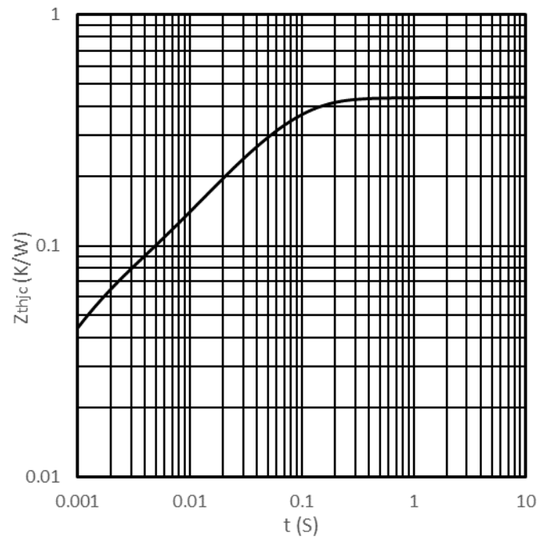
Switching losses Diode, Inverter (typical)
Erec = f (I_F)
R_{Gon} = 6.8Ω, V_{CE} = 600 V



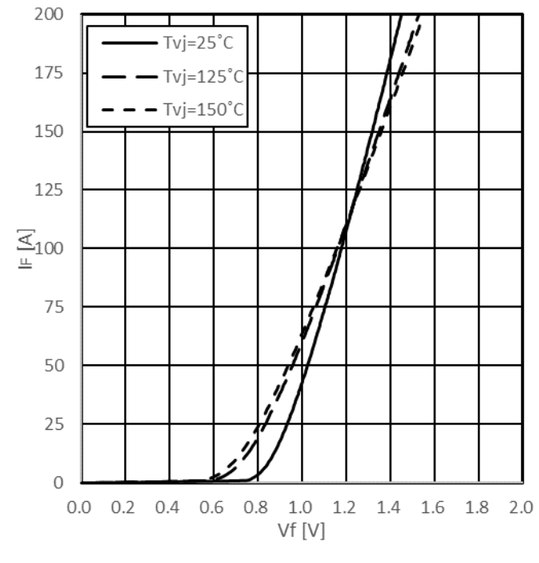
Switching losses Diode, Inverter (typical)
Erec = f (R_G)
I_F = 100 A, V_{CE} = 600 V



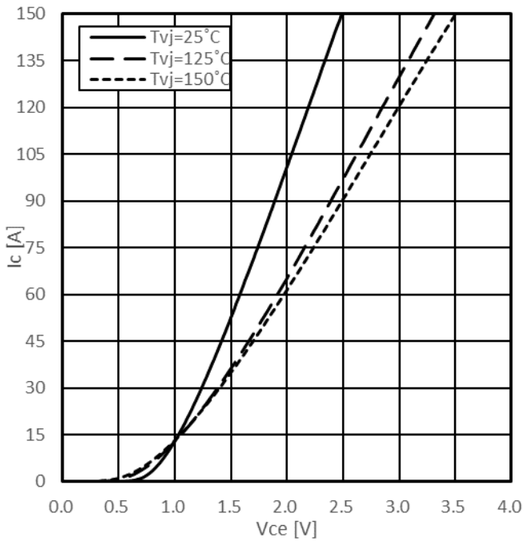
Transient thermal impedance Diode, Inverter
Z_{thJC} = f (t)



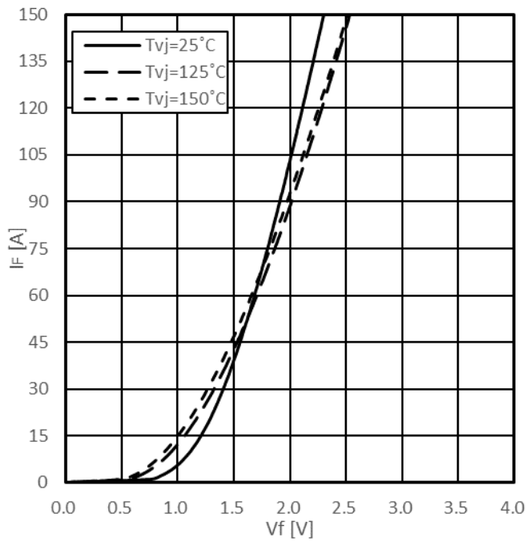
Forward characteristic of Diode, Rectifier (typical)
I_F = f(V_F)



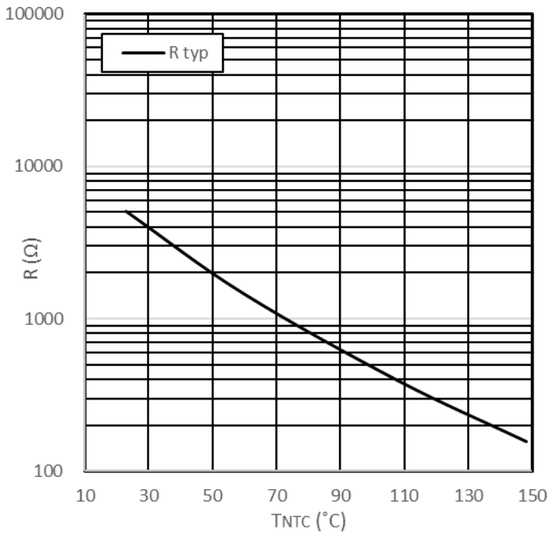
Output characteristic IGBT, Brake-Chopper (typical)
$I_C=f(V_{CE})$
$V_{GE}=15V$



Forward characteristic of Diode, Brake-Chopper (typical)
$I_F = f(V_F)$

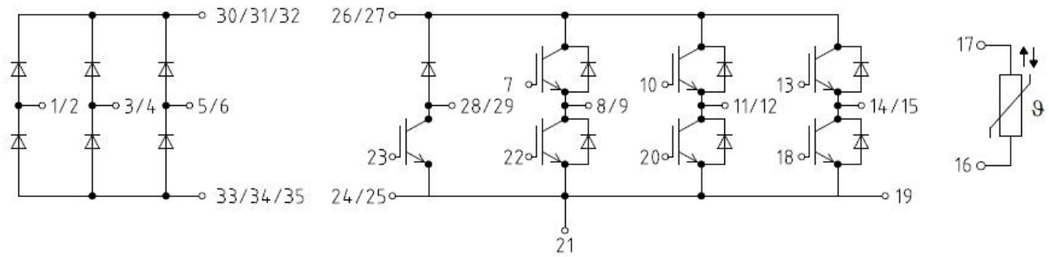


NTC-Thermistor-temperature characteristic (typical)
R=f(T)

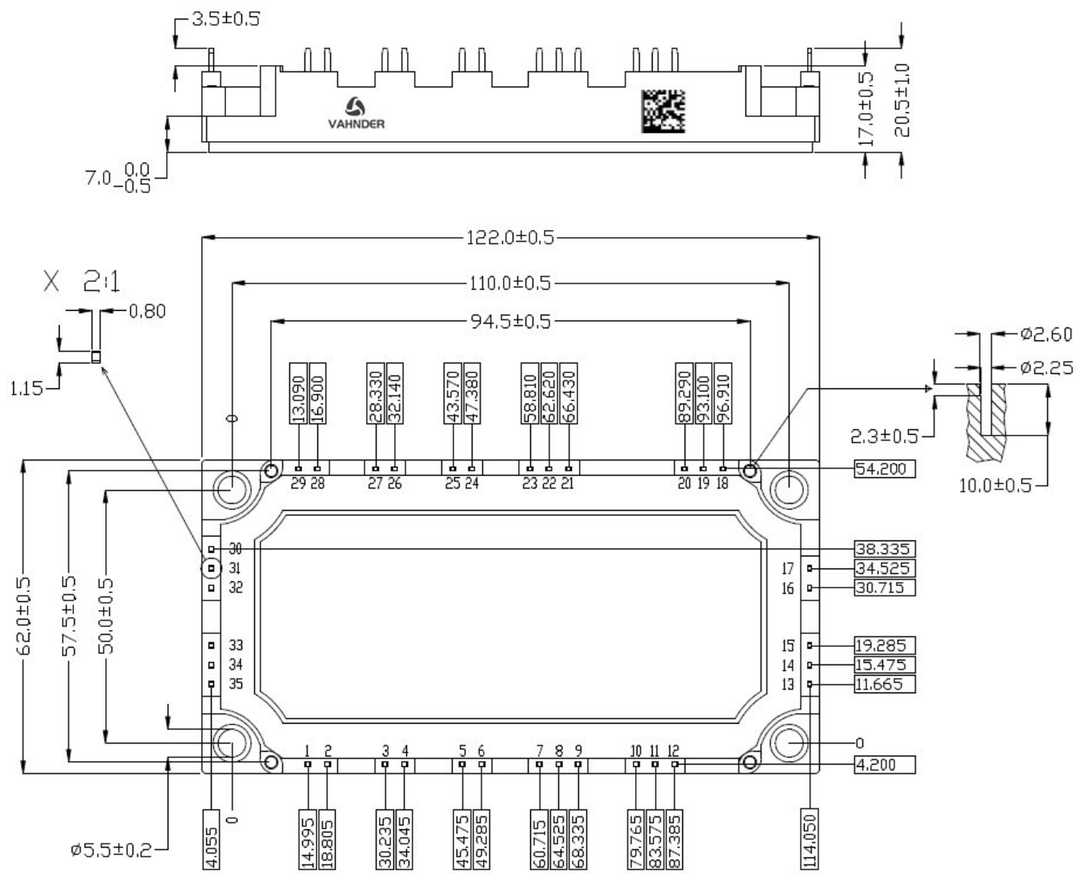


NIETZ PA100G120K0AUEAS

Circuit Diagram



Package outlines



PB100G120K0AUE00

1200V100A EconoPIM3 IGBT Module

IGBT, Inverter

Maximum Rated Values

Collector-emitter voltage	T_{vj} = 25°C	V_{CES}		1200	V
Continuous DC collector current	T_C = 100°C, T_{vj} max = 150°C	$I_{C\ nom}$		100	A
Repetitive peak collector current	t_P = 1 ms	I_{CRM}		200	A
Total power dissipation	T_C = 25°C, T_{vj} max = 150	P_{tot}		480	W
Gate-emitter peak voltage		V_{GES}		+/- 20	V

Characteristic value

				min.	typ.	max.	
Collector-emitter saturation voltage	I_C = 100 A, V_{GE} = 15 V	T_{vj} = 25°C	$V_{CE,sat}$		2.35		V
	I_C = 100 A, V_{GE} = 15 V	T_{vj} = 125°C			2.85		V
	I_C = 100 A, V_{GE} = 15 V	T_{vj} = 150°C			2.99		V
Gate threshold voltage	I_C = 1.0mA, V_{CE} = V_{GE}, T_{vj} = 25°C		$V_{GE,th}$	5.0	5.5	6.0	V
Gate charge	V_{GE} = -15 V ... +15 V		Q_G		0.98		µC
Internal gate resistor	T_{vj} = 25°C		R_{Gint}		3.0		Ω
Input capacitance	f=1MHz, T_{vj}=25°C, V_{CE}=25V, V_{GE}=0V		C_{ies}		27.6		nF
Reverse transfer capacitance	f=1MHz, T_{vj}=25°C, V_{CE}=25V, V_{GE}=0V		C_{res}				nF
Collector-emitter cut-off current	V_{CE} = 1200 V, V_{GE} = 0 V, T_{vj} = 25°C		I_{CES}			1	mA
Gate-emitter leakage current	V_{CE} = 0 V, V_{GE} = 20 V, T_{vj} = 25°C		I_{GES}			100	nA
Turn-on delay time, inductive load	I_C = 100A, V_{CE} = 600V	T_{vj} = 25°C	$T_{d,on}$		0.16		us
	V_{GE} = +15/-15V	T_{vj} = 125°C			0.18		us
	$R_{G,on}$ = 6.8Ω	T_{vj} = 150°C			0.21		us
Rise time, inductive load	I_C = 100A, V_{CE} = 600V	T_{vj} = 25°C	T_r		0.05		us
	V_{GE} = +15/-15V	T_{vj} = 125°C			0.06		us
	$R_{G,on}$ = 6.8Ω	T_{vj} = 150°C			0.08		us
Turn-off delay time, inductive load	I_C = 100A, V_{CE} = 600V	T_{vj} = 25°C	$T_{d,off}$		0.32		us
	V_{GE} = +15/-15V	T_{vj} = 125°C			0.34		us
	R_{Goff} = 6.8Ω	T_{vj} = 150°C			0.35		us
Fall time, inductive load	I_C = 100A, V_{CE} = 600V	T_{vj} = 25°C	T_f		0.12		us
	V_{GE} = +15/-15V	T_{vj} = 125°C			0.12		us
	R_{Goff} = 6.8Ω	T_{vj} = 150°C			0.12		us
Turn-on energy loss per pulse	I_C =100A, V_{CE} = 600V, L_S =20 nH	T_{vj} = 25°C	E_{on}		8.81		mJ
	V_{GE} = +15/-15V, di/dt =1300A/µs	T_{vj} = 125°C			14.1		mJ
	R_{Gon} = 6.8Ω, Tj=150°C	T_{vj} = 150°C			18.4		mJ
Turn-off energy loss per pulse	I_C = 100A, V_{CE} = 600V, L_S = 20nH	T_{vj} = 25°C	E_{off}		9.36		mJ
	V_{GE} =+15/-15V, dv/dt =5900V/µs	T_{vj} = 125°C			9.00		mJ

	R_{Goff} = 6.8Ω, Tj=150°C T_{vj} = 150°C			10.3		mJ
SC data	V_{GE} ≤15V, V_{CC} =600 V, t_P ≤ 8 μs, T_{vj} = 25°C , R_G =10Ω , C_{GE} = 0.0uF , V_{CEmax} = V_{CES} -L_{sCE} ・di/dt	I_{SC}		810		A
Thermal resistance, junction to case	Per IGBT	$R_{th,JC}$			0.26	K/W

Diode, Inverter

Maximum Rated Values

Repetitive peak reverse voltage	T_{vj} = 25°C	V_{RRM}	1200	V
Continuous DC forward current		I_F	100	A
Repetitive peak forward current	t_P = 1 ms	I_{FRM}	200	A

Characteristic value

				min.	typ.	max.	
Forward voltage	I_F = 100 A, V_{GE} = 0 V	T_{vj} = 25°C	V_F		2.16		V
	I_F = 100 A, V_{GE} = 0 V	T_{vj} = 125°C			2.01		V
	I_F = 100 A, V_{GE} = 0 V	T_{vj} = 150°C			1.96		V
Peak reverse recovery current	I_F = 100A, V_R = 600V	T_{vj} = 25°C	I_{RM}		81.9		A
	V_{GE} = -15V, -dif/dt =470A/μs	T_{vj} = 125°C			112.6		
	R_{Goff} = 6.8Ω, Tj=150°C	T_{vj} = 150°C			117.5		
Recovered charge	I_F = 100A, V_R = 600V	T_{vj} = 25°C	Q_r		5.75		μC
	V_{GE} = -15V, -dif/dt =470A/μs	T_{vj} = 125°C			18.8		
	R_{Goff} = 6.8Ω, Tj=150°C	T_{vj} = 150°C			22.4		
Reverse recovery energy	I_F = 100A, V_R = 600V	T_{vj} = 25°C	E_{rec}		1.29		mJ
	V_{GE} = -15V, -dif /dt =470A/μs	T_{vj} = 125°C			3.67		
	R_{Goff} = 6.8Ω, Tj=150°C	T_{vj} = 150°C			4.61		
Thermal resistance, junction to case	Per Diode		$R_{th,JC}$			0.44	K/W

Diode, Rectifier

Maximum Rated Values

Repetitive peak reverse voltage	T_{vj} = 25°C	V_{RRM}	1600	V
Average Rectified Output current	V_F = 1.2, T_{vj} = 150°C	I_F	100	A
Surge forward current	t_p = 10 ms, Tvj = 150°C	I_{FSM}	990	A
I^2t - value	t_p = 10 ms, Tvj = 150°C	I^2t	4950	A^2s

Characteristic value

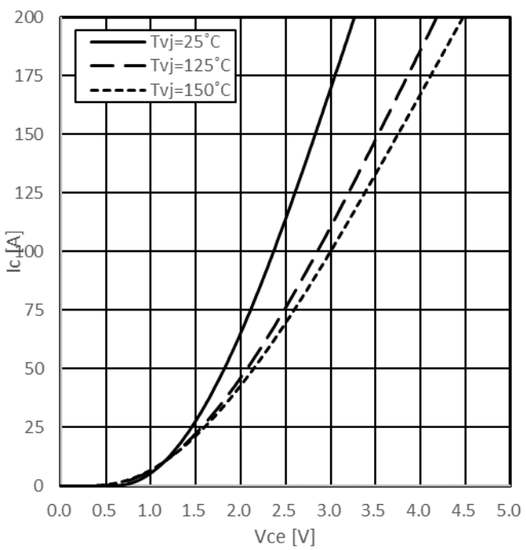
			min.	typ.	max.	
Forward voltage	T_{vj} = 150°C, I_F = 100 A	V_F		1.15		V
Reverse current	T_{vj} = 150°C, V_R = 1600 V	I_R		1		mA
Thermal resistance, junction to case	Per Diode	R_{thJC}			0.44	K/W

NTC-Thermistor

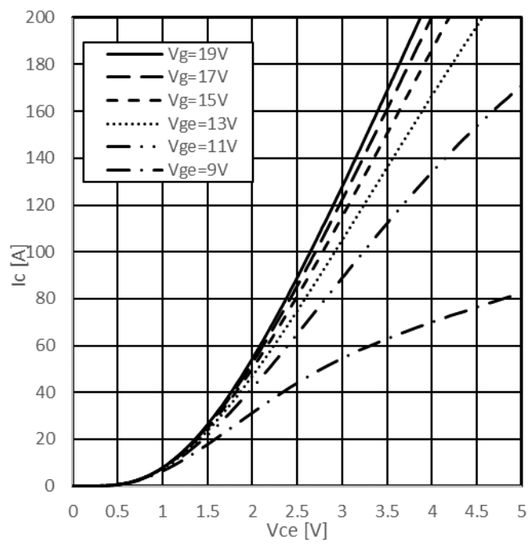
Characteristic value

			min.	typ.	max.	
Rated resistance	Tc = 25°C	R_{25}		5.07		KΩ
Power dissipation	Tc = 25°C	P_{25}			240	mW
B-value	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298, 15K))]$	B_{25}/B_{50}		3412.7		K
B-value	$R_2=R_{25}\exp[B_{25/75}(1/T_2-1/(298, 15K))]$	B_{25}/B_{75}		3454.8		K
B-value	$R_2=R_{25}\exp[B_{25/100}(1/T_2-1/(298, 15K))]$	B_{25}/B_{100}		3442.2		K

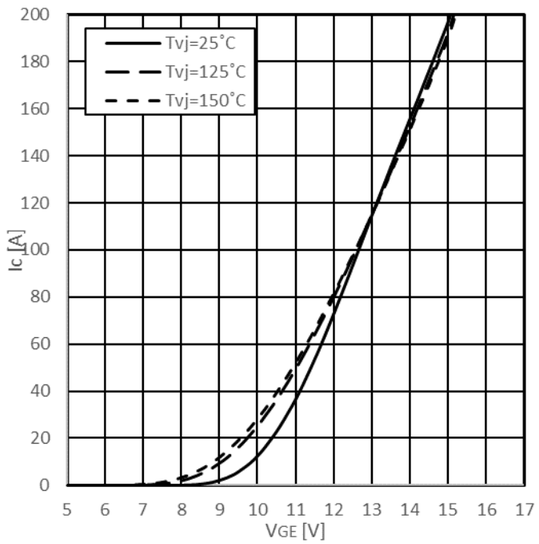
Output characteristic IGBT, Inverter (typical)
$I_C=f(V_{CE})$
$V_{GE}=15V$



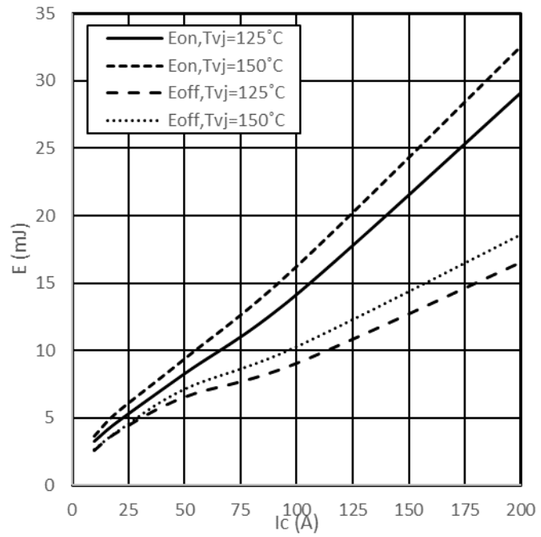
Output characteristic IGBT, Inverter (typical)
$I_C=f(V_{CE})$
$T_{vj}=150^{\circ}C$



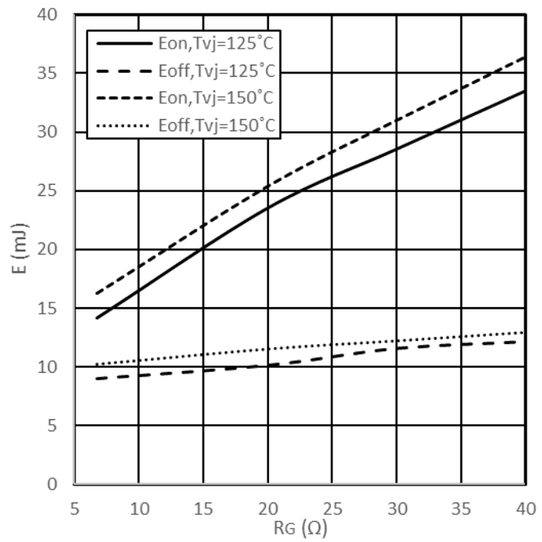
Transfer characteristic IGBT,Inverter (typical)
$I_C=f(V_{GE})$
$V_{CE}=20V$



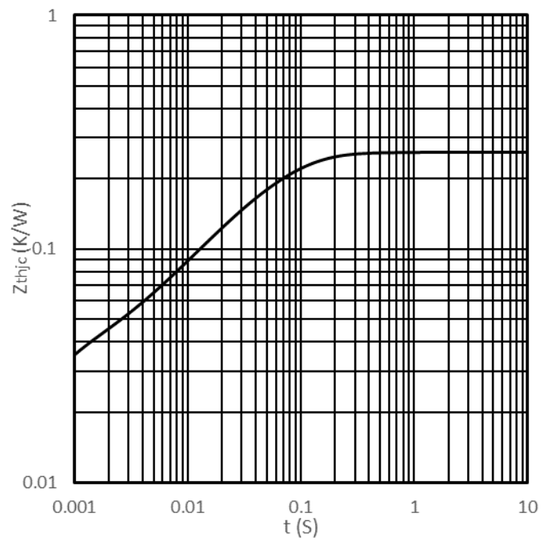
Switching losses IGBT,Inverter (typical)
$E_{on} = f(I_C)$, $E_{off} = f(I_C)$
$V_{GE} = \pm15$ V, $R_{Gon} = 6.8\Omega$, $R_{Goff} = 10\Omega$, $V_{CE} = 600$ V



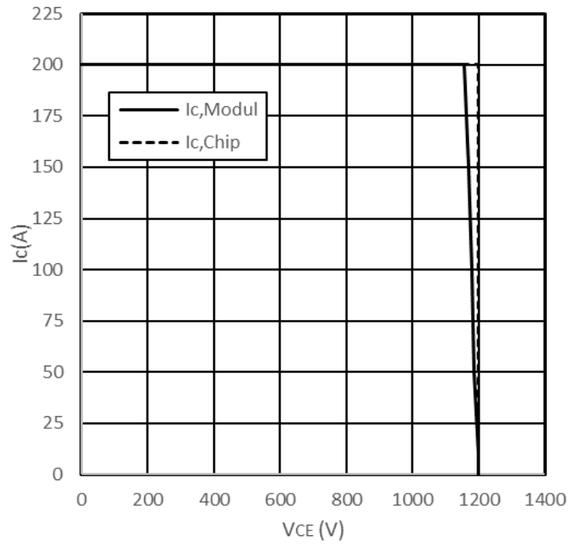
Switching losses IGBT,Inverter (typical)
$E_{on} = f(R_G)$, $E_{off} = f(R_G)$
$V_{GE} = \pm15$ V, $I_C=75A$, $V_{CE} = 600$ V



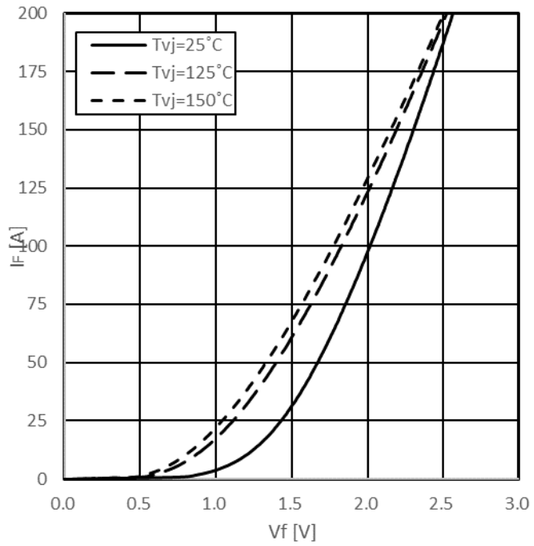
Transient thermal impedance IGBT,Inverter
$Z_{thJC} = f(t)$



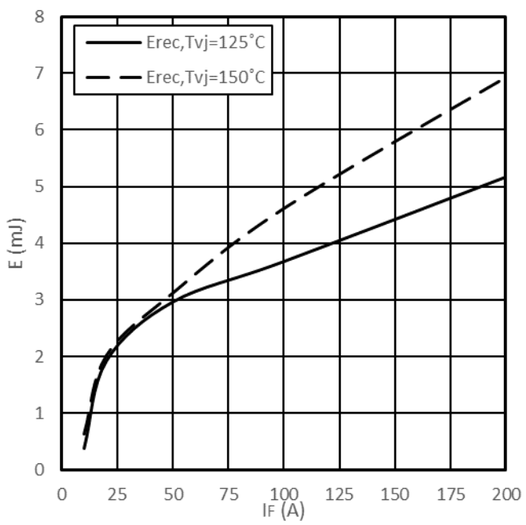
Reverse bias safe operating area IGBT,Inverter (RBSOA)
$I_C = f(V_{CE})$
$V_{GE} = \pm15$ V, $R_{Goff} = 10\Omega$, $T_{vj} = 150°C$



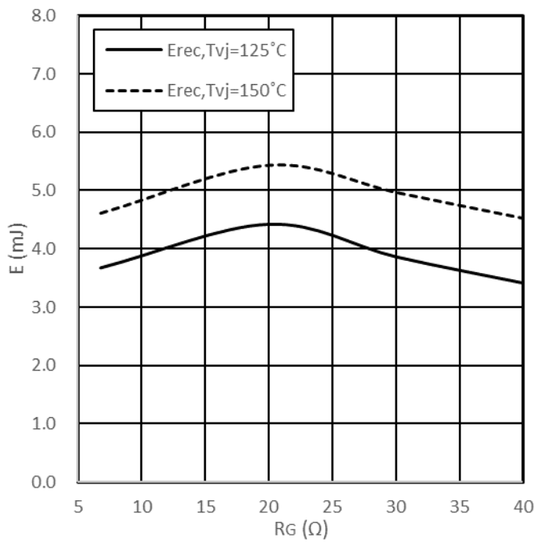
Forward characteristic of Diode, Inverter (typical)
$I_F = f(V_F)$



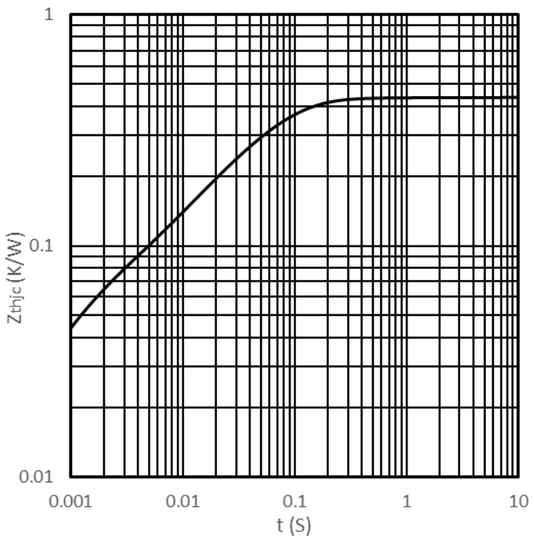
Switching losses Diode, Inverter (typical)
Erec = f (IF)
RGon = 6.8Ω, VCE = 600 V



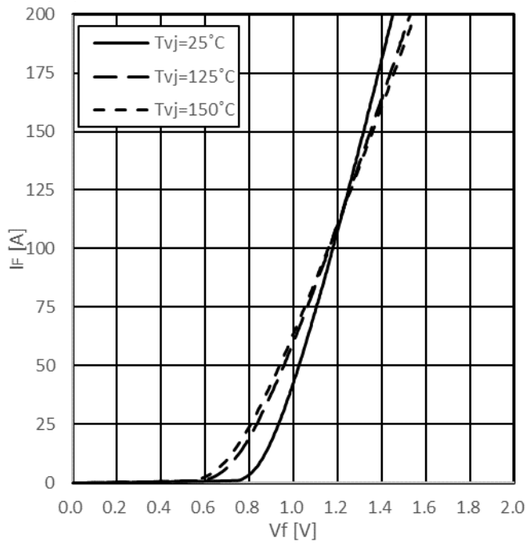
Switching losses Diode, Inverter (typical)
Erec = f (RG)
IF = 100 A, VCE = 600 V



Transient thermal impedance Diode, Inverter
ZthJC = f (t)

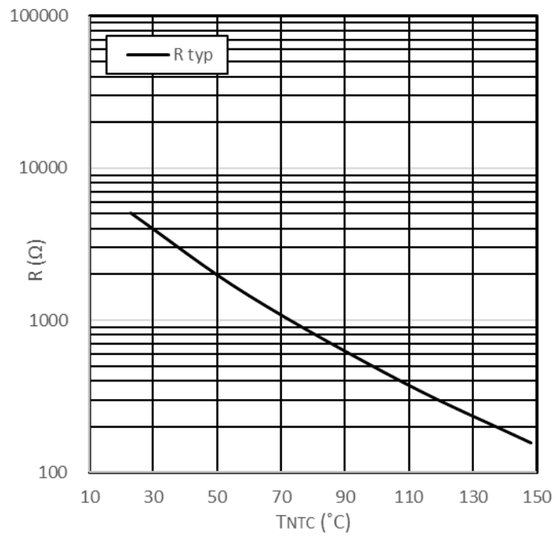


Forward characteristic of Diode, Rectifier (typical)
$I_F = f(V_F)$



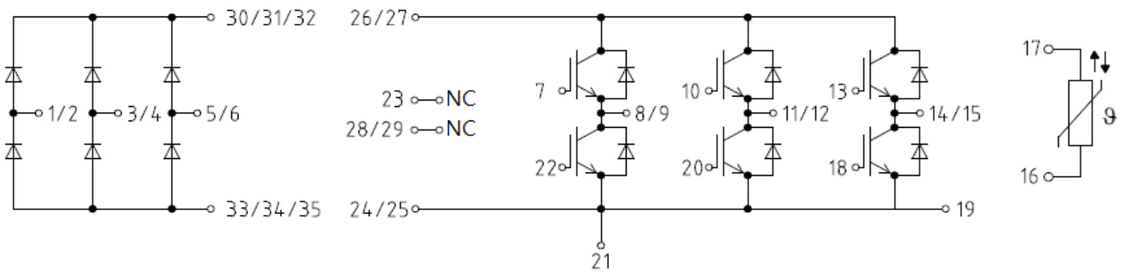
NIETZ PB100G120K0AUE00

NTC-Thermistor-temperature characteristic (typical)
R=f(T)

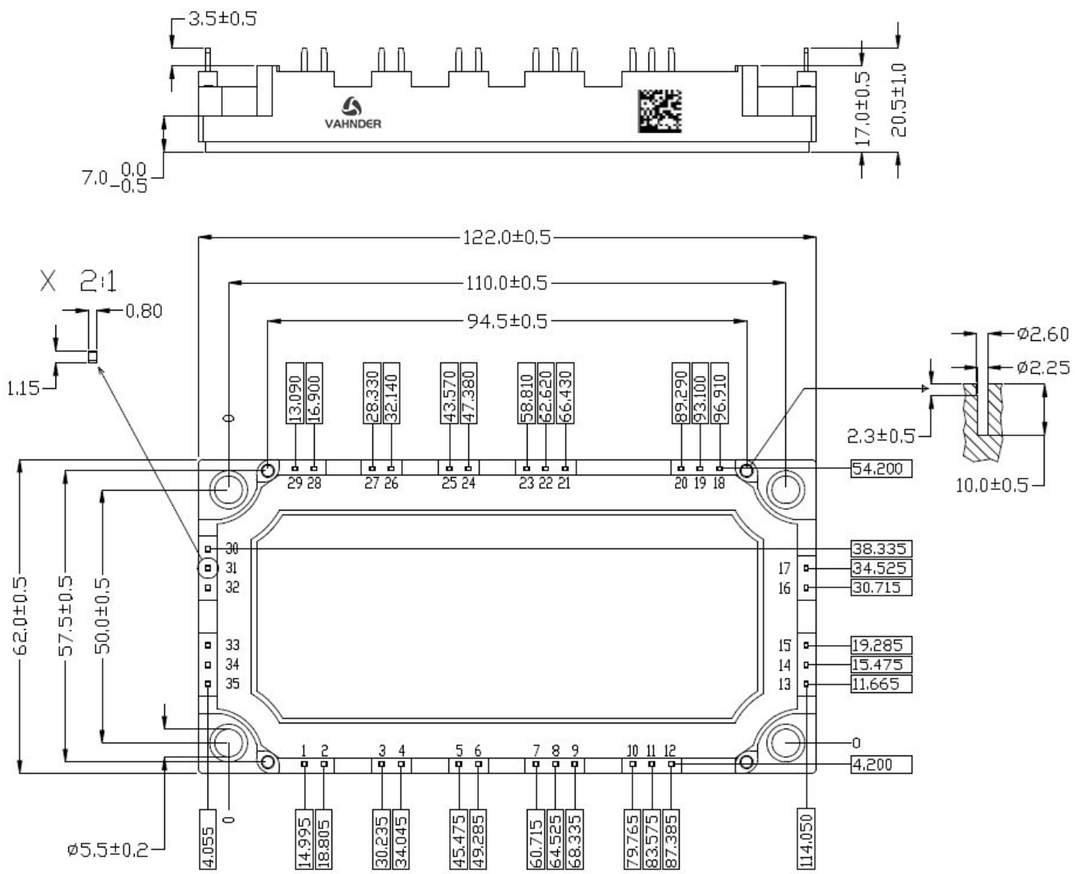


NIETZ	PB100G120K0AUE00

Circuit Diagram



Package outlines



PA150G120K1AUEAU

1200V150A EconoPIM3 IGBT Module

IGBT, Inverter

Maximum Rated Values

Collector-emitter voltage	T_{vj} = 25°C	V_{CES}	1200		V
Continuous DC collector current	T_C = 100°C, T_{vj} max = 150°C	$I_{C\ nom}$	150		A
Repetitive peak collector current	t_P = 1 ms	I_{CRM}	340		A
Total power dissipation	T_C = 25°C, T_{vj} max = 150	P_{tot}	410		W
Gate-emitter peak voltage		V_{GES}	+/- 20		V

Characteristic value

				min.	typ.	max.	
Collector-emitter saturation voltage	I_C = 150 A, V_{GE} = 15 V	T_{vj} = 25°C	$V_{CE,sat}$		1.74		V
	I_C = 150 A, V_{GE} = 15 V	T_{vj} = 125°C					V
	I_C = 150 A, V_{GE} = 15 V	T_{vj} = 150°C			2.13		V
Gate threshold voltage	I_C = 2.8mA, V_{CE} = V_{GE}, T_{vj} = 25°C		$V_{GE,th}$	5.0	6.0	6.5	V
Gate charge	V_{GE} = -15 V ... +15 V		Q_G				µC
Internal gate resistor	T_{vj} = 25°C		R_{Gint}				Ω
Input capacitance	f=1MHz, T_{vj}=25°C, V_{CE}=25V, V_{GE}=0V		C_{ies}				nF
Reverse transfer capacitance	f=1MHz, T_{vj}=25°C, V_{CE}=25V, V_{GE}=0V		C_{res}				nF
Collector-emitter cut-off current	V_{CE} = 1200 V, V_{GE} = 0 V, T_{vj} = 25°C		I_{CES}			1	mA
Gate-emitter leakage current	V_{CE} = 0 V, V_{GE} = 20 V, T_{vj} = 25°C		I_{GES}			100	nA
Turn-on delay time, inductive load	I_C = 150A, V_{CE} = 600V	T_{vj} = 25°C	$T_{d,on}$		0.32		us
	V_{GE} = +15/-15V	T_{vj} = 125°C					us
	$R_{G,on}$ = 15Ω	T_{vj} = 150°C					us
Rise time, inductive load	I_C = 150A, V_{CE} = 600V	T_{vj} = 25°C	T_r		0.09		us
	V_{GE} = +15/-15V	T_{vj} = 125°C					us
	$R_{G,on}$ = 15Ω	T_{vj} = 150°C					us
Turn-off delay time, inductive load	I_C = 150A, V_{CE} = 600V	T_{vj} = 25°C	$T_{d,off}$		0.65		us
	V_{GE} = +15/-15V	T_{vj} = 125°C					us
	R_{Goff} = 15Ω	T_{vj} = 150°C					us
Fall time, inductive load	I_C = 150A, V_{CE} = 600V	T_{vj} = 25°C	T_f		1.1		us
	V_{GE} = +15/-15V	T_{vj} = 125°C					us
	R_{Goff} = 15Ω	T_{vj} = 150°C					us
Turn-on energy loss per pulse	I_C =150A, V_{CE} = 600V, L_S =35 nH	T_{vj} = 25°C	E_{on}		43.1		mJ
	V_{GE} = +15/-15V,	T_{vj} = 125°C					mJ
	R_{Gon} = 15Ω	T_{vj} = 150°C					mJ
Turn-off energy loss per pulse	I_C = 150A, V_{CE} = 600V, L_S = 35nH	T_{vj} = 25°C	E_{off}		23.0		mJ
	V_{GE} =+15/-15V,	T_{vj} = 125°C					mJ

	R_{Goff} = 15Ω T_{vj} = 150°C					mJ
SC data	V_{GE} ≤15V, V_{CC} =600 V, t_P ≤ 8 µs, T_{vj} = 25°C , R_G =10Ω , C_{GE} = 0.0UF , V_{CEmax} = V_{CES} -L_{sCE} ·di/dt	I_{SC}		740		A
Thermal resistance, junction to case	per IGBT, grease = 1.3 W/(m·K)	$R_{th,JC}$			0.30	K/W

Diode, Inverter

Maximum Rated Values

Repetitive peak reverse voltage	T_{vj} = 25°C	V_{RRM}		1200	V
Continuous DC forward current		I_F		150	A
Repetitive peak forward current	t_P = 1 ms	I_{FRM}		300	A

Characteristic value

				min.	typ.	max.	
Forward voltage	I_F = 150 A, V_{GE} = 0 V	T_{vj} = 25°C	V_F		2.06		V
	I_F = 150 A, V_{GE} = 0 V	T_{vj} = 125°C					V
	I_F = 150 A, V_{GE} = 0 V	T_{vj} = 150°C			1.78		V
Peak reverse recovery current	I_F = 150A, V_R = 600V	T_{vj} = 25°C	I_{RM}		145		A
	V_{GE} = -15V	T_{vj} = 125°C					
		T_{vj} = 150°C					
Recovered charge	I_F = 150A, V_R = 600V	T_{vj} = 25°C	Q_r		25.8		µC
	V_{GE} = -15V	T_{vj} = 125°C					
		T_{vj} = 150°C					
Reverse recovery energy	I_F = 150A, V_R = 600V	T_{vj} = 25°C	E_{rec}		5.8		mJ
	V_{GE} = -15V	T_{vj} = 125°C					
		T_{vj} = 150°C					
Thermal resistance, junction to case	Per diode, grease = 1.3 W/(m·K)		$R_{th,JC}$			0.39	K/W

Diode, Rectifier

Maximum Rated Values

Repetitive peak reverse voltage	T_{vj} = 25°C	V_{RRM}	1600	V
Average Rectified Output current	V_F = 1.2, T_{vj} = 150°C	I_F	150	A
Surge forward current	t_p = 10 ms, Tvj = 150°C	I_{FSM}	1120	A
I^2t - value	t_p = 10 ms, Tvj = 150°C	I^2t	6272	A^2s

Characteristic value

			min.	typ.	max.	
Forward voltage	T_{vj} = 150°C, I_F = 150 A	V_F		1.11		V
Reverse current	T_{vj} = 150°C, V_R = 1600 V	I_R		0.54		mA
Thermal resistance, junction to case	per Diode	R_{thJC}			0.36	K/W
Thermal resistance, junction to	per Diode, λ grease = 1.3 W/(m·K)	R_{thJH}				K/W

heatsink						

IGBT, Brake-Chopper

Maximum Rated Values

Collector-emitter voltage	T_{vj} = 25°C	V_{CES}	1200	V
Continuous DC collector current	T_C = 100°C, T_{vj} max = 150°C	$I_{C\ nom}$	100	A
Repetitive peak collector current	t_P = 1 ms	I_{CRM}	200	A
Total power dissipation	T_C = 25°C, T_{vj} max = 150	P_{tot}	410	W
Gate-emitter peak voltage		V_{GES}	+/- 20	V

Characteristic value

				min.	typ.	max.	
Collector-emitter saturation voltage	I_C = 100 A, V_{GE} = 15 V	T_{vj} = 25°C	$V_{CE,sat}$		2.15		V
	I_C = 100 A, V_{GE} = 15 V	T_{vj} = 125°C			2.27		V
	I_C = 100 A, V_{GE} = 15 V	T_{vj} = 150°C			2.29		V
Gate threshold voltage	I_C = 5.7mA, V_{CE} = V_{GE}, T_{vj} = 25°C		$V_{GE,th}$	5.0	5.8	6.5	V
Gate charge	V_{GE} = -15 V ... +15 V		Q_G		1.73		µC
Internal gate resistor	T_{vj} = 25°C		R_{Gint}		2.1		Ω
Input capacitance	f=1MHz, T_{vj}=25°C,V_{CE}=25V, V_{GE}=0V		C_{ies}		21.59		nF
Reverse transfer capacitance	f=1MHz, T_{vj}=25°C,V_{CE}=25V, V_{GE}=0V		C_{res}		0.165		nF
Collector-emitter cut-off current	V_{CE} = 1200 V, V_{GE} = 0 V, T_{vj} = 25°C		I_{CES}			1	mA
Gate-emitter leakage current	V_{CE} = 0 V, V_{GE} = 20 V, T_{vj} = 25°C		I_{GES}			100	nA
Turn-on delay time, inductive load	I_C = 100A, V_{CE} = 600V	T_{vj} = 25°C			0.298		us
	V_{GE} = +15/-15V	T_{vj} = 125°C	$T_{d,on}$		0.2753		us
	$R_{G,on}$ = 15Ω	T_{vj} = 150°C					us
Rise time, inductive load	I_C = 100A, V_{CE} = 600V	T_{vj} = 25°C			0.077		us
	V_{GE} = +15/-15V	T_{vj} = 125°C	T_r		0.094		us
	$R_{G,on}$ = 15Ω	T_{vj} = 150°C					us
Turn-off delay time, inductive load	I_C = 100A, V_{CE} = 600V	T_{vj} = 25°C			0.505		us
	V_{GE} = +15/-15V	T_{vj} = 125°C	$T_{d,off}$		0.559		us
	R_{Goff} = 15Ω	T_{vj} = 150°C					us
Fall time, inductive load	I_C = 100A, V_{CE} = 600V	T_{vj} = 25°C			0.124		us
	V_{GE} = +15/-15V	T_{vj} = 125°C	T_f		0.339		us
	R_{Goff} = 15Ω	T_{vj} = 150°C					us
Turn-on energy loss per pulse	I_C =100A, V_{CE} = 600V, L_S =35 nH	T_{vj} = 25°C			16.49		mJ
	V_{GE} = +15/-15V,	T_{vj} = 125°C	E_{on}				mJ
	R_{Gon} = 15Ω	T_{vj} = 150°C					mJ

Turn-off energy loss per pulse	I_C = 100A, V_{CE} = 600V, L_S = 35nH	T_{vj} = 25°C	E_{off}		15.59		mJ
	V_{GE} =+15/-15V,	T_{vj} = 125°C			20.71		mJ
	R_{Goff} = 15Ω	T_{vj} = 150°C					mJ
SC data	V_{GE} ≤15V, V_{CC} =600 V, t_P ≤ 8 µs, T_{vj} = 25°C , R_G =10Ω , C_{GE} = 0.0uF , V_{CEmax} = V_{CES} -L_{sCE} ·di/dt		I_{SC}		520		A
Thermal resistance, junction to case	per IGBT, grease = 1.3 W/(m·K)		$R_{th,JC}$			0.30	K/W

Diode, Brake-Chopper

Maximum Rated Values

Repetitive peak reverse voltage	T_{vj} = 25°C		V_{RRM}		1200	V
Continuous DC forward current			I_F		100	A
Repetitive peak forward current	t_P = 1 ms		I_{FRM}		200	A

Characteristic value

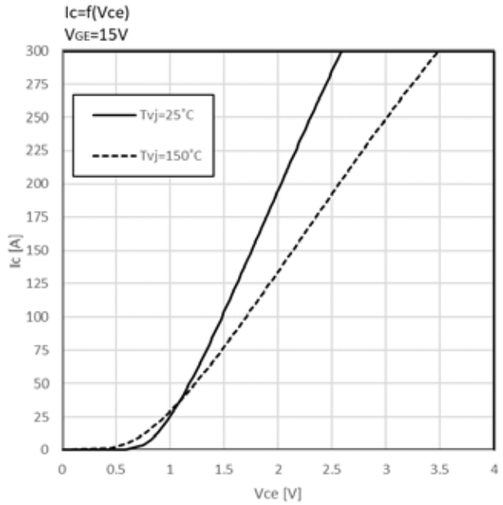
				min.	typ.	max.	
Forward voltage	I_F = 100 A, V_{GE} = 0 V	T_{vj} = 25°C	V_F		2.00		V
	I_F = 100 A, V_{GE} = 0 V	T_{vj} = 125°C					V
	I_F = 100 A, V_{GE} = 0 V	T_{vj} = 150°C			1.75		V
Peak reverse recovery current	I_F = 100A, V_R = 600V	T_{vj} = 25°C	I_{RM}		98		A
	V_{GE} = -15V	T_{vj} = 125°C					
		T_{vj} = 150°C					
Recovered charge	I_F = 100A, V_R = 600V	T_{vj} = 25°C	Q_r		26.4		µC
	V_{GE} = -15V	T_{vj} = 125°C					
		T_{vj} = 150°C					
Reverse recovery energy	I_F = 100A, V_R = 600V	T_{vj} = 25°C	E_{rec}		9.4		mJ
	V_{GE} = -15V	T_{vj} = 125°C					
		T_{vj} = 150°C					
Thermal resistance, junction to case	Per diode, grease = 1.3 W/(m·K)		$R_{th,JC}$			0.465	K/W

NTC-Thermistor

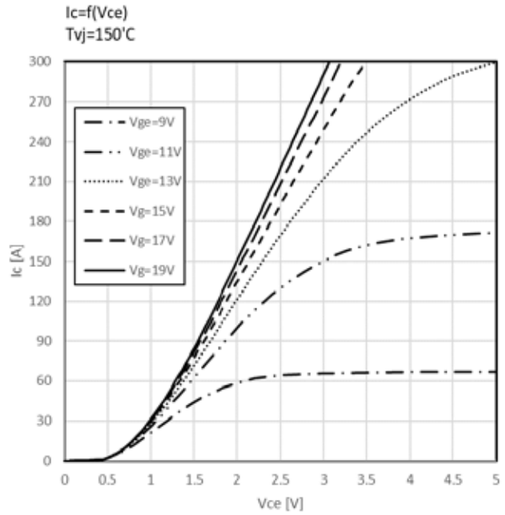
Characteristic value

			min.	typ.	max.	
Rated resistance	Tc = 25°C	R_{25}		5.07		KΩ
Power dissipation	Tc = 25°C	P_{25}			240	mW
B-value	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298, 15K))]$	B_{25}/B_{50}		3412.7		K
B-value	$R_2=R_{25}\exp[B_{25/75}(1/T_2-1/(298, 15K))]$	B_{25}/B_{75}		3454.8		K
B-value	$R_2=R_{25}\exp[B_{25/100}(1/T_2-1/(298, 15K))]$	B_{25}/B_{100}		3442.2		K

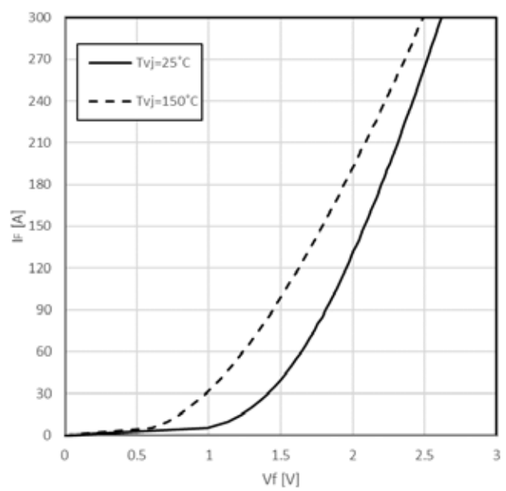
Output characteristic IGBT, Inverter (typical)



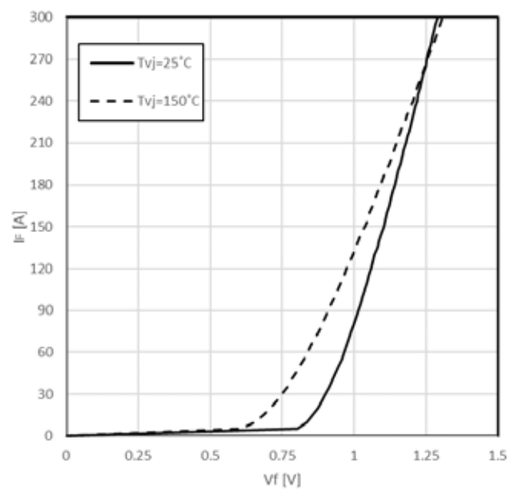
Output characteristic IGBT, Inverter (typical)



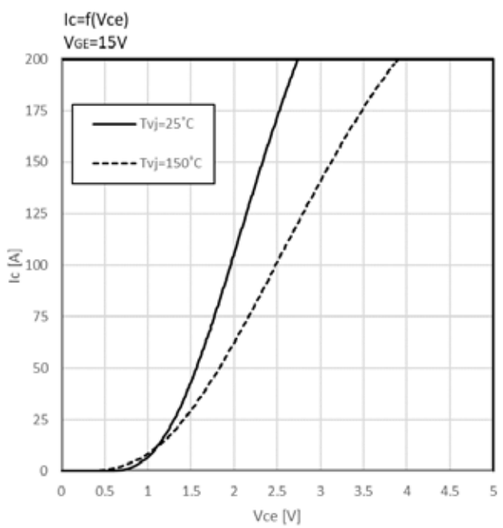
Forward characteristic of Diode, Inverter (typical)
$I_F = f(V_F)$



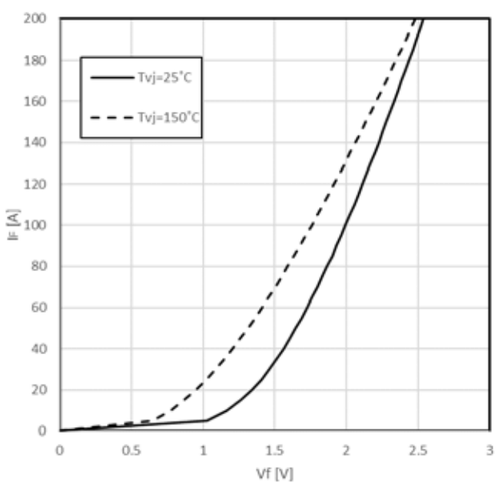
Forward characteristic of Diode, Rectifier (typical)
$I_F = f(V_F)$



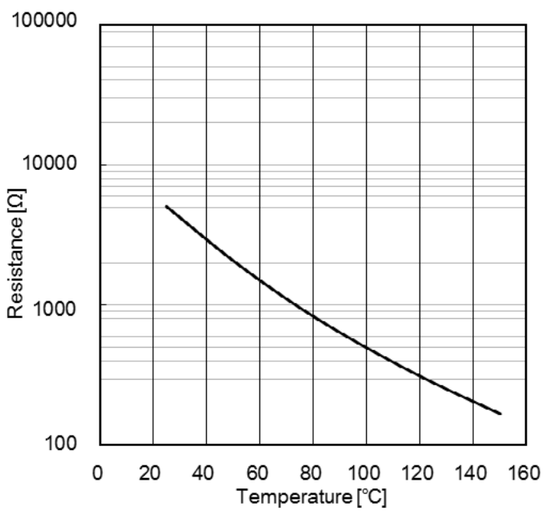
Output characteristic IGBT, Brake-Chopper (typical)



Forward characteristic of Diode, Brake-Chopper (typical)
$I_F = f(V_F)$

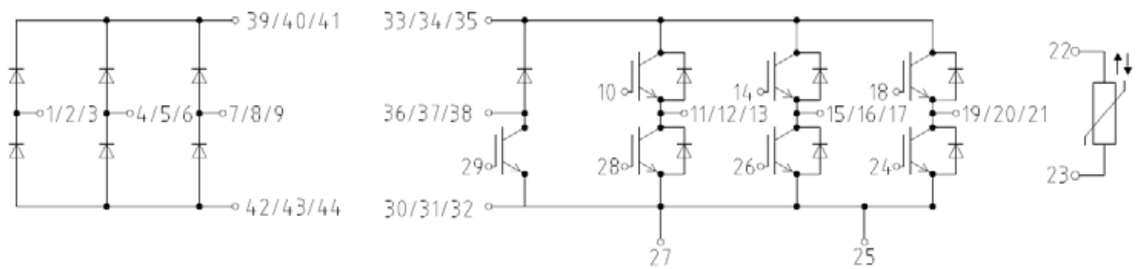


NTC-Thermistor-temperature characteristic (typical) R=f(T)

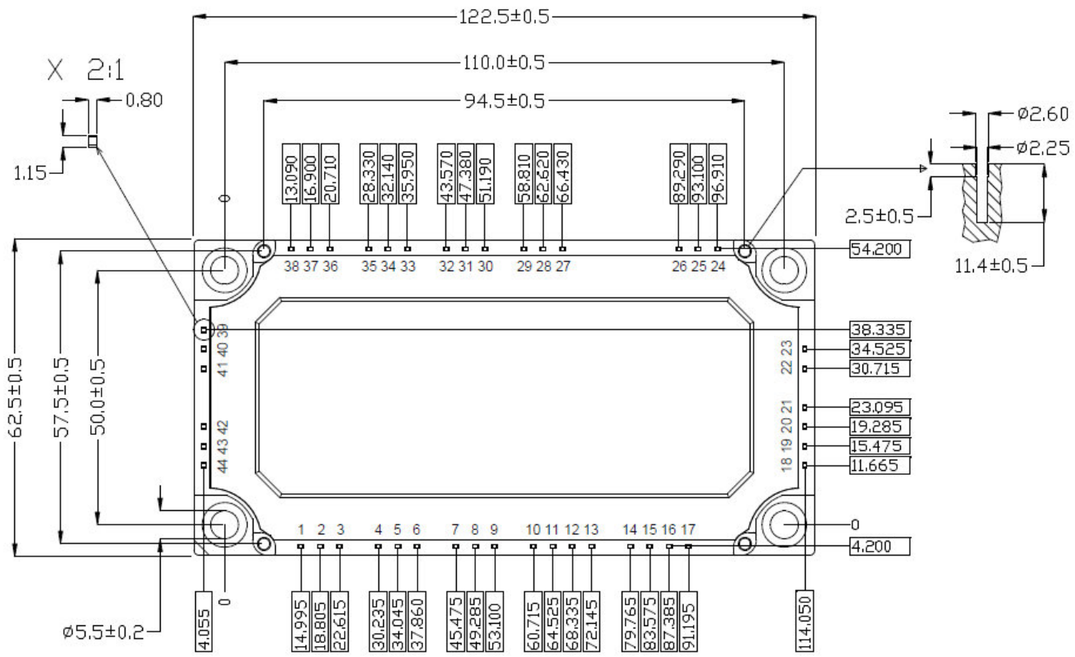


NIETZ PA150G120K1AUEAU

Circuit Diagram



Package outlines



PB150G120K1AUE00

1200V150A EconoPIM3 IGBT Module

IGBT, Inverter

Maximum Rated Values

Collector-emitter voltage	T_{vj} = 25°C	V_{CES}	1200	V
Continuous DC collector current	T_C = 100°C, T_{vj} max = 150°C	$I_{C\ nom}$	150	A
Repetitive peak collector current	t_P = 1 ms	I_{CRM}	340	A
Total power dissipation	T_C = 25°C, T_{vj} max = 150	P_{tot}	410	W
Gate-emitter peak voltage		V_{GES}	+/- 20	V

Characteristic value

				min.	typ.	max.	
Collector-emitter saturation voltage	I_C = 150 A, V_{GE} = 15 V	T_{vj} = 25°C	$V_{CE,sat}$		1.74		V
	I_C = 150 A, V_{GE} = 15 V	T_{vj} = 125°C					V
	I_C = 150 A, V_{GE} = 15 V	T_{vj} = 150°C			2.13		V
Gate threshold voltage	I_C = 1mA, V_{CE} = V_{GE}, T_{vj} = 25°C		$V_{GE,th}$	5.0	6.0	6.5	V
Gate charge	V_{GE} = -15 V ... +15 V		Q_G				µC
Internal gate resistor	T_{vj} = 25°C		R_{Gint}				Ω
Input capacitance	f=1MHz, T_{vj}=25°C, V_{CE}=25V, V_{GE}=0V		C_{ies}				nF
Reverse transfer capacitance	f=1MHz, T_{vj}=25°C, V_{CE}=25V, V_{GE}=0V		C_{res}				nF
Collector-emitter cut-off current	V_{CE} = 1200 V, V_{GE} = 0 V, T_{vj} = 25°C		I_{CES}			1	mA
Gate-emitter leakage current	V_{CE} = 0 V, V_{GE} = 20 V, T_{vj} = 25°C		I_{GES}			100	nA
Turn-on delay time, inductive load	I_C = 150A, V_{CE} = 600V	T_{vj} = 25°C	$T_{d,on}$		0.32		us
	V_{GE} = +15/-15V	T_{vj} = 125°C					us
	$R_{G,on}$ = 15Ω	T_{vj} = 150°C					us
Rise time, inductive load	I_C = 150A, V_{CE} = 600V	T_{vj} = 25°C	T_r		0.09		us
	V_{GE} = +15/-15V	T_{vj} = 125°C					us
	$R_{G,on}$ = 15Ω	T_{vj} = 150°C					us
Turn-off delay time, inductive load	I_C = 150A, V_{CE} = 600V	T_{vj} = 25°C	$T_{d,off}$		0.65		us
	V_{GE} = +15/-15V	T_{vj} = 125°C					us
	R_{Goff} = 15Ω	T_{vj} = 150°C					us
Fall time, inductive load	I_C = 150A, V_{CE} = 600V	T_{vj} = 25°C	T_f		1.1		us
	V_{GE} = +15/-15V	T_{vj} = 125°C					us
	R_{Goff} = 15Ω	T_{vj} = 150°C					us
Turn-on energy loss per pulse	I_C =150A, V_{CE} = 600V, L_S =35 nH	T_{vj} = 25°C	E_{on}		43.1		mJ
	V_{GE} = +15/-15V,	T_{vj} = 125°C					mJ
	R_{Gon} = 15Ω	T_{vj} = 150°C					mJ
Turn-off energy loss per pulse	I_C = 150A, V_{CE} = 600V, L_S = 35nH	T_{vj} = 25°C	E_{off}		23.0		mJ
	V_{GE} =+15/-15V,	T_{vj} = 125°C					mJ

	R_{Goff} = 15Ω T_{vj} = 150°C					mJ
SC data	V_{GE} ≤15V, V_{CC} =600 V, t_P ≤ 8 µs, T_{vj} = 25°C , R_G =10Ω , C_{GE} = 0.0UF , V_{CEmax} = V_{CES} -L_{sCE} ·di/dt	I_{SC}		740		A
Thermal resistance, junction to case	per IGBT, grease = 1.3 W/(m·K)	$R_{th,JC}$			0.30	K/W

Diode, Inverter

Maximum Rated Values

Repetitive peak reverse voltage	T_{vj} = 25°C	V_{RRM}		1200	V
Continuous DC forward current		I_F		150	A
Repetitive peak forward current	t_P = 1 ms	I_{FRM}		300	A

Characteristic value

				min.	typ.	max.	
Forward voltage	I_F = 150 A, V_{GE} = 0 V	T_{vj} = 25°C	V_F		2.06		V
	I_F = 150 A, V_{GE} = 0 V	T_{vj} = 125°C					V
	I_F = 150 A, V_{GE} = 0 V	T_{vj} = 150°C			1.78		V
Peak reverse recovery current	I_F = 150A, V_R = 600V	T_{vj} = 25°C	I_{RM}		145		A
	V_{GE} = -15V	T_{vj} = 125°C					
		T_{vj} = 150°C					
Recovered charge	I_F = 150A, V_R = 600V	T_{vj} = 25°C	Q_r		25.8		µC
	V_{GE} = -15V	T_{vj} = 125°C					
		T_{vj} = 150°C					
Reverse recovery energy	I_F = 150A, V_R = 600V	T_{vj} = 25°C	E_{rec}		5.8		mJ
	V_{GE} = -15V	T_{vj} = 125°C					
		T_{vj} = 150°C					
Thermal resistance, junction to case	Per diode, grease = 1.3 W/(m·K)		$R_{th,JC}$			0.39	K/W

Diode, Rectifier

Maximum Rated Values

Repetitive peak reverse voltage	T_{vj} = 25°C	V_{RRM}	1600	V
Average Rectified Output current	V_F = 1.2, T_{vj} = 150°C	I_F	150	A
Surge forward current	t_p = 10 ms, Tvj = 150°C	I_{FSM}	1120	A
I^2t - value	t_p = 10 ms, Tvj = 150°C	I^2t	6272	A^2s

Characteristic value

				min.	typ.	max.	
Forward voltage	T_{vj} = 150°C, I_F = 150 A		V_F		1.11		V
Reverse current	T_{vj} = 150°C, V_R = 1600 V		I_R		0.54		mA
Thermal resistance, junction to case	per Diode		R_{thJC}			0.36	K/W
Thermal resistance, junction to	per Diode, λ grease = 1.3 W/(m·K)		R_{thJH}				K/W

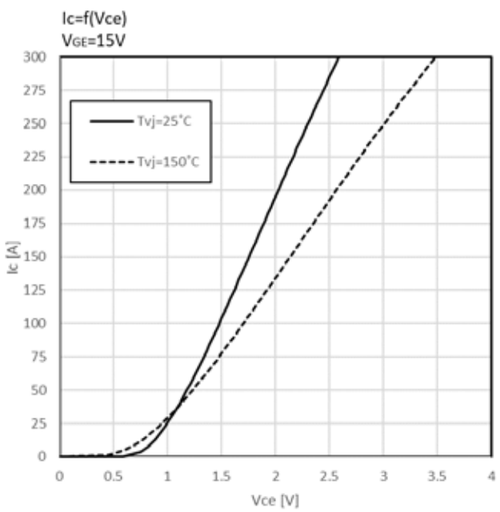
heatsink						

NTC-Thermistor

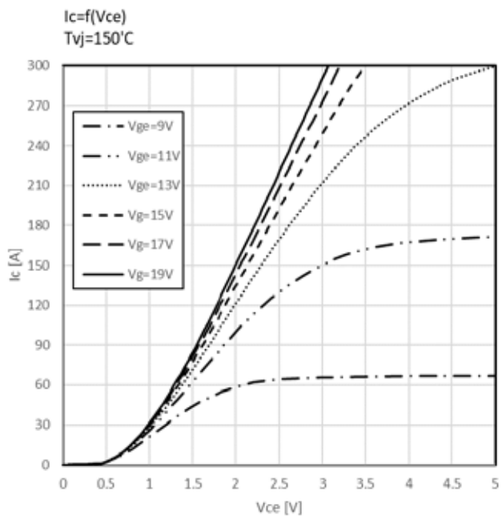
Characteristic value

			min.	typ.	max.	
Rated resistance	Tc = 25°C	R_{25}		5.07		KΩ
Power dissipation	Tc = 25°C	P_{25}			240	mW
B-value	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298, 15K))]$	B_{25}/B_{50}		3412.7		K
B-value	$R_2=R_{25}\exp[B_{25/75}(1/T_2-1/(298, 15K))]$	B_{25}/B_{75}		3454.8		K
B-value	$R_2=R_{25}\exp[B_{25/100}(1/T_2-1/(298, 15K))]$	B_{25}/B_{100}		3442.2		K

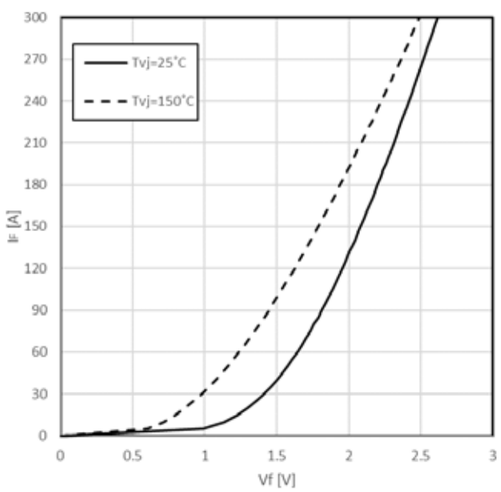
Output characteristic IGBT, Inverter (typical)



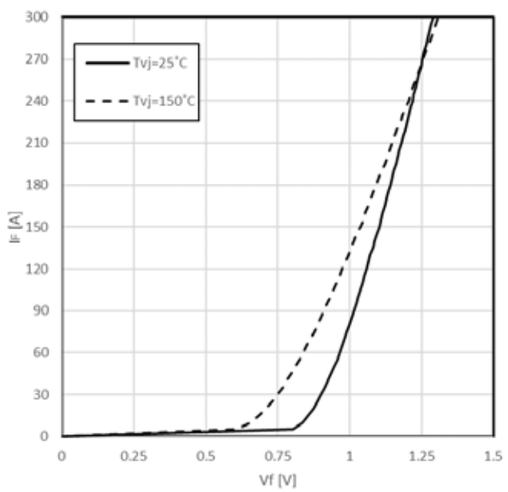
Output characteristic IGBT, Inverter (typical)



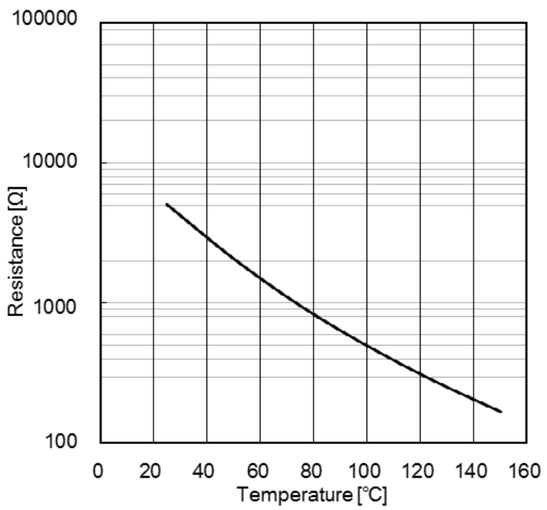
Forward characteristic of Diode, Inverter (typical)
$I_F = f(V_F)$



Forward characteristic of Diode, Rectifier (typical)
$I_F = f(V_F)$

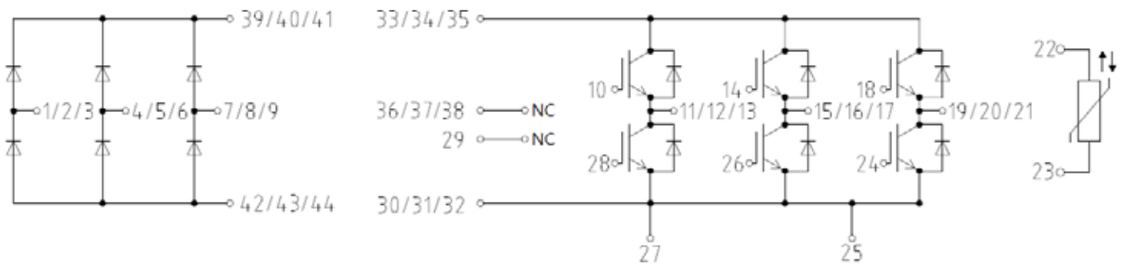


NTC-Thermistor-temperature characteristic (typical) R=f(T)

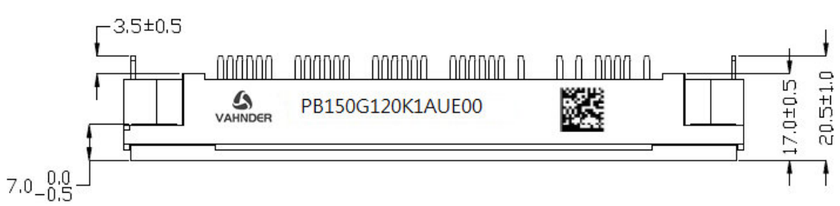


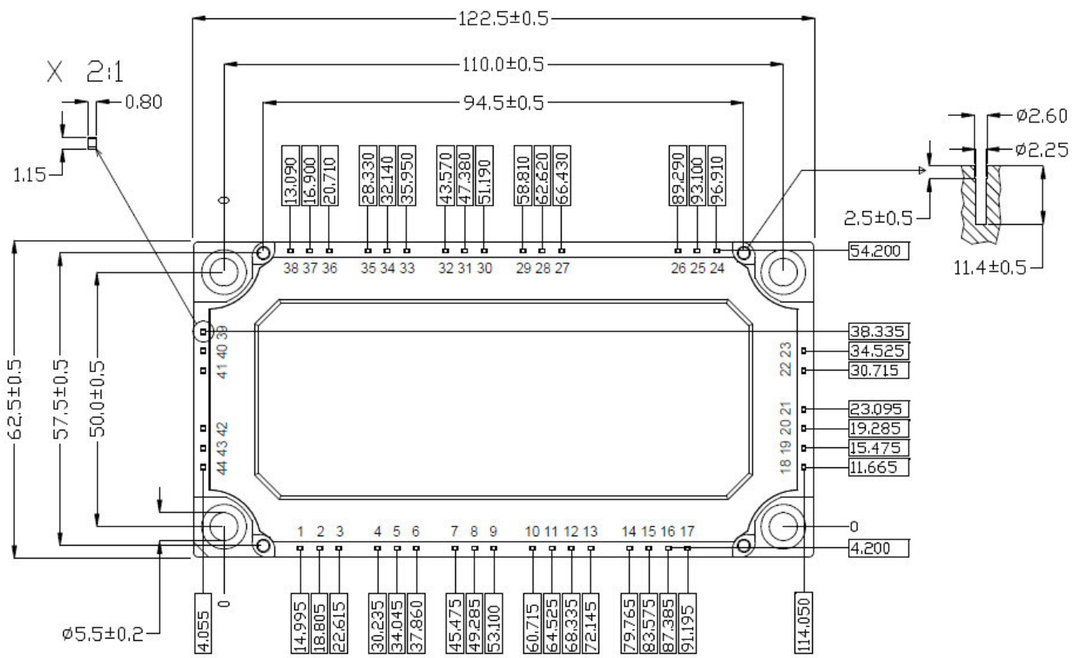
NIETZ	**PB150G120K1AUE00**

Circuit Diagram



Package outlines





DA300G120M0AU000

1200V 300A EconoDual3 IGBT Module

IGBT, Inverter

Maximum Rated Values

Collector-emitter voltage	T_{vj} = 25°C	V_{CES}	1200	V
Continuous DC collector current	T_C = 100°C, T_{vj} max = 150°C	$I_{C\ nom}$	300	A
Repetitive peak collector current	t_P = 1 ms	I_{CRM}	600	A
Total power dissipation	T_C = 25°C, T_{vj} max = 150	P_{tot}	735	W
Gate-emitter peak voltage		V_{GES}	+/- 20	V

Characteristic value

				min.	typ.	max.	
Collector-emitter saturation voltage	I_C = 300 A, V_{GE} = 15 V	T_{vj} = 25°C	$V_{CE,sat}$		1.55		V
	I_C = 300 A, V_{GE} = 15 V	T_{vj} = 125°C					V
	I_C = 300 A, V_{GE} = 15 V	T_{vj} = 150°C					V
Gate threshold voltage	I_C = 11.4mA, V_{CE} = V_{GE}, T_{vj} = 25°C		$V_{GE,th}$	5.0	6.0	6.5	V
Gate charge	V_{GE} = -15 V ... +15 V		Q_G		1.7		µC
Internal gate resistor	T_{vj} = 25°C		R_{Gint}		2.1		Ω
Input capacitance	f=1MHz, T_{vj}=25°C, V_{CE}=25V, V_{GE}=0V		C_{ies}		21.6		nF
Reverse transfer capacitance	f=1MHz, T_{vj}=25°C, V_{CE}=25V, V_{GE}=0V		C_{res}		0.16		nF
Collector-emitter cut-off current	V_{CE} = 1200 V, V_{GE} = 0 V, T_{vj} = 25°C		I_{CES}			2	mA
Gate-emitter leakage current	V_{CE} = 0 V, V_{GE} = 20 V, T_{vj} = 25°C		I_{GES}			200	nA
Turn-on delay time, inductive load	I_C = 300A, V_{CE} = 600V	T_{vj} = 25°C					us
	V_{GE} = +15/-15V	T_{vj} = 125°C	$T_{d,on}$				us
	$R_{G,on}$ = 5Ω	T_{vj} = 150°C			0.29		us
Rise time, inductive load	I_C = 300A, V_{CE} = 600V	T_{vj} = 25°C					us
	V_{GE} = +15/-15V	T_{vj} = 125°C	T_r				us
	$R_{G,on}$ = 5Ω	T_{vj} = 150°C			0.10		us
Turn-off delay time, inductive load	I_C = 300A, V_{CE} = 600V	T_{vj} = 25°C					us
	V_{GE} = +15/-15V	T_{vj} = 125°C	$T_{d,off}$				us
	R_{Goff} = 5Ω	T_{vj} = 150°C			0.74		us
Fall time, inductive load	I_C = 300A, V_{CE} = 600V	T_{vj} = 25°C					us
	V_{GE} = +15/-15V	T_{vj} = 125°C	T_f				us
	R_{Goff} = 5Ω	T_{vj} = 150°C			0.36		us
Turn-on energy loss per pulse	I_C =300A, V_{CE} = 600V, L_S =35 nH	T_{vj} = 25°C					mJ
	V_{GE} = +15/-15V,	T_{vj} = 125°C	E_{on}				mJ
	R_{Gon} = 5Ω, Tj=150°C	T_{vj} = 150°C			57		mJ
Turn-off energy loss per pulse	I_C = 300A, V_{CE} = 600V, L_S = 35nH	T_{vj} = 25°C	E_{off}				mJ
	V_{GE} =+15/-15V	T_{vj} = 125°C					mJ

	R_{Goff} = 5Ω, Tj=150°C T_{vj} = 150°C			48.6		mJ
SC data	V_{GE} ≤15V, V_{CC} =600 V, t_P ≤ 8 µs, T_{vj} = 25°C , R_G =5Ω , C_{GE} = 0.0UF , V_{CEmax} = V_{CES} -L_{sCE} ·di/dt	I_{SC}		1450		A
Thermal resistance, junction to case	per IGBT, grease = 1.3 W/(m·K)	$R_{th,JC}$			0.17	K/W

Diode, Inverter

Maximum Rated Values

Repetitive peak reverse voltage	T_{vj} = 25°C	V_{RRM}		1200	V
Continuous DC forward current		I_F		300	A
Repetitive peak forward current	t_P = 1 ms	I_{FRM}		600	A

Characteristic value

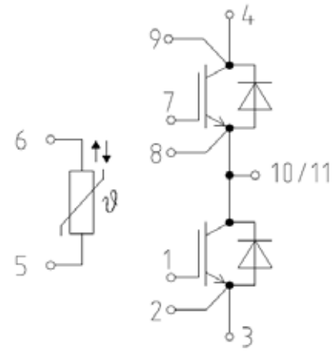
				min.	typ.	max.	
Forward voltage	I_F = 300 A, V_{GE} = 0 V	T_{vj} = 25°C	V_F		2.0		V
	I_F = 300 A, V_{GE} = 0 V	T_{vj} = 125°C					V
	I_F = 300 A, V_{GE} = 0 V	T_{vj} = 150°C					V
Peak reverse recovery current	I_F = 300A, V_R = 600V	T_{vj} = 25°C	I_{RM}				A
	V_{GE} = -15V	T_{vj} = 125°C					
		T_{vj} = 150°C			290		
Recovered charge	I_F = 300A, V_R = 600V	T_{vj} = 25°C	Q_r				µC
	V_{GE} = -15V,	T_{vj} = 125°C					
	R_{Goff} = 5Ω, Tj=150°C	T_{vj} = 150°C			50		
Reverse recovery energy	I_F = 300A, V_R = 600V	T_{vj} = 25°C	E_{rec}				mJ
	V_{GE} = -15V,	T_{vj} = 125°C					
	R_{Goff} = 5Ω, Tj=150°C	T_{vj} = 150°C			12.8		
Thermal resistance, junction to case	Per Diode		$R_{th,JC}$			0.22	K/W

NTC-Thermistor

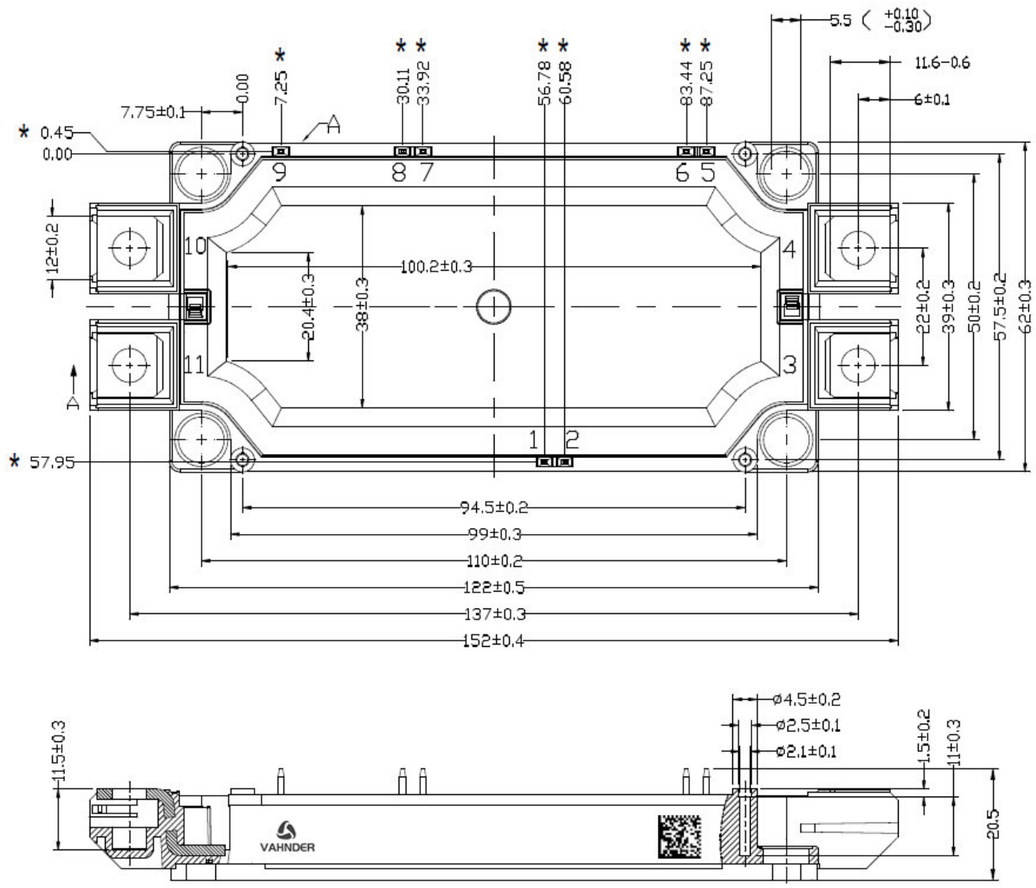
Characteristic value

			min.	typ.	max.	
Rated resistance	Tc = 25°C	R_{25}		5.07		KΩ
Power dissipation	Tc = 25°C	P_{25}			240	mW
B-value	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298, 15K))]$	B_{25}/B_{50}		3412.7		K
B-value	$R_2=R_{25}\exp[B_{25/75}(1/T_2-1/(298, 15K))]$	B_{25}/B_{75}		3454.8		K
B-value	$R_2=R_{25}\exp[B_{25/100}(1/T_2-1/(298, 15K))]$	B_{25}/B_{100}		3442.2		K

Circuit Diagram



Package outlines



DB300G120T0AU000
1200V300A IGBT Module

IGBT, Inverter

Maximum Rated Values

Collector-emitter voltage	Tvj = 25°C	V_{CES}	1200	V
Continuous DC collector current	T_C = 100°C, T_{vj} max = 150°C	$I_{C\ nom}$	300	A
Repetitive peak collector current	t_P = 1 ms	I_{CRM}	600	A
Total power dissipation	T_C = 25°C, T_{vj} max = 150 °C	P_{tot}	735	W
Gate-emitter peak voltage		V_{GES}	+/- 20	V

Characteristic value

				min.	typ.	Max.	
Collector-emitter saturation voltage	I_C = 300 A, V_{GE} = 15 V	T_{vj} = 25°C	$V_{CE,sat}$		1.55		V
	I_C = 300 A, V_{GE} = 15 V	T_{vj} = 125°C					V
	I_C = 300 A, V_{GE} = 15 V	T_{vj} = 150°C					V
Gate threshold voltage	I_C = 11.4mA, V_{CE} = V_{GE}, T_{vj} = 25°C		$V_{GE,th}$	5.0	6.0	6.5	V
Gate charge	V_{GE} = -15 V ... +15 V		Q_G		1.7		µC
Internal gate resistor	T_{vj} = 25°C		R_{Gint}		2.1		Ω
Input capacitance	f=1MHz, T_{vj}=25°C,V_{CE}=25V, V_{GE}=0V		C_{ies}		22.0		nF
Reverse transfer capacitance	f=1MHz, T_{vj}=25°C,V_{CE}=25V, V_{GE}=0V		C_{res}		0.16		nF
Collector-emitter cut-off current	V_{CE} = 1200 V, V_{GE} = 0 V, T_{vj} = 25°C		I_{CES}			2	mA
Gate-emitter leakage current	V_{CE} = 0 V, V_{GE} = 20 V, T_{vj} = 25°C		I_{GES}			200	nA
Turn-on delay time, inductive load	I_C = 300A, V_{CE} = 600V	T_{vj} = 25°C	$T_{d,on}$				ns
	V_{GE} = +15/-15V	T_{vj} = 125°C					ns
	$R_{G,on}$ = 5Ω	T_{vj} = 150°C			0.29		ns
Rise time, inductive load	I_C = 300A, V_{CE} = 600V	T_{vj} = 25°C	T_r				ns
	V_{GE} = +15/-15V	T_{vj} = 125°C					ns
	$R_{G,on}$ = 5Ω	T_{vj} = 150°C			0.11		ns
Turn-off delay time, inductive load	I_C = 300A, V_{CE} = 600V	T_{vj} = 25°C	$T_{d,off}$				ns
	V_{GE} = +15/-15V	T_{vj} = 125°C					ns
	R_{Goff} = 5Ω	T_{vj} = 150°C			0.73		ns
Fall time, inductive load	I_C = 300A, V_{CE} = 600V	T_{vj} = 25°C	T_f				ns
	V_{GE} = +15/-15V	T_{vj} = 125°C					ns
	R_{Goff} =5Ω	T_{vj} = 150°C			0.37		ns
Turn-on energy loss per pulse	I_C =300A, V_{CE} = 600V,	T_{vj} = 25°C	E_{on}				mJ
	L_S =35 nH	T_{vj} = 125°C					mJ
	V_{GE} = +15/-15V	T_{vj} = 150°C			57		mJ

	R_{Gon} = 5Ω					
Turn-off energy loss per pulse	I_C = 300A, V_{CE} = 600V, L_S = 35 nH T_{vj} = 25°C V_{GE} =+15/-15V T_{vj} = 125°C (T_{vj} = 150°C), R_{Goff} = T_{vj} = 150°C 5Ω	E_{off}		48.6		mJ mJ mJ
SC data	V_{GE} ≤15V, V_{CC} =600 V, t_P ≤ 8 µs, T_{vj} = 150°C , R_G =5Ω , V_{CEmax} = V_{CES} -L_{sCE} ·di/dt	I_{SC}		1450		A
Thermal resistance, junction to case	per IGBT, grease = 1.3 W/(m·K)	$R_{th,JC}$			0.17	K/W

Diode, Inverter

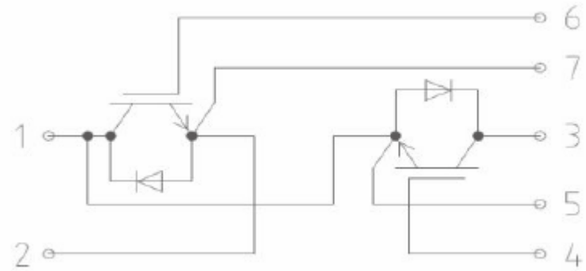
Maximum Rated Values

Repetitive peak reverse voltage	T_{vj} = 25°C	V_{RRM}	1200	V
Continuous DC forward current		I_F	300	A
Repetitive peak forward current	t_P = 1 ms	I_{FRM}	600	A
I^2t - value	V_R = 0 V, t_P = 10 ms, T_{vj} = 125°C	I^2t	18500	A^2s

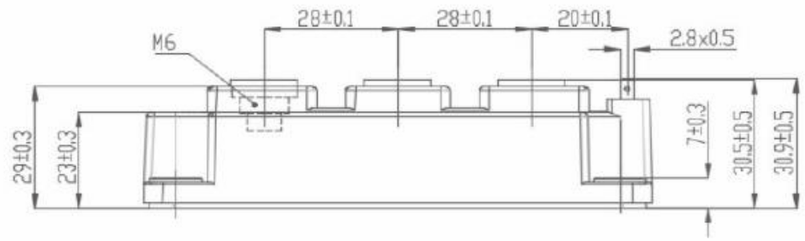
Characteristic value

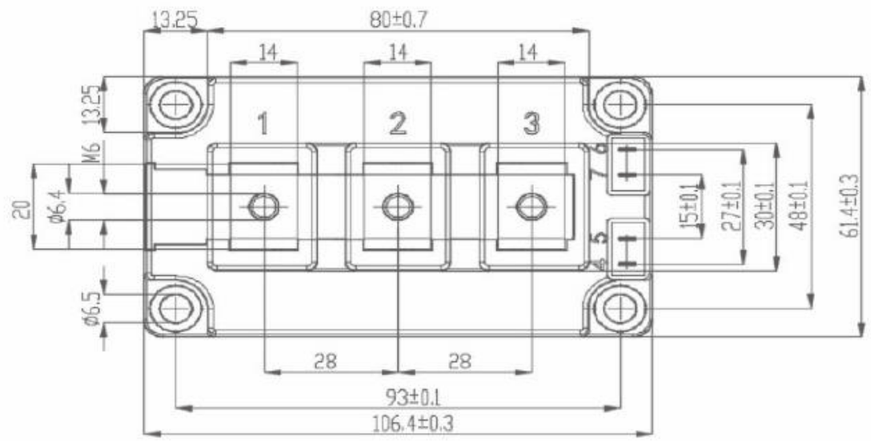
				min.	typ.	Max.	
Forward voltage	I_C = 300 A, V_{GE} = 0 V I_C = 300 A, V_{GE} = 0V I_C = 300 A, V_{GE} = 0 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	V_F		2		V V V
Peak reverse recovery current	I_F = 300A, (T_{vj} = 150°C), V_R = 600V V_{GE} = -15V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	I_{RM}		290		A A A
Recovered charge	I_F = 300A, (T_{vj} = 150°C), V_R = 600V V_{GE} = -15V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	Q_r		50		µC µC µC
Reverse recovery energy	I_F = 300A, (T_{vj} = 150°C), V_R = 600V V_{GE} = -15V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	E_{rec}		13		mJ
Thermal resistance, junction to case	Per diode		$R_{th,JC}$			0.22	K/W

Circuit Diagram



Package outlines





DA450G120M0AU000

1200V450A EconoDual3 IGBT Module

IGBT, Inverter

Maximum Rated Values

Collector-emitter voltage	T_{vj} = 25°C	V_{CES}	1200	V
Continuous DC collector current	T_C = 100°C, T_{vj} max = 150°C	$I_{C\ nom}$	450	A
Repetitive peak collector current	t_P = 1 ms	I_{CRM}	900	A
Total power dissipation	T_C = 25°C, T_{vj} max = 150	P_{tot}	950	W
Gate-emitter peak voltage		V_{GES}	+/- 20	V

Characteristic value

				min.	typ.	max.	
Collector-emitter saturation voltage	I_C = 450 A, V_{GE} = 15 V	T_{vj} = 25°C	$V_{CE,sat}$		1.6		V
	I_C = 450 A, V_{GE} = 15 V	T_{vj} = 125°C					V
	I_C = 450 A, V_{GE} = 15 V	T_{vj} = 150°C					V
Gate threshold voltage	I_C = 17.1mA, V_{CE} = V_{GE}, T_{vj} = 25°C		$V_{GE,th}$	5.0	5.8	6.5	V
Gate charge	V_{GE} = -15 V ... +15 V		Q_G				µC
Internal gate resistor	T_{vj} = 25°C		R_{Gint}				Ω
Input capacitance	f=1MHz, T_{vj}=25°C, V_{CE}=25V, V_{GE}=0V		C_{ies}				nF
Reverse transfer capacitance	f=1MHz, T_{vj}=25°C, V_{CE}=25V, V_{GE}=0V		C_{res}				nF
Collector-emitter cut-off current	V_{CE} = 1200 V, V_{GE} = 0 V, T_{vj} = 25°C		I_{CES}			3	mA
Gate-emitter leakage current	V_{CE} = 0 V, V_{GE} = 20 V, T_{vj} = 25°C		I_{GES}			300	nA
Turn-on delay time, inductive load	I_C = 450A, V_{CE} = 600V	T_{vj} = 25°C	$T_{d,on}$		0.22		us
	V_{GE} = +15/-15V	T_{vj} = 125°C					us
	$R_{G,on}$ = 2Ω	T_{vj} = 150°C					us
Rise time, inductive load	I_C = 450A, V_{CE} = 600V	T_{vj} = 25°C	T_r		0.09		us
	V_{GE} = +15/-15V	T_{vj} = 125°C					us
	$R_{G,on}$ = 2Ω	T_{vj} = 150°C					us
Turn-off delay time, inductive load	I_C = 450A, V_{CE} = 600V	T_{vj} = 25°C	$T_{d,off}$		0.70		us
	V_{GE} = +15/-15V	T_{vj} = 125°C					us
	R_{Goff} = 2Ω	T_{vj} = 150°C					us
Fall time, inductive load	I_C = 450A, V_{CE} = 600V	T_{vj} = 25°C	T_f		0.37		us
	V_{GE} = +15/-15V	T_{vj} = 125°C					us
	R_{Goff} = 2Ω	T_{vj} = 150°C					us
Turn-on energy loss per pulse	I_C =450A, V_{CE} = 600V, L_S =20 nH	T_{vj} = 25°C	E_{on}		36.0		mJ
	V_{GE} = +15/-15V,	T_{vj} = 125°C					mJ
	R_{Gon} = 2Ω	T_{vj} = 150°C					mJ
Turn-off energy loss per pulse	I_C = 450A, V_{CE} = 600V, L_S = 20nH	T_{vj} = 25°C	E_{off}		74.0		mJ
	V_{GE} =+15/-15V,	T_{vj} = 125°C					mJ

	R_{Goff} = 2Ω T_{vj} = 150°C					mJ
SC data	V_{GE} ≤15V, V_{CC} =600 V, t_P ≤ 8 µs, T_{vj} = 25°C , R_G =5Ω , C_{GE} = 0.0UF , V_{CEmax} = V_{CES} -L_{sCE} ·di/dt	I_{SC}		2100		A
Thermal resistance, junction to case	per IGBT, grease = 1.3 W/(m·K)	$R_{th,JC}$			0.13	K/W

Diode, Inverter

Maximum Rated Values

Repetitive peak reverse voltage	T_{vj} = 25°C	V_{RRM}	1200	V
Continuous DC forward current		I_F	450	A
Repetitive peak forward current	t_P = 1 ms	I_{FRM}	900	A

Characteristic value

				min.	typ.	max.	
Forward voltage	I_F = 450 A, V_{GE} = 0 V	T_{vj} = 25°C	V_F		2.0		V
	I_F = 450 A, V_{GE} = 0 V	T_{vj} = 125°C					V
	I_F = 450 A, V_{GE} = 0 V	T_{vj} = 150°C					V
Peak reverse recovery current	I_F = 450A, V_R = 600V	T_{vj} = 25°C	I_{RM}		580		A
	V_{GE} = -15V	T_{vj} = 125°C					
		T_{vj} = 150°C					
Recovered charge	I_F = 450A, V_R = 600V	T_{vj} = 25°C	Q_r		85		µC
	V_{GE} = -15V	T_{vj} = 125°C					
		T_{vj} = 150°C					
Reverse recovery energy	I_F = 450A, V_R = 600V	T_{vj} = 25°C	E_{rec}		39		mJ
	V_{GE} = -15V	T_{vj} = 125°C					
		T_{vj} = 150°C					
Thermal resistance, junction to case	Per diode, grease = 1.3 W/(m·K)		$R_{th,JC}$			0.17	K/W

NTC-Thermistor

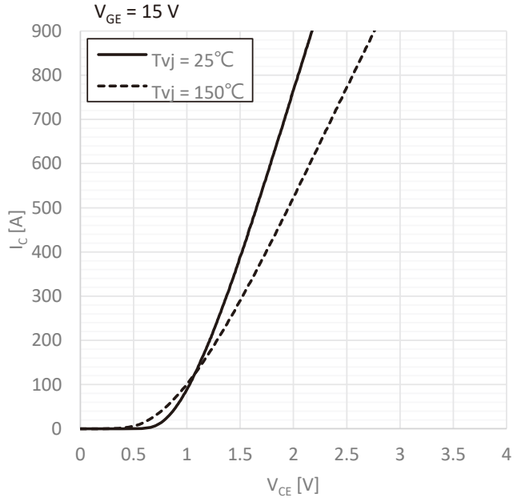
Characteristic value

			min.	typ.	max.	
Rated resistance	Tc = 25°C	R_{25}		5.07		KΩ
Power dissipation	Tc = 25°C	P_{25}			240	mW
B-value	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298, 15K))]$	B_{25}/B_{50}		3412.7		K
B-value	$R_2=R_{25}\exp[B_{25/75}(1/T_2-1/(298, 15K))]$	B_{25}/B_{75}		3454.8		K
B-value	$R_2=R_{25}\exp[B_{25/100}(1/T_2-1/(298, 15K))]$	B_{25}/B_{100}		3442.2		K

NIETZ DA450G120M0AU000

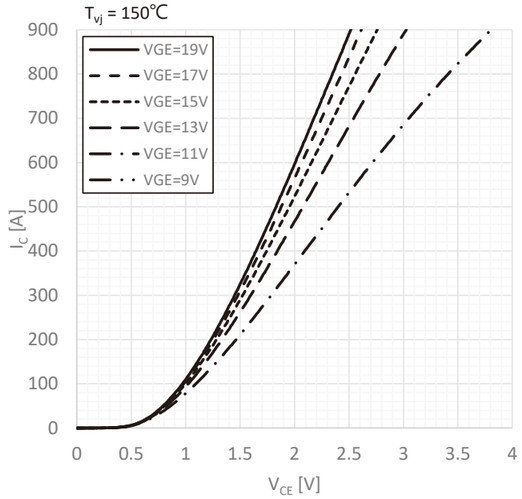
Output characteristic IGBT, Inverter (typical)

$I_C = f(V_{CE})$
V_{GE} = 15 V



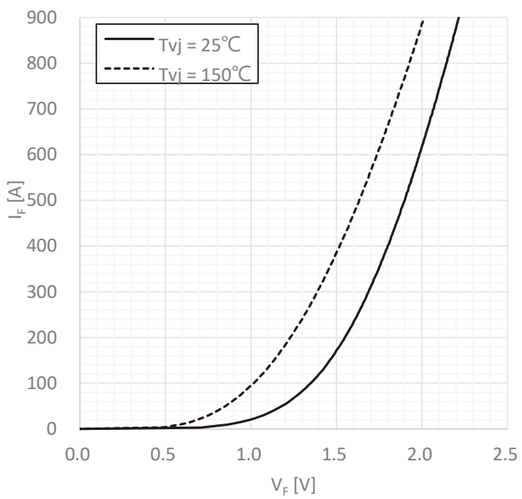
Output characteristic IGBT, Inverter (typical)

$I_C = f(V_{CE})$
T_{vj} = 150°C

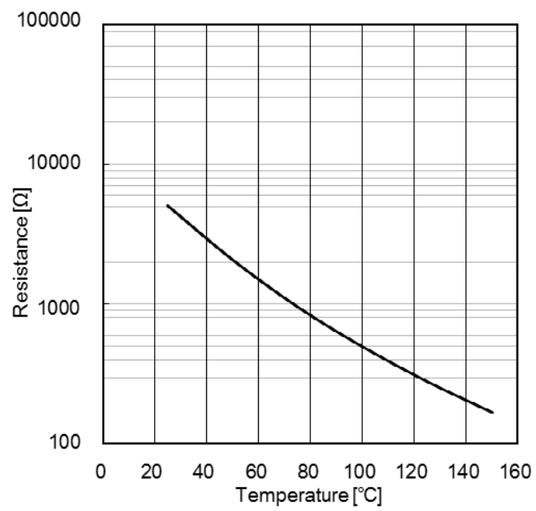


Forward characteristic of Diode, Inverter (typical)

$I_F = f(V_F)$

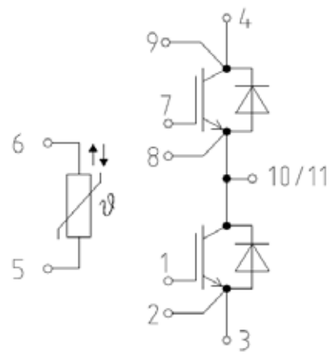
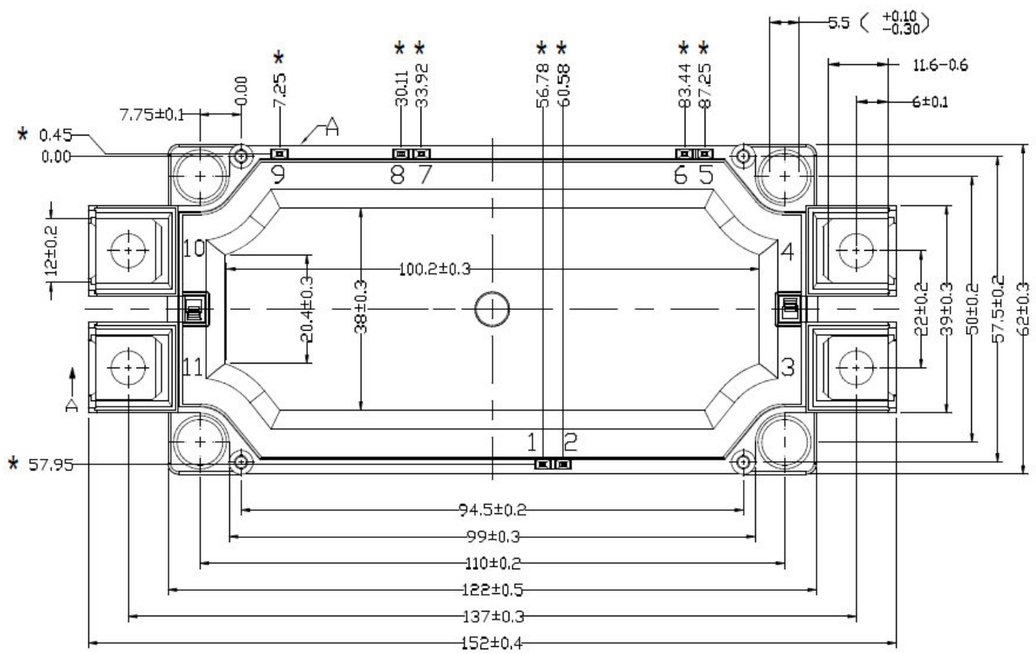
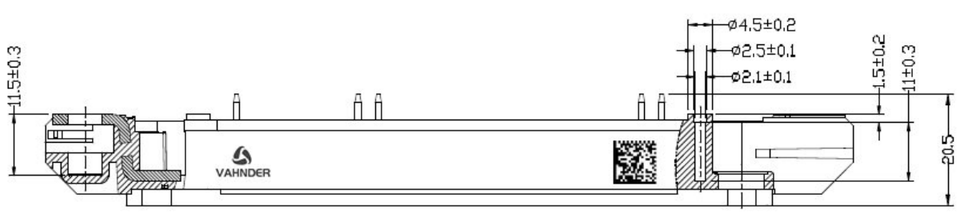


NTC-Thermistor-temperature characteristic (typical) R=f(T)



NIETZ	**DA450G120M0AU000**

Circuit Diagram



Package outlines