MG050PB120N0

1200V50A EconoPIM2 IGBT Module

NIETZ | MG050PB120N0

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	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		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		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		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		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		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		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

NIETZ

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

NIETZ

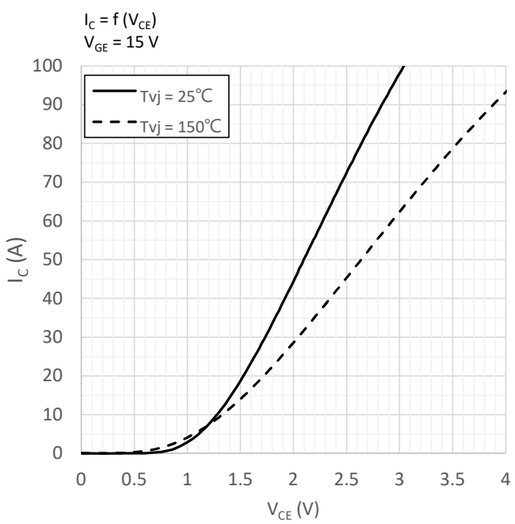
NIETZ MG050PB120N0

NTC-Thermistor

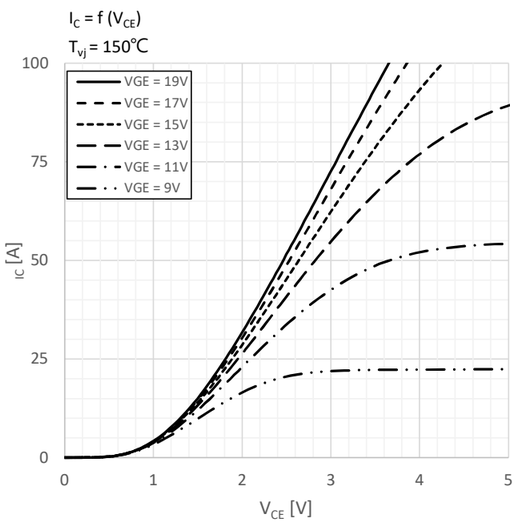
Characteristic value

			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

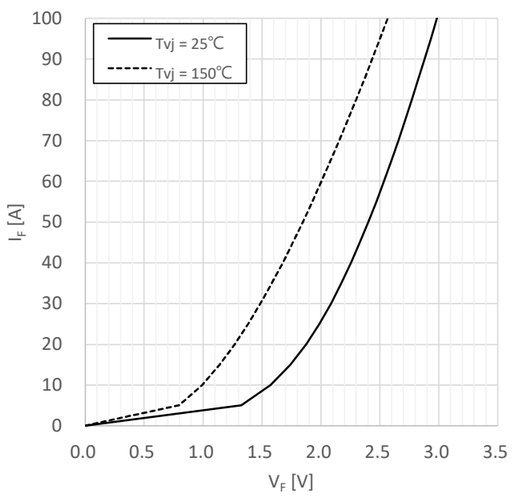
Output characteristic IGBT, Inverter (typical)



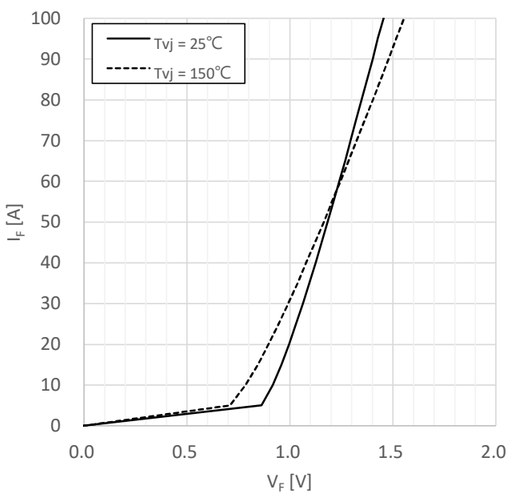
Output characteristic IGBT, Inverter (typical)



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

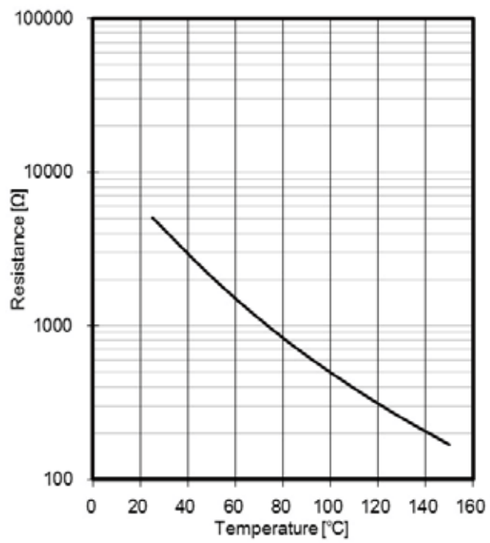


Forward characteristic of Diode, Rectifier (typical)
$I_F = f(V_F)$



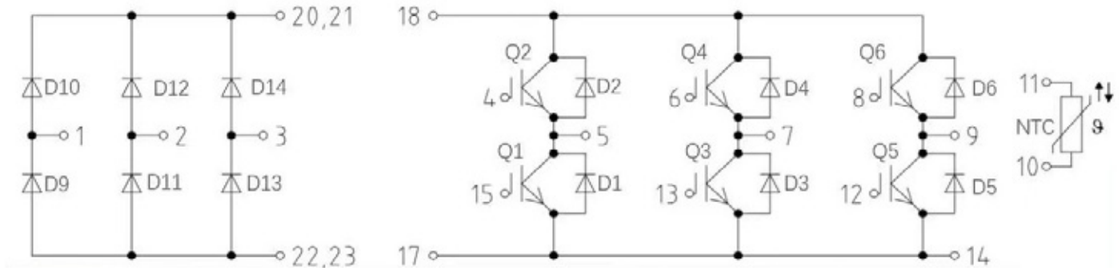
NIETZ MG050PB120N0

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

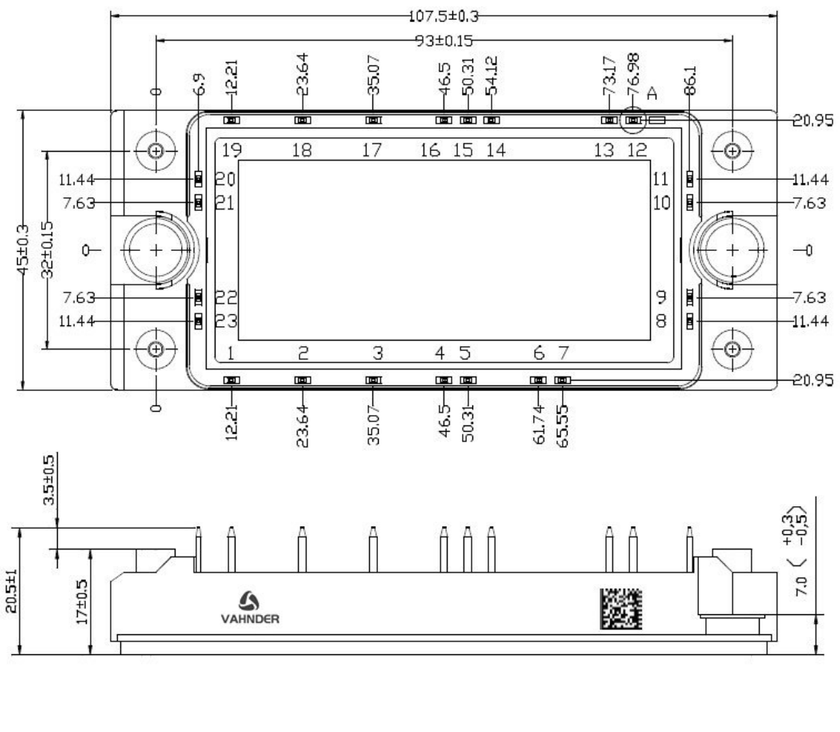


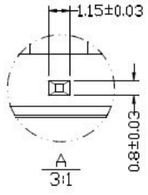
NIETZ	MG050PB120N0

Circuit Diagram



Package outlines





NIETZ	MG075PA120K0

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			0.11		us
	V_{GE} = +15/-15V	T_{vj} = 125°C	$T_{d,on}$		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			0.04		us
	V_{GE} = +15/-15V	T_{vj} = 125°C	T_r		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			0.20		us
	V_{GE} = +15/-15V	T_{vj} = 125°C	$T_{d,off}$		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			0.15		us
	V_{GE} = +15/-15V	T_{vj} = 125°C	T_f		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			6.38		mJ
	V_{GE} = +15/-15V,	T_{vj} = 125°C	E_{on}		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			3.89		mJ
	V_{GE} =+15/-15V,	T_{vj} = 125°C	E_{off}		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