



MG450DA120M0

1200V450A EconoDual3 IGBT Module

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IGBT, Inverter

Maximum Rated Values

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

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

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	$R_{Goff} = 2\Omega$	$T_{vj} = 150^{\circ}C$					mJ
SC data	$V_{GE} \leq 15V, V_{CC} = 600V, t_p \leq 8\mu s, T_{vj} = 25^{\circ}C, R_G = 5\Omega,$ $C_{GE} = 0.0\mu F, V_{CEmax} = V_{CES} - L_{SCE} \cdot di/dt$		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	$T_{vj} = 25^{\circ}C$	V_{RRM}	1200	V
Continuous DC forward current		I_F	450	A
Repetitive peak forward current	$t_p = 1\text{ ms}$	I_{FRM}	900	A

Characteristic value

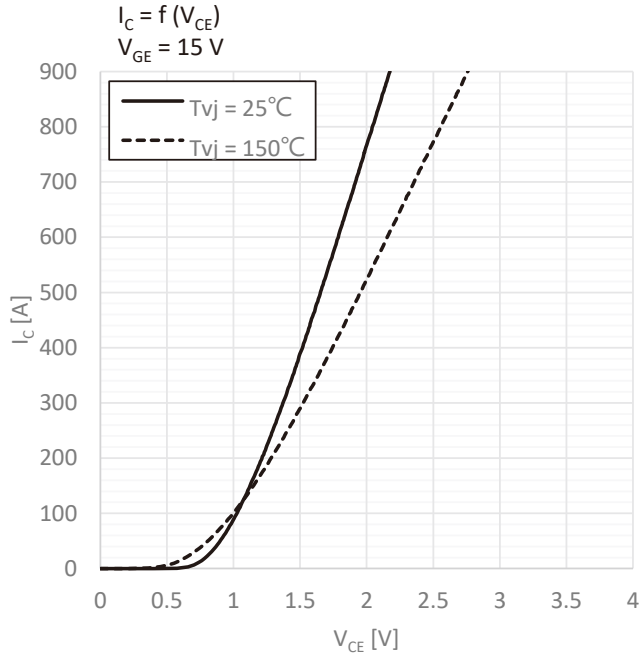
				min.	typ.	max.	
Forward voltage	$I_F = 450\text{ A}, V_{GE} = 0\text{ V}$	$T_{vj} = 25^{\circ}C$	V_F		2.0		V
	$I_F = 450\text{ A}, V_{GE} = 0\text{ V}$	$T_{vj} = 125^{\circ}C$					V
	$I_F = 450\text{ A}, V_{GE} = 0\text{ V}$	$T_{vj} = 150^{\circ}C$					V
Peak reverse recovery current	$I_F = 450\text{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

NTC-Thermistor
Characteristic value

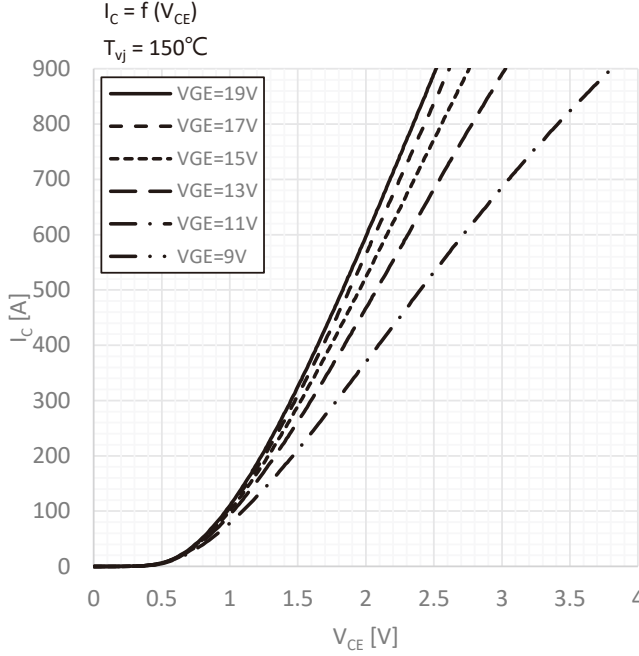
			min.	typ.	max.	
Rated resistance	$T_c = 25^{\circ}C$	R_{25}		5.07		$K\Omega$
Power dissipation	$T_c = 25^{\circ}C$	P_{25}			240	mW
B-value	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298, 15K))]$	B_{25}/B_{50}		3412.7		K
B-value	$R_2=R_{25}\exp[B_{25/75}(1/T_2-1/(298, 15K))]$	B_{25}/B_{75}		3454.8		K
B-value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

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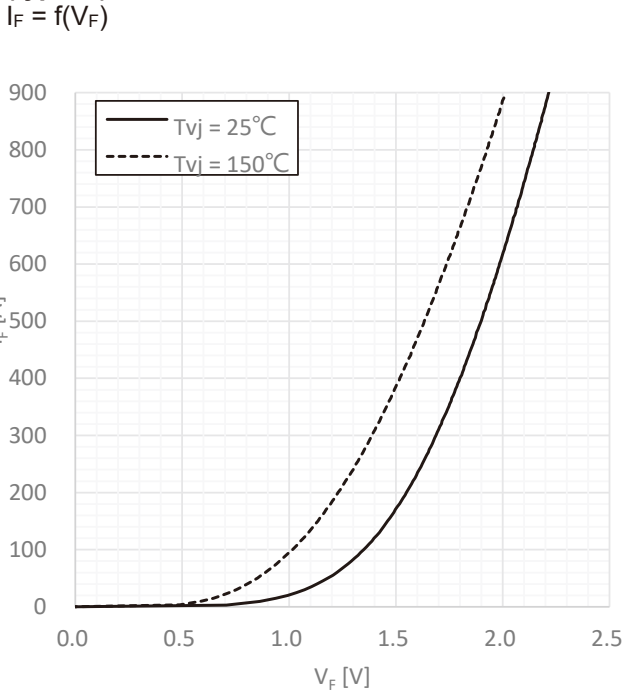
Output characteristic IGBT, Inverter (typical)



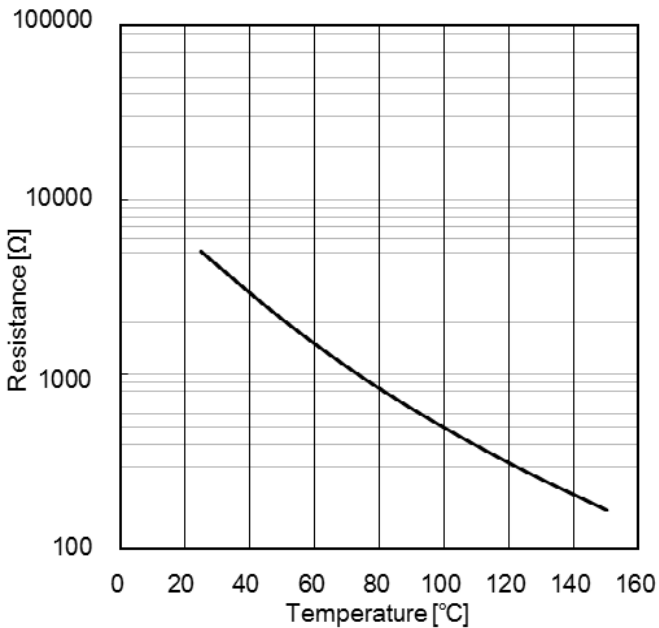
Output characteristic IGBT, Inverter (typical)



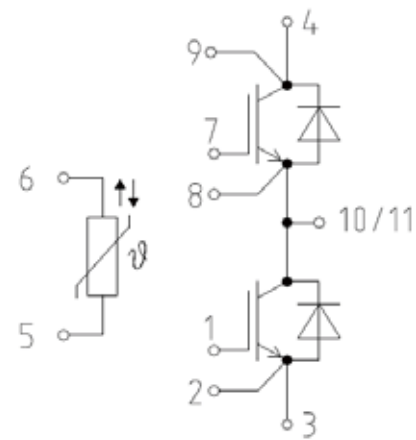
Forward characteristic of Diode, Inverter
(typical)



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



Circuit Diagram



Package outlines

