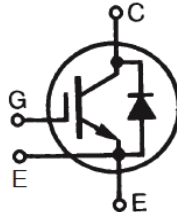


High-frequency switch IGBT Module 1200V / 100A

Preliminary

Features

- ◆ Fast switching field stop IGBT trench technology
- ◆ Low switching loss
- ◆ Superfast diodes
- ◆ High short circuit capability



Applications

- ◆ Welder / Power Supply
- ◆ UPS / Inverter
- ◆ Industrial Motor Drive

Maximum Ratings (T_c = 25°C)

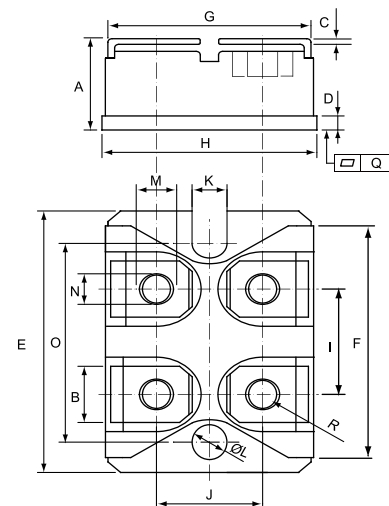
Item	Symbol	Rated Value	Unit
Collector-Emitter Voltage	V _{CES}	1200	V
Gate-Emitter Voltage	V _{GES}	±20	V
DC-Collector Current	T _c = 80°C I _{C,nom.}	100	A
Repetitive Peak Collector Current	t _p = 1ms I _{CRM}	200	A
Total Power Dissipation	P _{tot}	625	W
Isolation Voltage (Terminal to Base, AC 1 min.) Between All Terminals and Baseplate	V _{iso}	2500	V
DC Forward Current	I _F	100	A
Repetitive Peak Forward Current	t _p = 1ms I _{FRM}	200	A
Junction Temperature Range	T _J	- 40 ~ + 150	°C
Storage Temperature Range	T _{stg}	- 40 ~ + 125	°C
Mounting Torque (M4 Screw)	To heatsink To terminals M _d	1.3 1.1	N.m
Weight		30.5	g

SOT-227



G = Gate, C = Collector, E = Emitter

Dimensions in inches and (millimeters)



	DIMENSIONS			
	INCHES		MM	
	MIN	MAX	MIN	MAX
A	0.460	0.483	11.68	12.28
B	0.307	0.323	7.80	8.20
C	0.030	0.033	0.75	0.85
D	0.071	0.081	1.80	2.05
E	1.488	1.504	37.80	38.20
F	1.248	1.260	31.70	32.00
G	0.917	0.957	23.30	24.30
H	0.996	1.008	25.30	25.60
I	0.579	0.602	14.70	15.30
J	0.492	0.516	12.50	13.10
K	0.161	0.169	4.10	4.30
L	0.161	0.169	4.10	4.30
M	0.181	0.197	4.60	5.00
N	0.165	0.181	4.20	4.60
O	1.181	1.197	30.00	30.40
Q	-0.002	0.004	-0.05	0.10
R	M4*8			

■ Electrical Characteristics ($T_{VJ} = 25^{\circ}\text{C}$)

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Unit	
Collector-Emitter Cut-Off Current	I_{CES}	$V_{CE} = 1200\text{V}, V_{GE} = 0\text{V}, T_{VJ} = 25^{\circ}\text{C}$	-	50	500	μA	
Gate-Emitter Leakage Current	I_{GES}	$V_{CE} = 0\text{V}, V_{GE} = 20\text{V}, T_{VJ} = 25^{\circ}\text{C}$	-	-	400	nA	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 100\text{A}, V_{GE} = 15\text{V}, T_{VJ} = 25^{\circ}\text{C}$	-	1.6	2.0	V	
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$I_C = 4\text{mA}, V_{CE} = V_{GE}, T_{VJ} = 25^{\circ}\text{C}$	4.5	5.5	6.5	V	
Gate charge	Q_G	$I_C = 100\text{A}, V_{CE} = 600\text{V}, V_{GE} = 15\text{V}$	-	380	-	nC	
Input capacitance	C_{ies}	$f = 100\text{KHz}, T_{VJ} = 25^{\circ}\text{C}, V_{CE} = 25\text{V}, V_{GE} = 0\text{V}$	-	16.7	-	nF	
Output capacitance	C_{oes}	$f = 100\text{KHz}, T_{VJ} = 25^{\circ}\text{C}, V_{CE} = 25\text{V}, V_{GE} = 0\text{V}$	-	0.47	-	nF	
Reverse transfer capacitance	C_{res}	$f = 100\text{KHz}, T_{VJ} = 25^{\circ}\text{C}, V_{CE} = 25\text{V}, V_{GE} = 0\text{V}$	-	0.072	-	nF	
Turn-on delay time, inductive load	$t_{d\ on}$	$I_C = 100\text{A}, V_{CE} = 600\text{V}$	$T_{VJ} = 25^{\circ}\text{C}$	-	207	-	ns
		$V_{GE} = \pm 15\text{V}$	$T_{VJ} = 125^{\circ}\text{C}$	-	210	-	
		$R_{G(on)} = 4.7\Omega, R_{G(off)} = 1.0\Omega$	$T_{VJ} = 150^{\circ}\text{C}$	-	211	-	
Rise time, inductive load	t_r	$I_C = 100\text{A}, V_{CE} = 600\text{V}$	$T_{VJ} = 25^{\circ}\text{C}$	-	27	-	ns
		$V_{GE} = \pm 15\text{V}$	$T_{VJ} = 125^{\circ}\text{C}$	-	27	-	
		$R_{G(on)} = 4.7\Omega, R_{G(off)} = 1.0\Omega$	$T_{VJ} = 150^{\circ}\text{C}$	-	27	-	
Turn-off delay time, inductive load	$t_{d\ off}$	$I_C = 100\text{A}, V_{CE} = 600\text{V}$	$T_{VJ} = 25^{\circ}\text{C}$	-	198	-	ns
		$V_{GE} = \pm 15\text{V}$	$T_{VJ} = 125^{\circ}\text{C}$	-	216	-	
		$R_{G(on)} = 4.7\Omega, R_{G(off)} = 1.0\Omega$	$T_{VJ} = 150^{\circ}\text{C}$	-	222	-	
Fall time, inductive load	t_f	$I_C = 100\text{A}, V_{CE} = 600\text{V}$	$T_{VJ} = 25^{\circ}\text{C}$	-	61	-	ns
		$V_{GE} = \pm 15\text{V}$	$T_{VJ} = 125^{\circ}\text{C}$	-	68	-	
		$R_{G(on)} = 4.7\Omega, R_{G(off)} = 1.0\Omega$	$T_{VJ} = 150^{\circ}\text{C}$	-	80	-	
Turn-on energy loss per pulse	E_{on}	$I_C = 100\text{A}, V_{CE} = 600\text{V}$	$T_{VJ} = 25^{\circ}\text{C}$	-	1.1	-	mJ
		$V_{GE} = \pm 15\text{V}$	$T_{VJ} = 125^{\circ}\text{C}$	-	2.0	-	
		$R_{G(on)} = 4.7\Omega, R_{G(off)} = 1.0\Omega$	$T_{VJ} = 150^{\circ}\text{C}$	-	2.2	-	
Turn-off energy loss per pulse	E_{off}	$I_C = 100\text{A}, V_{CE} = 600\text{V}$	$T_{VJ} = 25^{\circ}\text{C}$	-	3.5	-	mJ
		$V_{GE} = \pm 15\text{V}$	$T_{VJ} = 125^{\circ}\text{C}$	-	4	-	
		$R_{G(on)} = 4.7\Omega, R_{G(off)} = 1.0\Omega$	$T_{VJ} = 150^{\circ}\text{C}$	-	4.2	-	
Internal gate resistor	R_{Gint}	$T_{VJ} = 25^{\circ}\text{C}$	-	3.3	-	W	
Thermal resistance, junction to case	R_{thJC}		-	-	0.2	$^{\circ}\text{C/W}$	

■ Free Wheeling Diode Ratings & Characteristics ($T_{VJ} = 25^{\circ}\text{C}$)

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Unit	
Forward voltage	V_F	$I_F = 100\text{A}, V_{GE} = 0\text{V}$	$T_{VJ} = 25^{\circ}\text{C}$	-	2.1	2.4	V
Peak reverse recovery current	I_{RRM}	$I_F = 100\text{A}, -di_F/dt = 3900/\mu\text{s}$ $V_R = 600\text{V}, V_{GE} = \pm 15\text{V}$	$T_{VJ} = 125^{\circ}\text{C}$	-	140	-	A
Recovered charge	Q_{rr}	$I_F = 100\text{A}, -di_F/dt = 3900/\mu\text{s}$ $V_R = 600\text{V}, V_{GE} = \pm 15\text{V}$	$T_{VJ} = 125^{\circ}\text{C}$	-	12560	-	nC
Reverse recovery time	T_{rr}	$I_F = 100\text{A}, -di_F/dt = 3900/\mu\text{s}$ $V_R = 600\text{V}, V_{GE} = \pm 15\text{V}$	$T_{VJ} = 125^{\circ}\text{C}$	-	302	-	ns
Reverse recovery energy	E_{rec}	$I_F = 100\text{A}, -di_F/dt = 3900/\mu\text{s}$ $V_R = 600\text{V}, V_{GE} = \pm 15\text{V}$	$T_{VJ} = 125^{\circ}\text{C}$	-	3119	-	μJ
Thermal resistance, junction to case	R_{thJC}				0.48	$^{\circ}\text{C/W}$	

Typical Characteristics

Preliminary Data

Fig.1 Output characteristic (Typical)

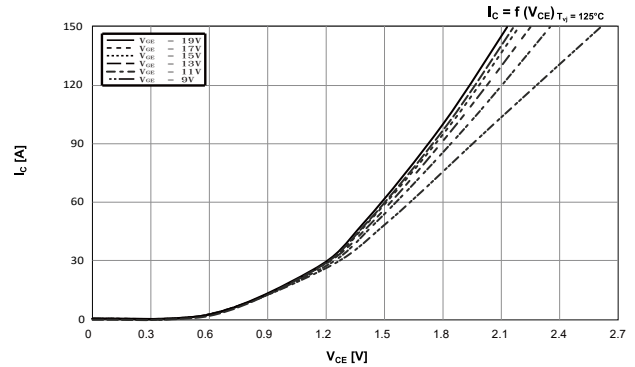
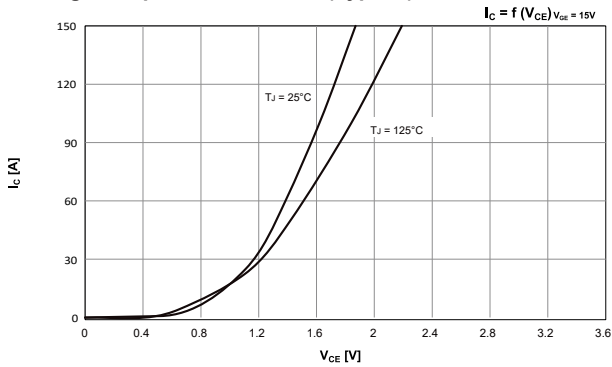


Fig.2 Transfer characteristic (Typical)

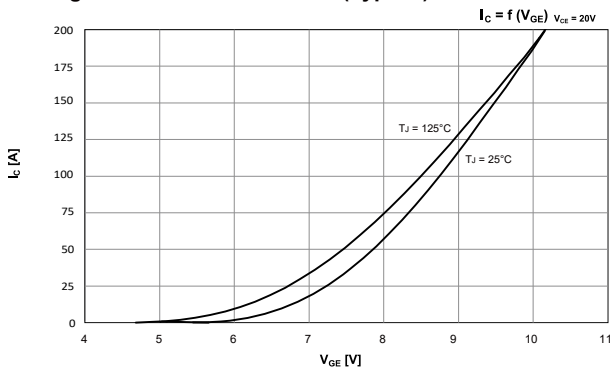


Fig.3 Forward characteristic of inverse diode (typical)

Fig.4 Switching losses (Typical)

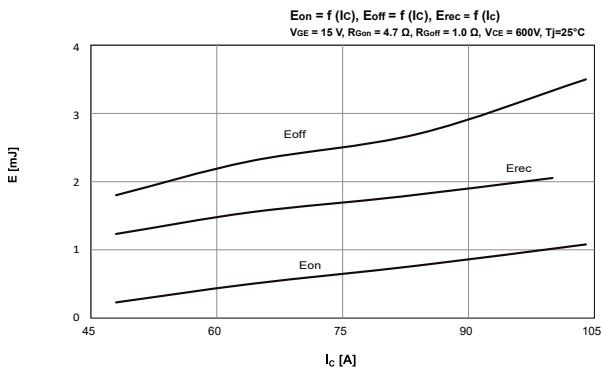


Fig.5 Switching losses IGBT, Inverter (typical)

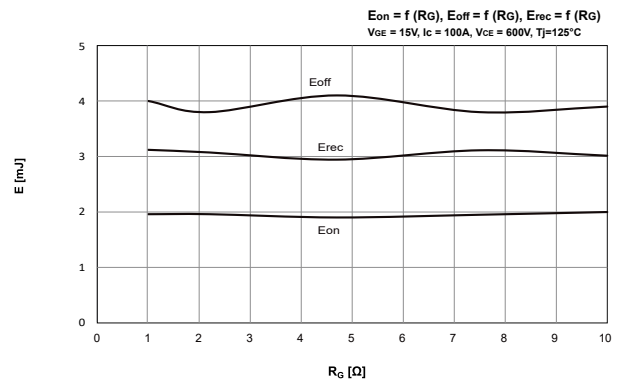


Fig.6 Transient thermal impedance

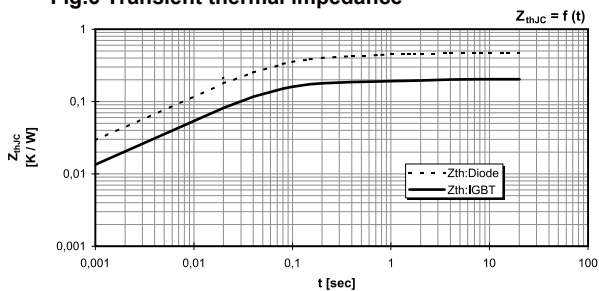
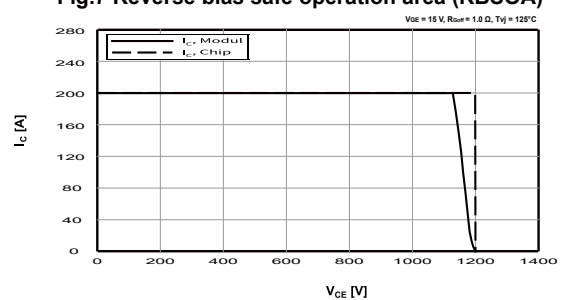


Fig.7 Reverse bias safe operation area (RBSOA)



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