



IGBT Module 1200V / 75A

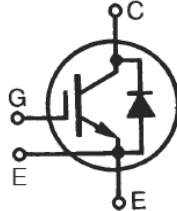
Features

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

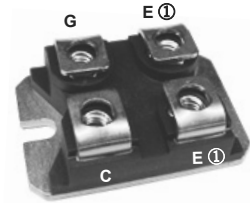
Applications

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

Preliminary



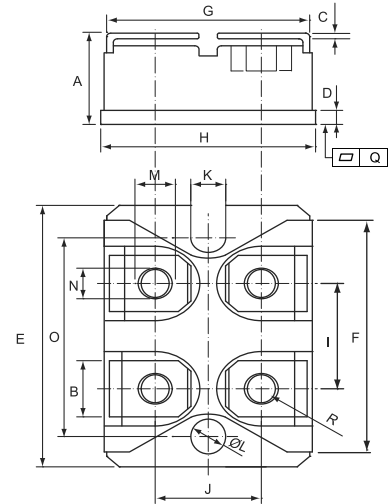
SOT-227



G = Gate, C = Collector, E = Emitter

① either emitter terminal can be used as Main or Kelvin Emitter

Dimensions in inches and (millimeters)



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.}	75	A
Repetitive Peak Collector Current t _p = 1ms	I _{CRM}	150	A
Total Power Dissipation	P _{tot}	350	W
Isolation Voltag (e Terminal to Base, AC 1 min.)	V _{iso}	2500	V
DC Forward Current	I _F	75	A
Repetitive Peak Forward. Current t _p = 1ms	I _{FRM}	150	A
Junction Temperature Range	T _J	-40~+150	°C
Storage Temperature Range	T _{stg}	-40~+125	°C
Mounting Torque	M _d	1.3	N.m

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

Characteristic		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Collector-Emitter Cut-Off Current		I_{CES}	$V_{CE} = 1200\text{V}$ $V_{GE} = 0\text{V}$	-	10	500	μA
Gate-Emitter Leakage Current		I_{GES}	$V_{GE} = 20\text{V}$ $V_{CE} = 0\text{V}$	-	-	400	nA
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$	$I_C = 75\text{A}$, $V_{GE} = 15\text{V}$	-	2.2	2.8	V
Gate-Emitter Threshold Voltage		$V_{GE(th)}$	$V_{CE} = V_{GE}$, $I_C = 4\text{mA}$	4.5	5.5	6.5	V
Input Capacitance		C_{ies}	$V_{CE} = 25\text{V}$, $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$	-	14	-	nF
Output Capacitance		C_{oes}	$V_{CE} = 25\text{V}$, $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$	-	0.5	-	nF
Reverse Transfer Capacitance		C_{res}	$V_{CE} = 25\text{V}$, $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$	-	0.3	-	nF
Switching Time	Rise Time	t_r	$V_{CC} = 600\text{V}$ $I_C = 75\text{A}$ $R_G = 6.6\Omega$ $V_{GE} = \pm 15\text{V}$	-	0.15	-	μs
	Turn-On Time	$t_{d,on}$		-	0.3	-	
	Fall Time	t_f		-	0.05	-	
	Turn-Off Time	$t_{d,off}$		-	0.35	-	
Turn-on Energy Loss Per Pulse		E_{on}	$I_C = 75\text{A}$, $V_{CC} = 600\text{V}$ $V_{GE} = 15\text{V}$, $R_G = 6.6\Omega$	-	8	-	mWs
Turn-off Energy Loss Per Pulse		E_{off}	Inductive load	-	2.4	-	mWs
External Gate Resistance		R_G	Per Switch	4.7	-	10	Ω

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

Characteristic		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Peak Forward Voltage		V_F	$I_F = 75\text{A}$, $V_{GE} = 0\text{V}$	-	1.8	2.3	V
Peak Reverse Recovery Current		I_{RM}	$I_F = 75\text{A}$, $R_G = 6.6\Omega$ $V_R = 600\text{V}$, $V_{GE} = -15\text{V}$	-	20	-	A
Recovered Charge		Q_r	$I_F = 75\text{A}$, $R_G = 6.6\Omega$ $V_R = 600\text{V}$, $V_{GE} = -15\text{V}$	-	2.6	-	μC
Reverse Recovery Energy		E_{rec}	$I_F = 75\text{A}$, $R_G = 6.6\Omega$ $V_R = 600\text{V}$, $V_{GE} = -15\text{V}$	-	0.56	-	mJ
Reverse Recovery Time		T_{rr}	$I_F = 75\text{A}$, $R_G = 6.6\Omega$ $V_R = 300\text{V}$, $V_{GE} = -15\text{V}$	-	162	-	ns

■ Thermal Characteristics ($T_C = 25^{\circ}\text{C}$)

Characteristic		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Thermal Impedance	IGBT	$R_{th(j-c)}$	Junction to Case	-	-	0.36	$^{\circ}\text{C/W}$
	Diode			-	-	0.55	



Typical Characteristics

Preliminary Data

Fig.1 Output characteristic (Typical)

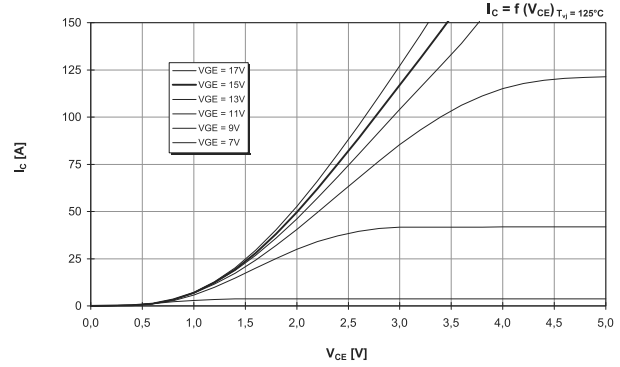
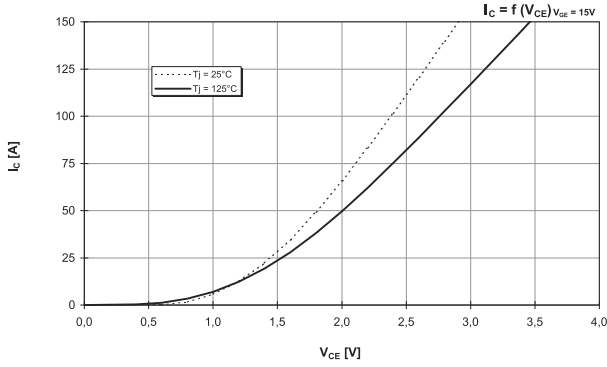


Fig.2 Transfer characteristic (Typical)

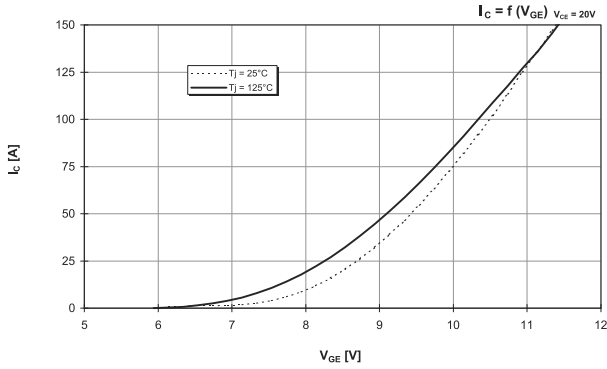


Fig.3 Forward characteristic of inverse diode (typical)

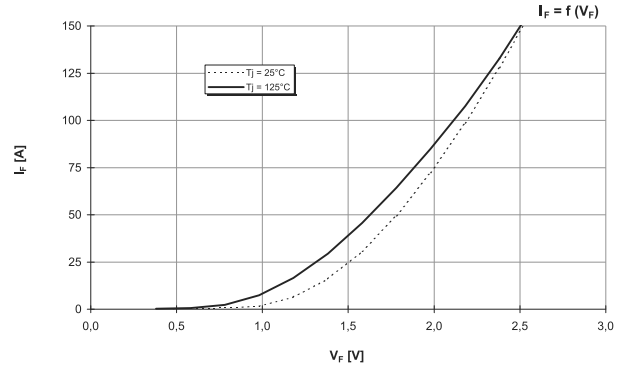


Fig.4 Switching losses (Typical)

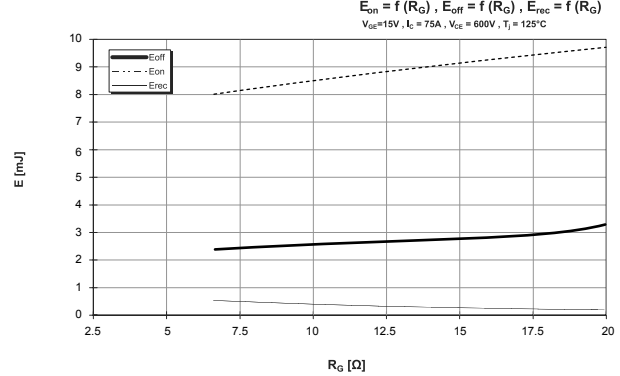
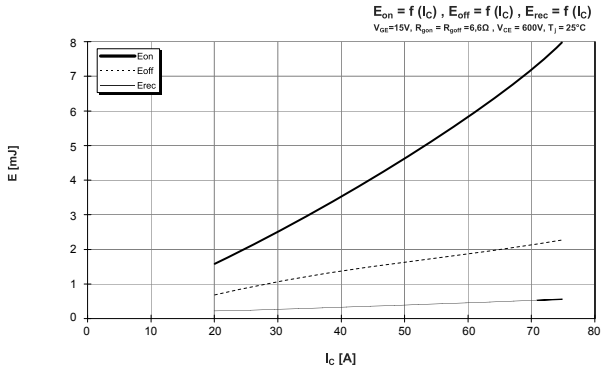
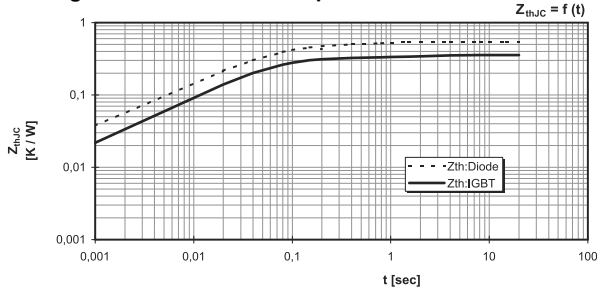
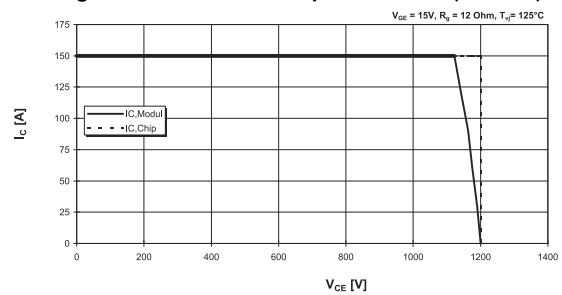


Fig.5 Transient thermal impedance



i	1	2	3	4
r_i [K/kW] : IGBT	20,13	60,93	79,4	19,54
τ_i [sec] : IGBT	0,002	0,03	0,066	1,655
r_i [K/kW] : Diode	65,43	173,31	189,08	72,18
τ_i [sec] : Diode	0,002	0,03	0,072	0,682

Fig.6 Reverse bias safe operation area (RBSOA)





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