



IGBT Power Module 1200V / 150A

Features

- ◆ 62mm Fast Switching Trench / Field Stop IGBT Technology
- ◆ Low Switching Losses
- ◆ Super Fast Diodes
- ◆ High Short Circuit Capability

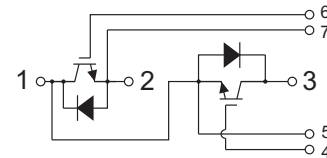
Preliminary

Applications

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



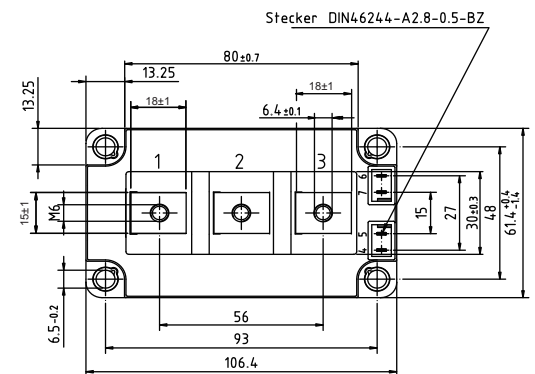
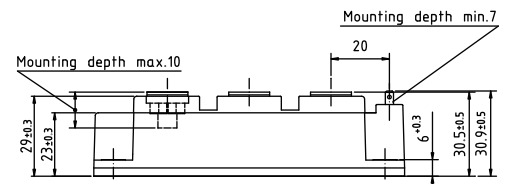
Circuit Diagram Headline



Maximum Ratings (T_c=25°C)

Item	Symbol	Rated Value	Unit
Collector-Emitter Voltage T _{vj} = 25°C	V _{CES}	1200	V
Gate-Emitter Peak Voltage	V _{GES}	±20	V
Continuous DC Collector Current T _c = 80°C T _c = 25°C	I _{C,nom.} I _C	150 225	A
Repetitive Peak Collector Current t _p = 1ms	I _{CRM}	300	A
Total Power Dissipation	P _{tot}	780	W
Isolation Voltage (Terminal to Base, AC 1 min.)	V _{iso}	3000	V
Continuous DC Forward Current	I _F	150	A
Repetitive Peak Forward Current t _p = 1ms	I _{FRM}	300	A
Temperature under switching conditions	T _{VJ op}	-40~+150	°C
Storage Temperature	T _{stg}	-40~+125	°C
Mounting Torque	Module Base to Heatsink (M6)	3~6	N.m
	Busbar to Terminal (M6)	2.5~5	

Package Outlines



Dimensions in mm (1 mm = 0.0394")



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

Characteristic		Symbol	Test Conditions	Min.	Typ.	Max.	Unit	
Collector-Emitter Cut-Off Current		I_{CES}	$V_{CE} = 1200\text{V}$ $V_{GE} = 0\text{V}$	-	-	5.0	mA	
Gate-Emitter Leakage Current		I_{GES}	$V_{GE} = 20\text{V}$ $V_{CE} = 0\text{V}$	-	-	400	nA	
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$	$I_C = 150\text{A}, V_{GE} = 15\text{V}$	-	1.75	2.15	V	
Gate Threshold Voltage		$V_{GE(th)}$	$V_{CE} = V_{GE}, I_C = 6.0\text{mA}$	5.0	5.8	6.5	V	
Input Capacitance		C_{ies}	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$	-	24.0	-	nF	
Reverse Transfer Capacitance		C_{res}	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$	-	0.24	-	nF	
Switching Time	Rise Time	t_r	$V_{CE} = 600\text{V}$ $I_C = 150\text{A}$ $R_G = 4.7\Omega$ $V_{GE} = \pm 15\text{V}$	-	0.08	-	μs	
	Turn-On Time	$t_{d,on}$		-	0.35	-		
	Fall Time	t_f		-	0.05	-		
	Turn-Off Time	$t_{d,off}$		-	0.55	-		
Turn-on Energy Loss Per Pulse		E_{on}	$I_C = 150\text{A}, V_{CE} = 600\text{V}, L_S = 30\text{nH}$ $V_{GE} = \pm 15\text{V}, R_{Gon} = 4.7\Omega$ $di/dt = 3000\text{A}/\mu\text{s}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$	-	6.5 10.0	-	mJ
Turn-off Energy Loss Per Pulse		E_{off}	$I_C = 150\text{A}, V_{CE} = 600\text{V}, L_S = 30\text{nH}$ $V_{GE} = \pm 15\text{V}, R_{Goff} = 4.7\Omega$ $du/dt = 4500\text{V}/\mu\text{s}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$	-	11.5 19.0	-	mJ

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

Characteristic		Symbol	Test Conditions	Min.	Typ.	Max.	Unit	
Forward Voltage		V_F	$I_F = 150\text{A}, V_{GE} = 0\text{V}$	-	2.0	2.15	V	
Peak Reverse Recovery Current		I_{RM}	$I_F = 150\text{A}, V_R = 600\text{V}$ $V_{GE} = -15\text{V}$ $-di_F/dt = 3000\text{A}/\mu\text{s} (T_{vj} = 125^{\circ}\text{C})$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$	-	92 122	-	A
Recovered Charge		Q_r	$I_F = 150\text{A}, V_R = 600\text{V}$ $V_{GE} = -15\text{V}$ $-di_F/dt = 3000\text{A}/\mu\text{s} (T_{vj} = 125^{\circ}\text{C})$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$	-	10 23	-	μC
Reverse Recovery Energy		E_{rec}	$I_F = 150\text{A}, V_R = 600\text{V}$ $V_{GE} = -15\text{V}$ $-di_F/dt = 3000\text{A}/\mu\text{s} (T_{vj} = 125^{\circ}\text{C})$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$	-	4.9 9.9	-	mJ

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

Characteristic		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Thermal Resistance	IGBT	$R_{th(j-c)}$	Junction to Case	-	-	0.16	K/W
	Diode			-	-	0.30	



Typical Characteristics

Preliminary Data

Fig.1 Output characteristic IGBT, Inverter (typical)

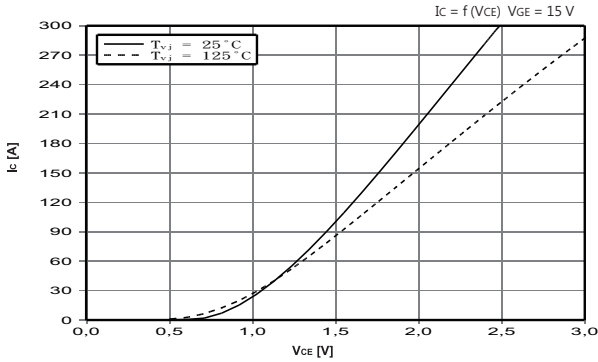


Fig.2 Output characteristic IGBT, Inverter (typical)

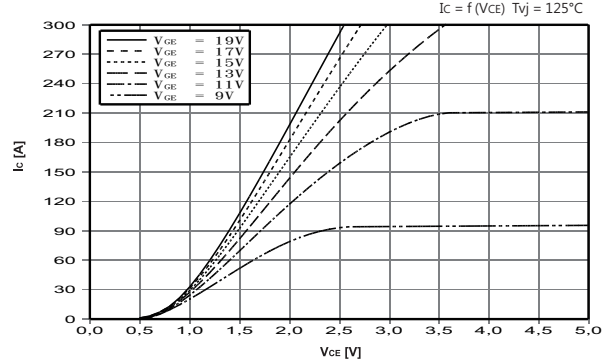


Fig.3 Transfer characteristic IGBT, Inverter (typical)

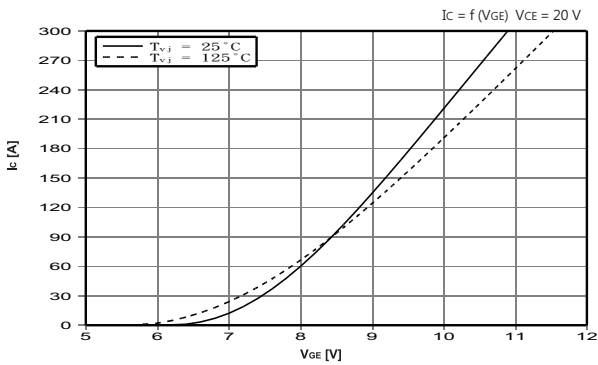


Fig.4 Switching losses IGBT, Inverter (typical)

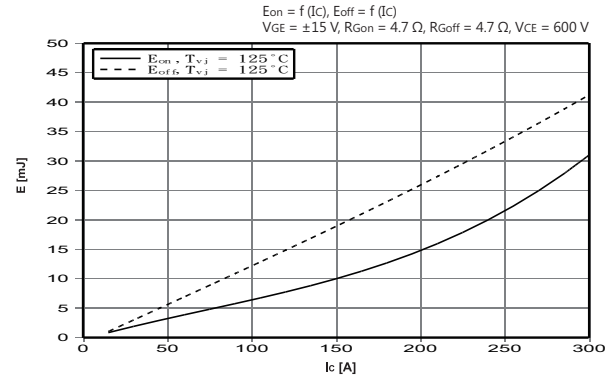


Fig.5 Switching losses IGBT, Inverter (typical)

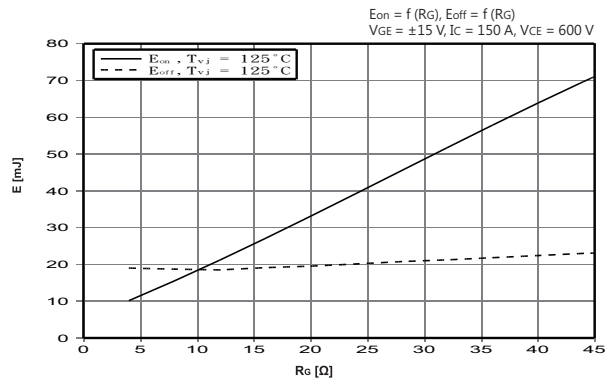


Fig.6 Transient thermal impedance IGBT, Inverter

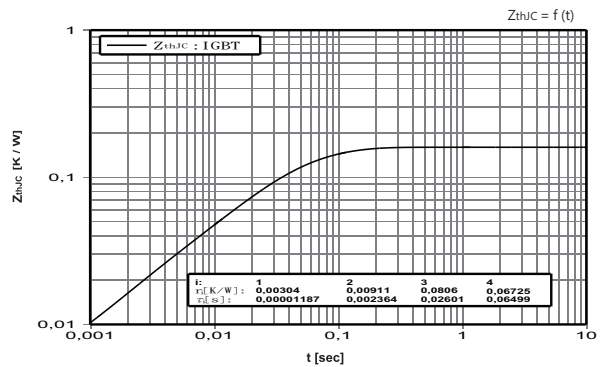


Fig.7 Reverse bias safe operating area IGBT, Inverter (RBSOA)

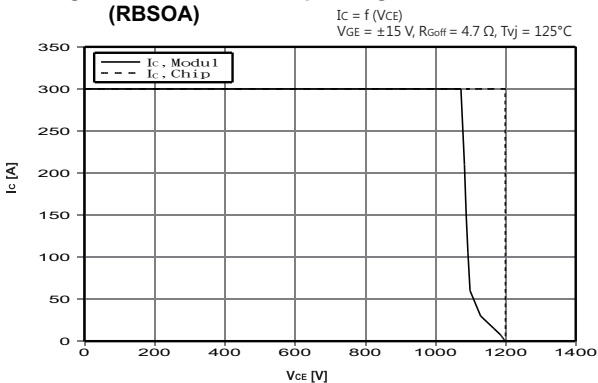
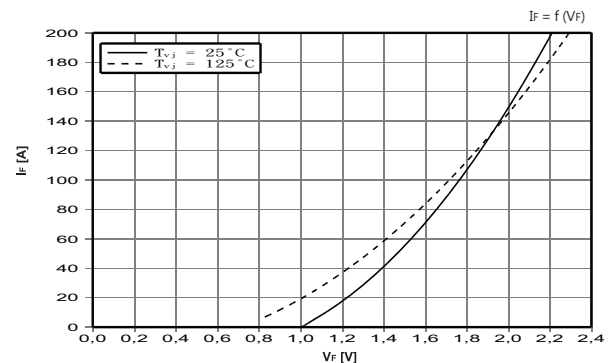


Fig.8 Forward characteristic of Diode, Inverter (typical)





Typical Characteristics

Preliminary Data

Fig.9 Switching losses Diode, Inverter (typical)

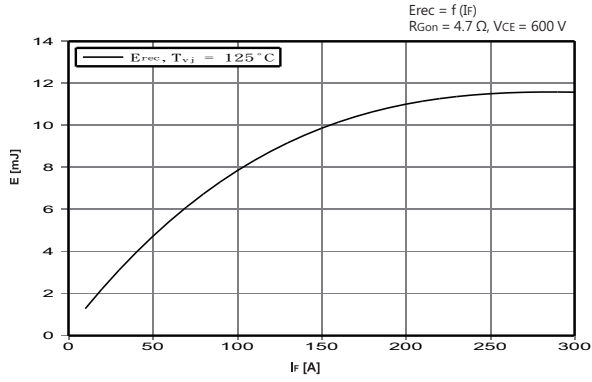


Fig.10 Switching losses Diode, Inverter (typical)

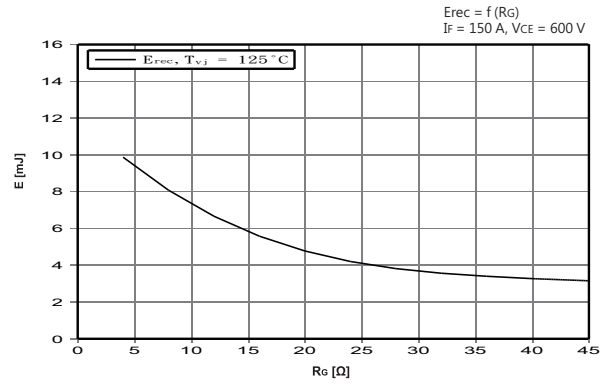
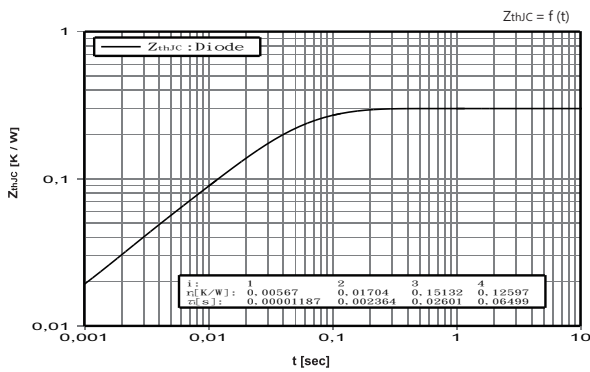


Fig.11 Transient thermal impedance Diode, Inverter





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