Molding Type Module IGBT, 2-in-1 Package, 1200 V and 200 A

Dual INT-A-PAK

FEATURES

- 10 µs short circuit capability
- $V_{CE(on)}$ with positive temperature coefficient
- Maximum junction temperature 150 °C
- Low switching losses
- Rugged with ultrafast performance
- Low inductance case
- Fast and soft reverse recovery antiparallel FWD
- Isolated copper baseplate using DCB (Direct Copper Bonding) technology
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT

TYPICAL APPLICATIONS

- Switching mode power supplies
- Inductive heating
- Electronic welder

DESCRIPTION

Vishay's IGBT power module provides ultra low conduction loss as well as short circuit ruggedness. It is designed for applications such as electronic welder and inductive heating.

PRIMARY CHARACTERISTICS	
V_{CES}	1200 V
I_C at T_C = 80 °C	200 A
$V_{CE(on)}$ (typical) at I_C = 200 A, 25 °C	3.10 V
Speed	8 kHz to 30 kHz
Package	Dual INT-A-PAK
Circuit configuration	Half bridge

ABSOLUTE MAXIMUM RATINGS (T_C = 25 °C unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS
Collector to emitter voltage	V_{CES}		1200	V
Gate to emitter voltage	V_{GES}		± 20	
Collector current	I_C	T_C = 25 °C	262	A
		T_C = 80 °C	200	
Pulsed collector current	I_{CM} (1)	t_p = 1 ms	400	
Diode continuous forward current	I_F	T_C = 80 °C	200	
Diode maximum forward current	I_{FM}	t_p = 1 ms	400	
Maximum power dissipation	P_D	T_J = 150 °C	1315	W
Short circuit withstand time	t_{SC}	T_J = 125 °C	10	µs
RMS isolation voltage	V_{ISOL}	f = 50 Hz, t = 1 min	2500	V

Note

(1) Repetitive rating: pulse width limited by maximum junction temperature

IGBT ELECTRICAL SPECIFICATIONS (T_C = 25 °C unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Collector to emitter breakdown voltage	$V_{(BR)CES}$	T_J = 25 °C	1200	-	-	V
Collector to emitter voltage	$V_{CE(on)}$	V_{GE} = 15 V, I_C = 200 A, T_J = 25 °C	-	3.00	3.45	
		V_{GE} = 15 V, I_C = 200 A, T_J = 125 °C	-	3.80	-	
Gate to emitter threshold voltage	$V_{GE(th)}$	V_{CE} = V_{GE}, I_C = 2.0 mA, T_J = 25 °C	4.5	5.4	6.5	
Collector cut-off current	I_{CES}	V_{CE} = V_{CES}, V_{GE} = 0 V, T_J = 25 °C	-	-	5.0	mA
Gate to emitter leakage current	I_{GES}	V_{GE} = V_{GES}, V_{CE} = 0 V, T_J = 25 °C	-	-	400	nA

SWITCHING CHARACTERISTICS						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Turn-on delay time	$t_{d(on)}$	V_{CC} = 600 V, I_C = 200 A, R_g = 4.7 Ω, V_{GE} = ± 15 V, T_J = 25 °C	-	87	-	ns
Rise time	t_r		-	40	-	
Turn-off delay time	$t_{d(off)}$		-	451	-	
Fall time	t_f		-	63	-	
Turn-on switching loss	E_{on}		-	6.8	-	mJ
Turn-off switching loss	E_{off}		-	11.9	-	
Turn-on delay time	$t_{d(on)}$	V_{CC} = 600 V, I_C = 200 A, R_g = 4.7 Ω, V_{GE} = ± 15 V, T_J = 125 °C	-	88	-	ns
Rise time	t_r		-	44	-	
Turn-off delay time	$t_{d(off)}$		-	483	-	
Fall time	t_f		-	78	-	
Turn-on switching loss	E_{on}		-	11.4	-	mJ
Turn-off switching loss	E_{off}		-	13.5	-	
Input capacitance	C_{ies}	V_{GE} = 0 V, V_{CE} = 30 V, f = 1.0 MHz	-	13.0	-	nF
Output capacitance	C_{oes}		-	1.51	-	
Reverse transfer capacitance	C_{res}		-	0.85	-	
SC data	I_{SC}	$t_{sc} \leq$ 10 µs, V_{GE} = 15 V, T_J = 125 °C, V_{CC} = 900 V, $V_{CEM} \leq$ 1200 V	-	1300	-	A
Internal gate resistance	R_{gint}		-	1.3	-	Ω
Stray inductance	L_{CE}		-	-	30	nH
Module lead resistance, terminal to chip	$R_{CC'+EE'}$	T_C = 25 °C	-	0.35	-	mΩ

DIODE ELECTRICAL SPECIFICATIONS (T_C = 25 °C unless otherwise noted)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
Diode forward voltage	V_F	I_F = 200 A, V_{GE} = 0 V	T_J = 25 °C	-	1.95	2.40	V
			T_J = 125 °C	-	2.00	-	
Diode reverse recovery charge	Q_{rr}	I_F = 200 A, V_R = 600 V, dI/dt = 4600 A/µs, V_{GE} = -15 V	T_J = 25 °C	-	13.3	-	µC
			T_J = 125 °C	-	23.0	-	
Diode peak reverse recovery current	I_{rr}		T_J = 25 °C	-	236	-	A
			T_J = 125 °C	-	269	-	
Diode reverse recovery energy	E_{rec}		T_J = 25 °C	-	6.6	-	mJ
			T_J = 125 °C	-	10.5	-	

THERMAL AND MECHANICAL SPECIFICATIONS							
PARAMETER		SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Maximum junction temperature		T_J		-	-	150	°C
Operating junction temperature range		T_J		-40	-	125	
Storage temperature range		T_{STG}		-40	-	125	
Junction to case	IGBT	R_{thJC}		-	-	0.095	K/W
	Diode			-	-	0.202	
Case to heatsink	IGBT	R_{thCS}		-	0.029	-	
	Diode			-	0.063	-	
	Module			-	0.010	-	
Mounting torque			Power terminal screw: M5	2.5	-	5.0	Nm
			Mounting screw: M6	3.0	-	5.0	
Weight				-	300	-	g

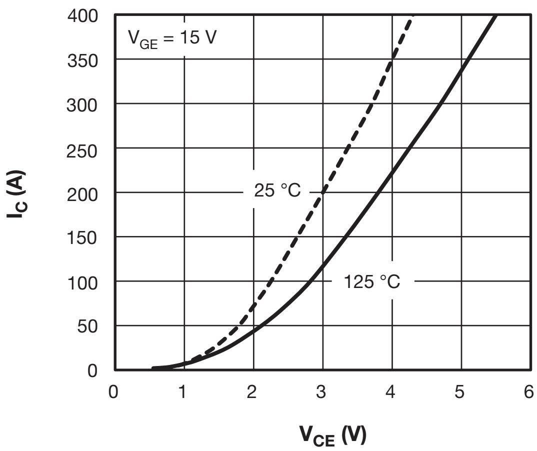


Fig. 1 - IGBT Typical Output Characteristics

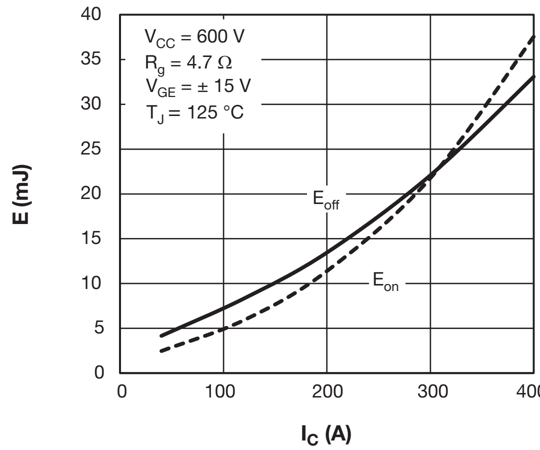


Fig. 3 - IGBT Switching Loss vs. I_C

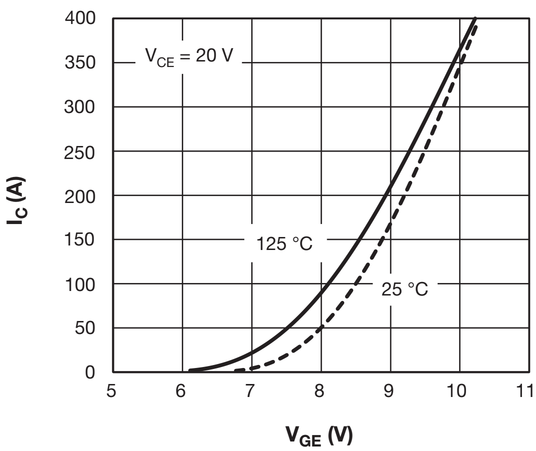


Fig. 2 - IGBT Typical Transfer Characteristics

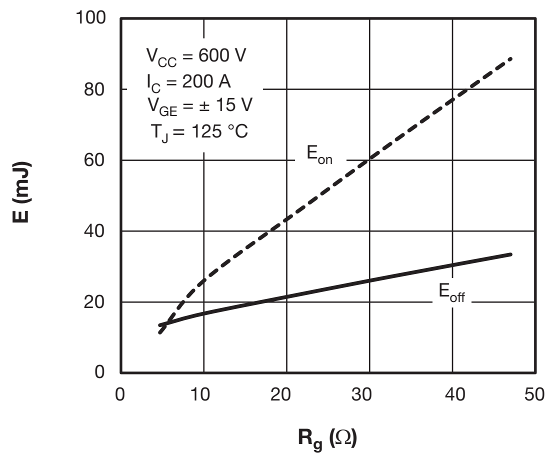


Fig. 4 - IGBT Switching Loss vs. R_g

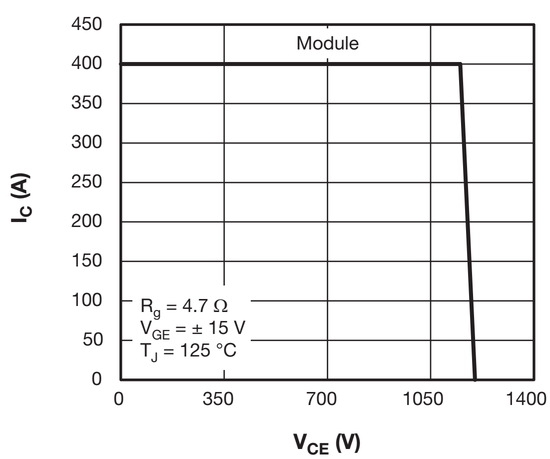


Fig. 5 - RBSOA

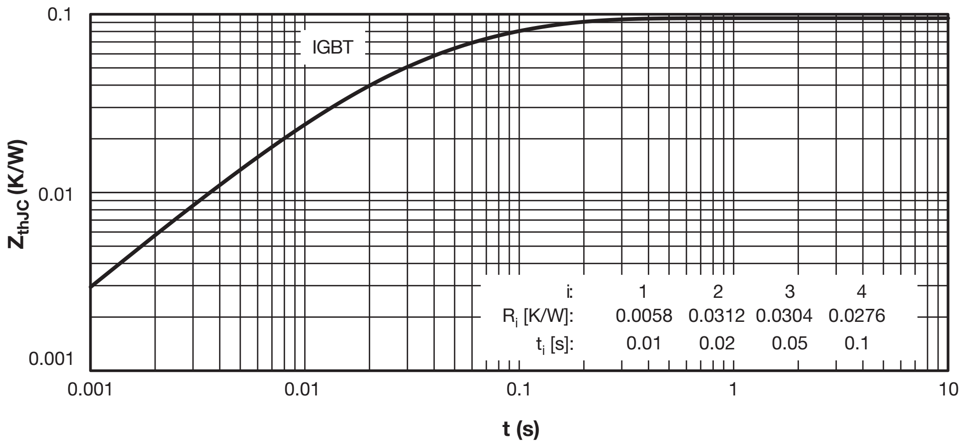


Fig. 6 - IGBT Transient Thermal Impedance

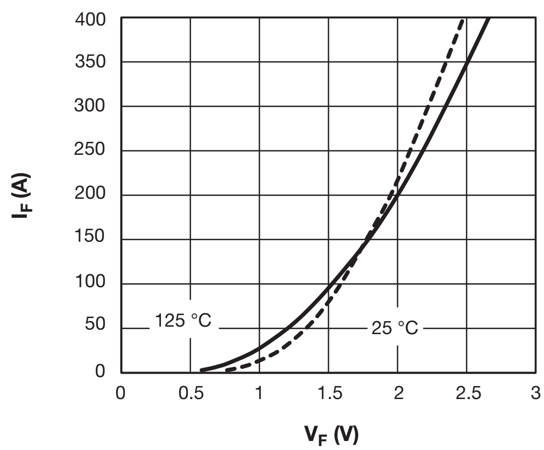


Fig. 7 - Diode Typical Forward Characteristics

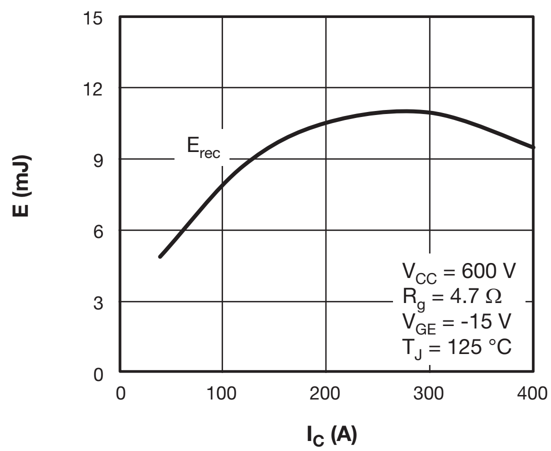


Fig. 8 - Diode Switching Loss vs. I_F

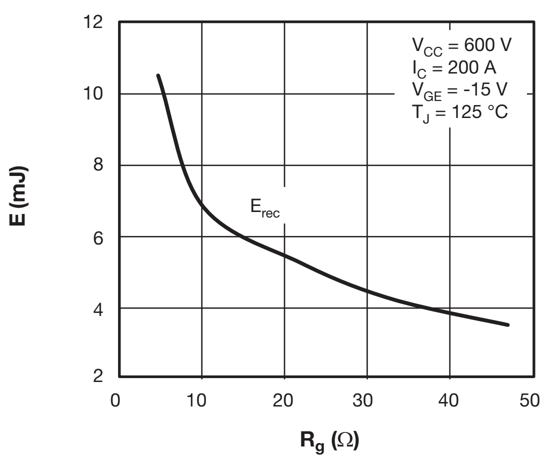


Fig. 9 - Diode Switching Loss vs. Gate Resistance

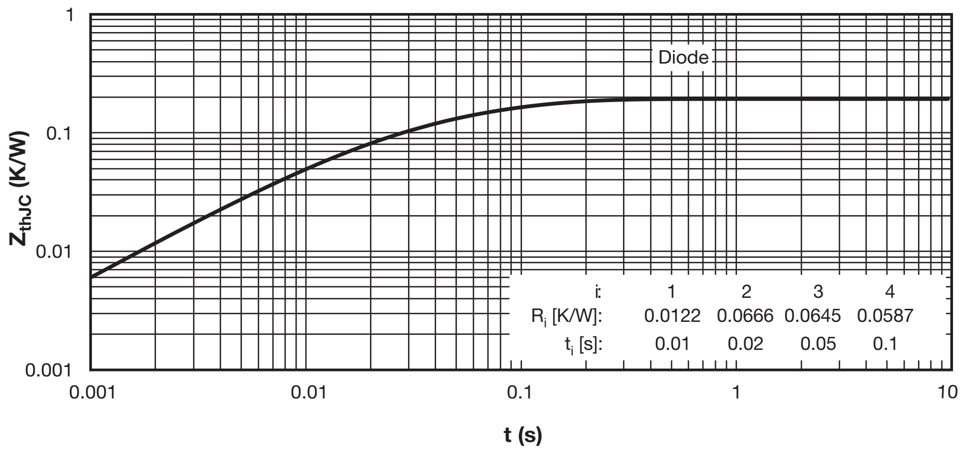
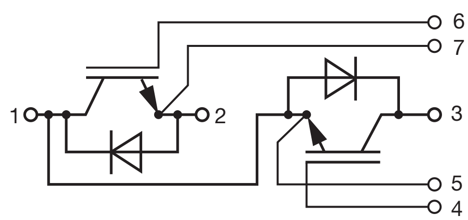


Fig. 10 - Diode Transient Thermal Impedance

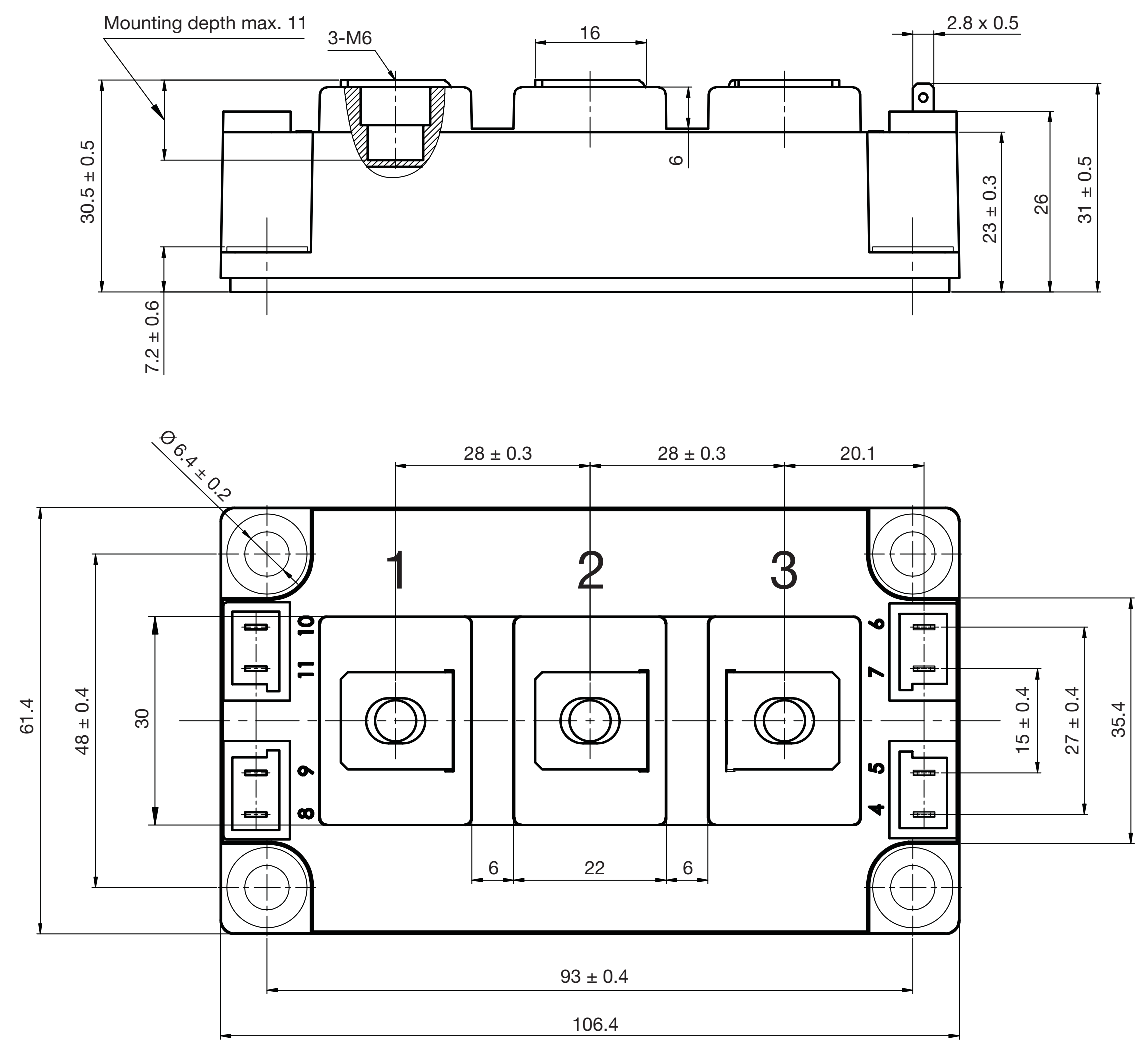
CIRCUIT CONFIGURATION



LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95525

Double INT-A-PAK

DIMENSIONS in millimeters (inches)



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