

Half Bridge IGBT Power Module, 600 V, 100 A



INT-A-PAK

FEATURES

- Low $V_{CE(on)}$ trench IGBT technology
- 5 μ s short circuit capability
- $V_{CE(on)}$ with positive temperature coefficient
- Maximum junction temperature 175 °C
- 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

PRIMARY CHARACTERISTICS	
V_{CES}	600 V
I_C at $T_C = 80$ °C	100 A
$V_{CE(on)}$ (typical) at $I_C = 100$ A, 25 °C	1.65 V
Speed	8 kHz to 30 kHz
Package	INT-A-PAK
Circuit configuration	Half bridge

TYPICAL APPLICATIONS

- UPS (uninterruptable power supply)
- Switching mode power supplies
- Electronic welders

DESCRIPTION

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

ABSOLUTE MAXIMUM RATINGS ($T_C = 25$ °C unless otherwise noted)				
PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS
Collector to emitter voltage	V_{CES}		600	V
Gate to emitter voltage	V_{GES}		± 20	
Collector current	I_C	$T_C = 25$ °C	160	A
		$T_C = 80$ °C	100	
Pulsed collector current	$I_{CM}^{(1)}$	$t_p = 1$ ms	200	
Diode continuous forward current	I_F	$T_C = 80$ °C	100	
Diode maximum forward current	$I_{FM}^{(1)}$	$t_p = 1$ ms	200	
Maximum power dissipation	P_D	$T_J = 175$ °C	417	
Short circuit withstand time	t_{SC}	$T_C = 125$ °C	5	μ s
RMS isolation voltage	V_{ISOL}	$f = 50$ Hz, $t = 1$ min	4000	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	600	-	-	V
Collector to emitter voltage	$V_{CE(on)}$	$V_{GE} = 15$ V, $I_C = 100$ A, $T_J = 25$ °C	-	1.65	2.10	
		$V_{GE} = 15$ V, $I_C = 100$ A, $T_J = 175$ °C	-	2.00	-	
Gate to emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}$, $I_C = 1.0$ mA, $T_J = 25$ °C	4.0	4.4	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	$t_{d(on)}$	$V_{CC} = 300\text{ V}, I_C = 100\text{ A}, R_g = 2.2\ \Omega,$ $V_{GE} = \pm 15\text{ V}, T_J = 25\text{ }^\circ\text{C}$	-	106	-	ns	
Rise time	t_r		-	49	-		
Turn-off delay time	$t_{d(off)}$		-	102	-		
Fall time	t_f		-	85	-		
Turn-on switching loss	E_{on}		$V_{CC} = 300\text{ V}, I_C = 100\text{ A}, R_g = 2.2\ \Omega,$ $V_{GE} = \pm 15\text{ V}, T_J = 125\text{ }^\circ\text{C}$	-	0.46	-	mJ
Turn-off switching loss	E_{off}			-	0.95	-	
Turn-on delay time	$t_{d(on)}$	-		112	-	ns	
Rise time	t_r	-		62	-		
Turn-off delay time	$t_{d(off)}$	-		126	-		
Fall time	t_f	-		109	-		
Turn-on switching loss	E_{on}	$V_{GE} = 0\text{ V}, V_{CE} = 30\text{ V}, f = 1.0\text{ MHz}$	-	0.78	-	mJ	
Turn-off switching loss	E_{off}		-	1.73	-		
Input capacitance	C_{ies}		$V_{GE} = 0\text{ V}, V_{CE} = 30\text{ V}, f = 1.0\text{ MHz}$	-	7.71	-	nF
Output capacitance	C_{oes}			-	0.53	-	
Reverse transfer capacitance	C_{res}			-	0.23	-	
SC data	I_{SC}		$t_p \leq 5\ \mu\text{s}, V_{GE} = 15\text{ V}, T_J = 125\text{ }^\circ\text{C},$ $V_{CC} = 360\text{ V}, V_{CEM} \leq 1200\text{ V}$	-	900	-	A
Stray inductance	L_{CE}		-	-	30	nH	
Module lead resistance, terminal to chip	$R_{CC'+EE'}$		-	0.75	-	m Ω	

DIODE ELECTRICAL SPECIFICATIONS ($T_C = 25\text{ }^\circ\text{C}$ unless otherwise noted)							
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS	
Forward voltage	V_F	$I_F = 100\text{ A}$	$T_J = 25\text{ }^\circ\text{C}$	-	1.40	1.80	V
			$T_J = 125\text{ }^\circ\text{C}$	-	1.40	-	
Reverse recovery charge	Q_{rr}	$I_F = 100\text{ A}, V_R = 600\text{ V},$ $R_G = 5.6\ \Omega,$ $V_{GE} = -15\text{ V}$	$T_J = 25\text{ }^\circ\text{C}$	-	5.5	-	μC
			$T_J = 125\text{ }^\circ\text{C}$	-	7.3	-	
Peak reverse recovery current	I_{rr}		$T_J = 25\text{ }^\circ\text{C}$	-	68	-	A
			$T_J = 125\text{ }^\circ\text{C}$	-	88	-	
Reverse recovery energy	E_{rec}		$T_J = 25\text{ }^\circ\text{C}$	-	0.89	-	mJ
			$T_J = 125\text{ }^\circ\text{C}$	-	1.71	-	

THERMAL AND MECHANICAL SPECIFICATIONS							
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS	
Maximum junction temperature	T_J		-	-	175	$^\circ\text{C}$	
Storage temperature range	T_{Stg}		-40	-	125		
Junction to case	R_{thJC}					IGBT	0.36
						Diode	0.57
Case to sink (conductive grease applied)	R_{thCS}		-	0.05	-	K/W	
Mounting torque		Power terminal screw: M5	2.5 to 5.0			Nm	
		Mounting screw: M6	3.0 to 5.0				
Weight			-	150	-	g	

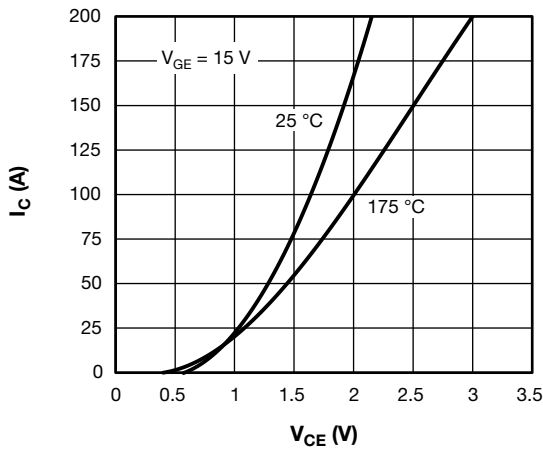


Fig. 1 - IGBT Typical Output Characteristics

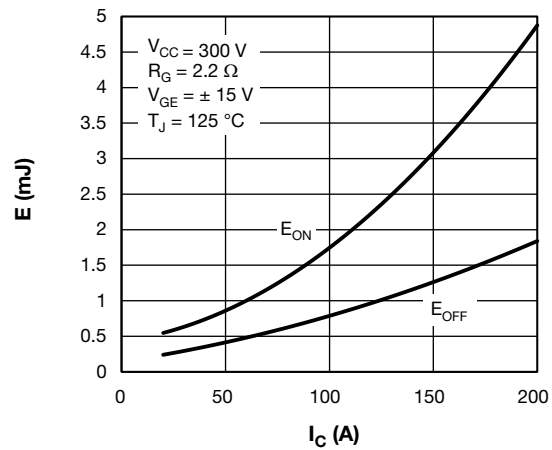


Fig. 3 - IGBT Switching Loss vs. I_C

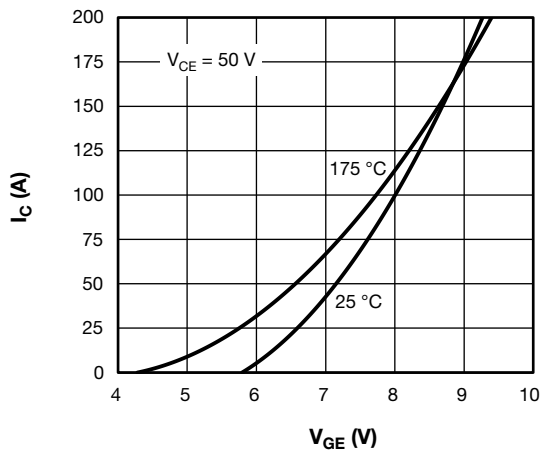


Fig. 2 - IGBT Transfer Characteristics

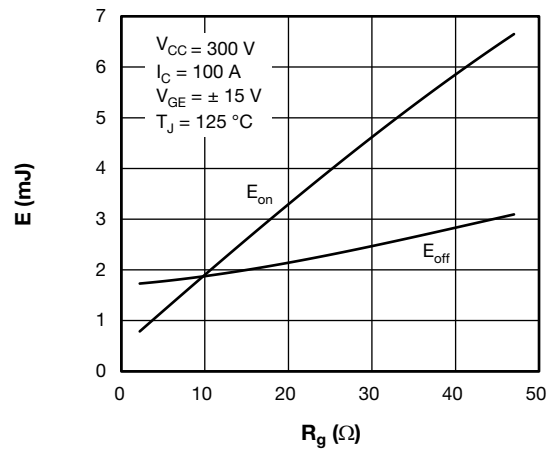


Fig. 4 - IGBT Switching Loss vs. R_G

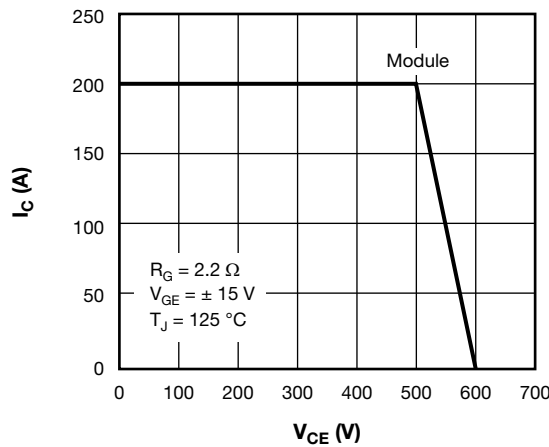


Fig. 5 - RBSOA

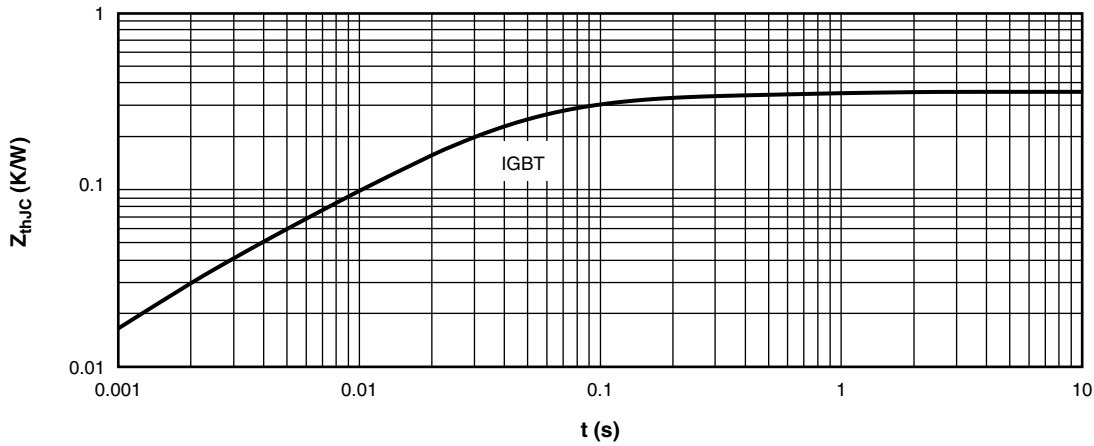


Fig. 6 - IGBT Transient Thermal Impedance

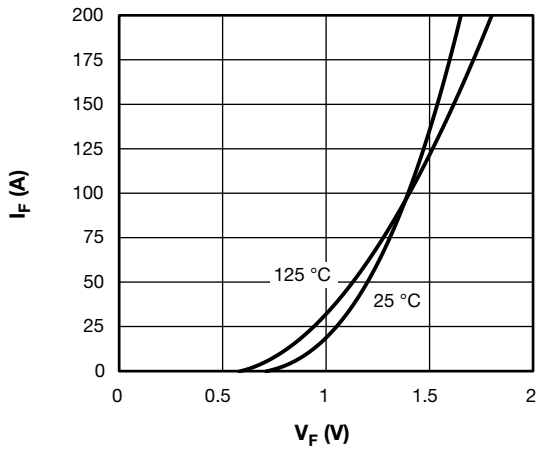


Fig. 7 - Diode Forward Characteristics

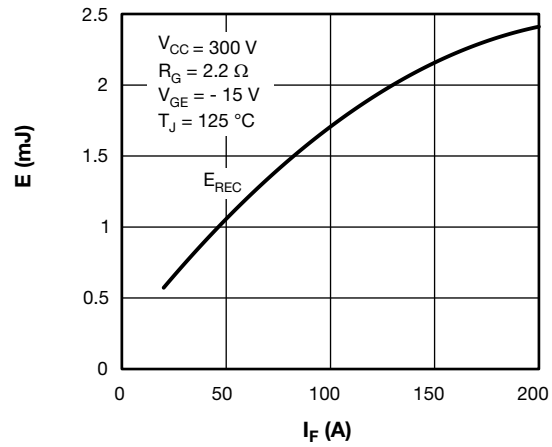


Fig. 8 - Diode Switching Loss vs. I_F

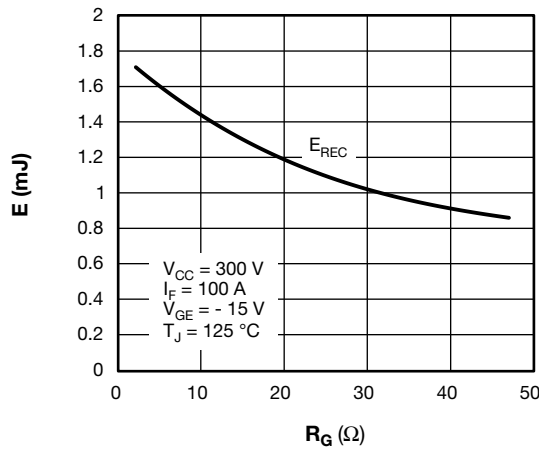


Fig. 9 - Diode Switching Loss vs. R_G

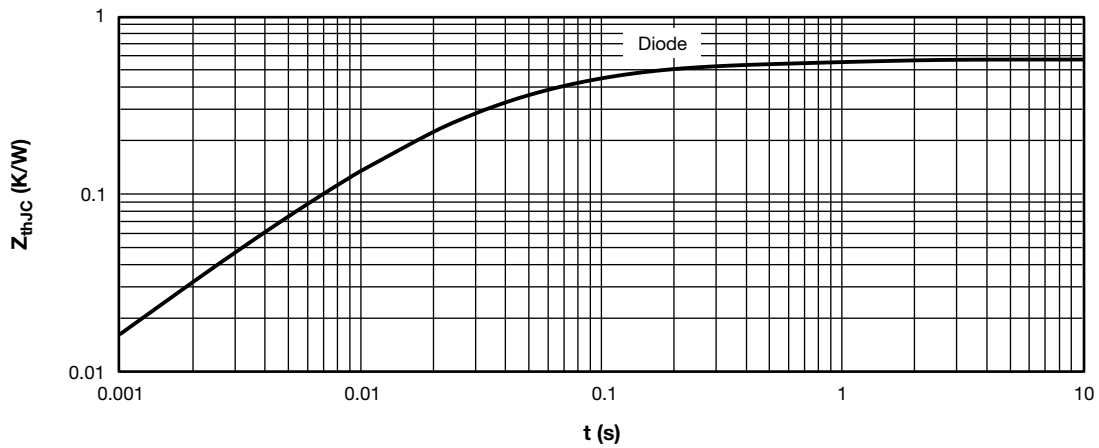
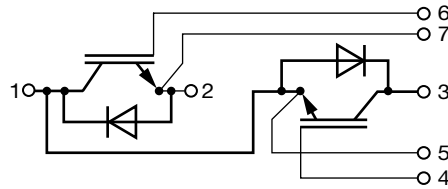


Fig. 10 - Forward Characteristics of Diode

CIRCUIT CONFIGURATION



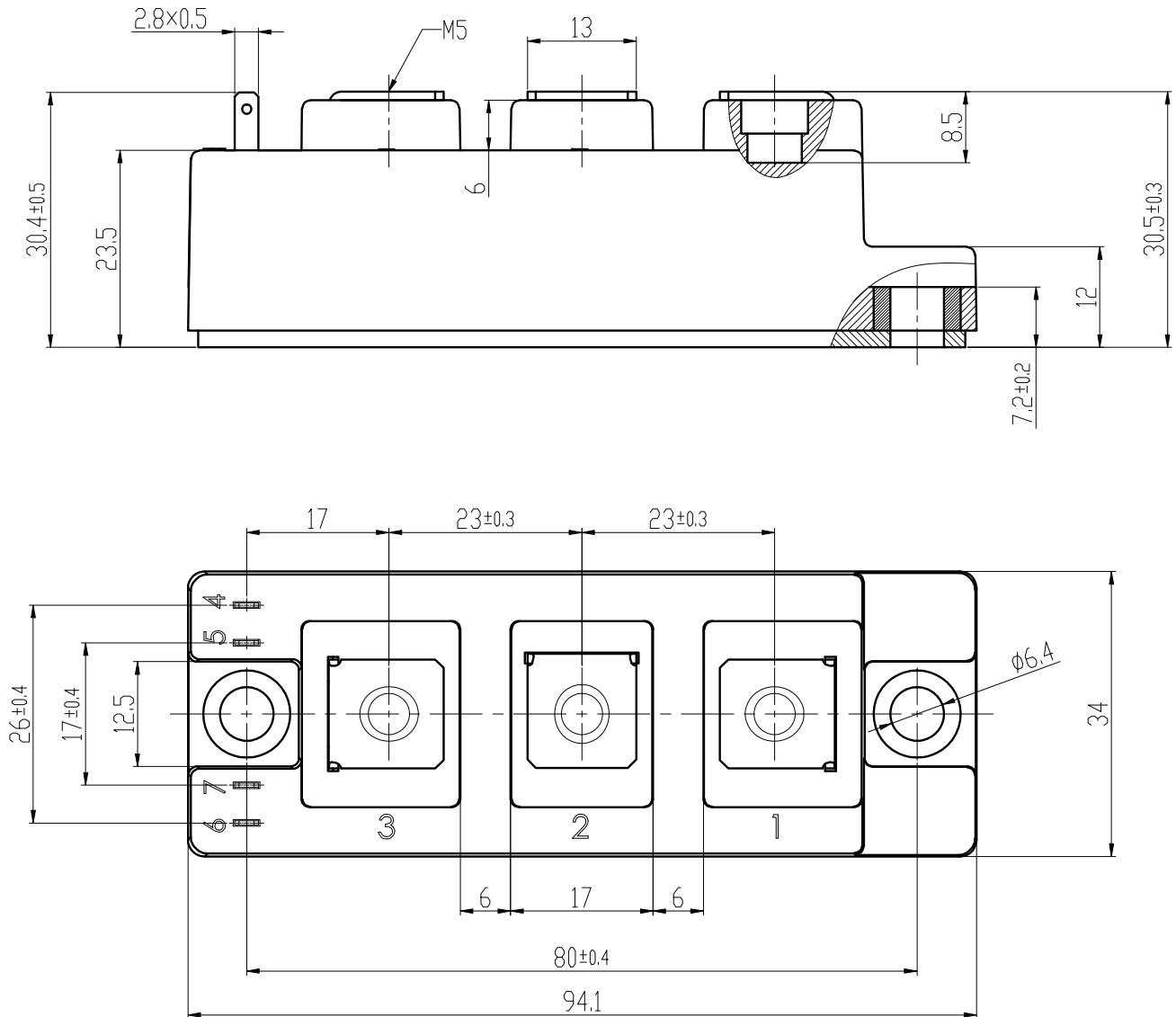
LINKS TO RELATED DOCUMENTS

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Dimensions	www.vishay.com/doc?95524



INT-A-PAK

DIMENSIONS in millimeters (inches)





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