

Molding Type Module IGBT 2-in 1-Package, 1200 V, 75 A


INT-A-PAK

RoHS
COMPLIANT

FEATURES

- High short circuit capability, self limiting to 6 x I_C
- 10 μ s short circuit capability
- V_{CE(on)} with positive temperature coefficient
- 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

TYPICAL APPLICATIONS

- AC inverter drivers
- Electronic welders
- Switching mode power supplies

DESCRIPTION

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

PRODUCT SUMMARY	
V _{CES}	1200 V
I _C at T _C = 80 °C	75 A
V _{CE(on)} (typical) at I _C = 75 A, T _J = 25 °C	1.90 V
Speed	8 kHz to 30 kHz
Package	INT-A-PAK
Circuit	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	150	A
		T _C = 80 °C	75	
Pulsed collector current	I _{CM} ⁽¹⁾	t _p = 1 ms	150	
Diode continuous forward current	I _F	T _C = 80 °C	75	
Diode maximum forward current	I _{FM} ⁽¹⁾	t _p = 1 ms	150	
Maximum power dissipation	P _D	T _J = 150 °C	543	W
Short circuit withstand time	T _{SC}	T _J = 125 °C	10	μs
I ² t-value, diode		V _R = 0 V, t = 10 ms, T _J = 125 °C	1050	A ² s
RMS isolation voltage	V _{ISOL}	f = 50 Hz, t = 1 min	2500	V
Maximum junction temperature	T _J		+150	°C

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}	V _{GE} = 0 V, I _C = 1.0 mA, T _J = 25 °C	1200	-	-	V
Collector to emitter voltage	V _{CE(on)}	V _{GE} = 15 V, I _C = 75 A, T _J = 25 °C	-	1.9	2.35	
		V _{GE} = 15 V, I _C = 75 A, T _J = 125 °C	-	2.1	-	
Gate to emitter threshold voltage	V _{GE(th)}	V _{CE} = V _{GE} , I _C = 3.0 mA, T _J = 25 °C	5.0	6.2	7.0	
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	$t_{d(on)}$	$V_{CC} = 600 \text{ V}$, $I_C = 75 \text{ A}$, $R_g = 10 \Omega$, $V_{GE} = \pm 15 \text{ V}$, $T_J = 25^\circ\text{C}$	-	305	-	-	ns
Rise time	t_r		-	67	-	-	
Turn-off delay time	$t_{d(off)}$		-	328	-	-	
Fall time	t_f		-	187	-	-	
Turn-on switching loss	E_{on}		-	6.74	-	-	mJ
Turn-off switching loss	E_{off}		-	4.25	-	-	
Turn-on delay time	$t_{d(on)}$	$V_{CC} = 600 \text{ V}$, $I_C = 75 \text{ A}$, $R_g = 10 \Omega$, $V_{GE} = \pm 15 \text{ V}$, $T_J = 125^\circ\text{C}$	-	311	-	-	ns
Rise time	t_r		-	67	-	-	
Turn-off delay time	$t_{d(off)}$		-	347	-	-	
Fall time	t_f		-	337	-	-	
Turn-on switching loss	E_{on}		-	9.75	-	-	mJ
Turn-off switching loss	E_{off}		-	7.05	-	-	
Input capacitance	C_{ies}	$V_{GE} = 0 \text{ V}$, $V_{CE} = 25 \text{ V}$, $f = 1.0 \text{ MHz}$, $T_J = 25^\circ\text{C}$	-	5.52	-	-	nF
Output capacitance	C_{oes}		-	0.40	-	-	
Reverse transfer capacitance	C_{res}		-	0.26	-	-	
SC data	I_{SC}	$t_s \leq 10 \mu\text{s}$, $V_{GE} = 15 \text{ V}$, $T_J = 125^\circ\text{C}$, $V_{CC} = 900 \text{ V}$, $V_{CEM} \leq 1200 \text{ V}$	-	350	-	-	A
Internal gate resistance	R_{GINT}		-	3	-	-	Ω
Stray inductance	L_{CE}		-	-	-	30	nH
Module lead resistance, terminal to chip	$R_{CC'EE'}$		-	0.75	-	-	$\text{m}\Omega$

DIODE ELECTRICAL SPECIFICATIONS ($T_C = 25^\circ\text{C}$ unless otherwise noted)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
Forward voltage	V_F	$I_F = 75 \text{ A}$	$T_J = 25^\circ\text{C}$	-	1.78	2.18	V
			$T_J = 125^\circ\text{C}$	-	1.85	-	
Reverse recovery charge	Q_{rr}	$I_F = 75 \text{ A}$, $V_R = 600 \text{ V}$, $dI_F/dt = 1300 \text{ A}/\mu\text{s}$, $V_{GE} = -15 \text{ V}$	$T_J = 25^\circ\text{C}$	-	4.0	-	μC
Peak reverse recovery current	I_{rr}		$T_J = 125^\circ\text{C}$	-	9.3	-	
			$T_J = 25^\circ\text{C}$	-	55	-	A
			$T_J = 125^\circ\text{C}$	-	73	-	
Reverse recovery energy	E_{rec}		$T_J = 25^\circ\text{C}$	-	2.98	-	mJ
			$T_J = 125^\circ\text{C}$	-	4.46	-	

THERMAL AND MECHANICAL SPECIFICATIONS							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
Maximum junction temperature	T_J			-	-	150	$^\circ\text{C}$
Storage temperature range	T_{Stg}			-40	-	125	$^\circ\text{C}$
Junction to case per $\frac{1}{2}$ module	IGBT Diode	R_{thJC}		-	-	0.23	K/W
Case to sink (Conductive grease applied)	R_{thCS}			-	-	0.33	
Mounting torque			Power terminal screw: M5	2.5 to 5.0			Nm
			Mounting screw: M6	3.0 to 5.0			
Weight		Weight of module		-	150	-	g

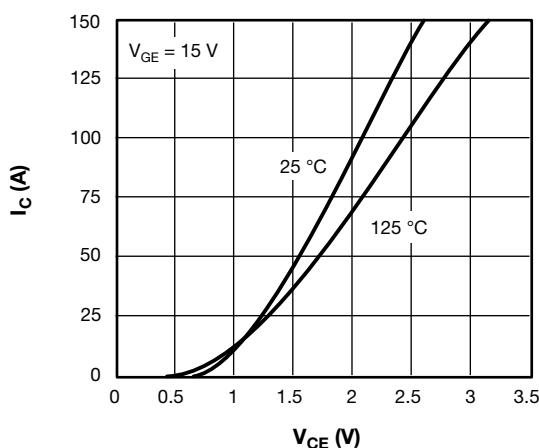


Fig. 1 - IGBT Typical Output Characteristics

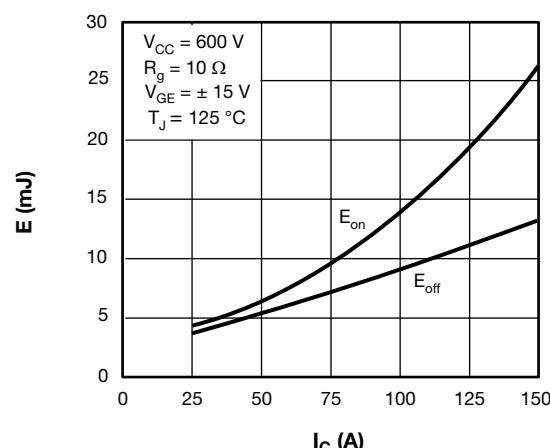


Fig. 3 - IGBT Switching Loss vs. I_C

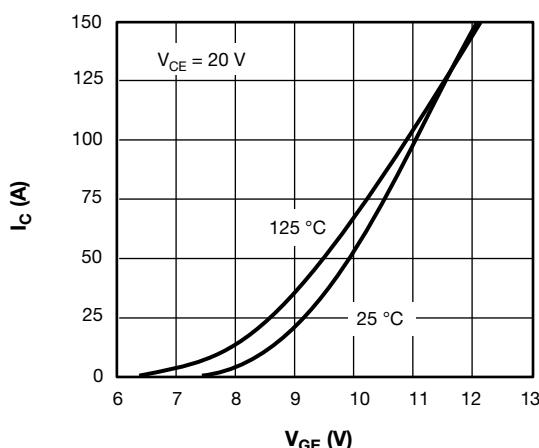


Fig. 2 - IGBT Typical Transfer Characteristics

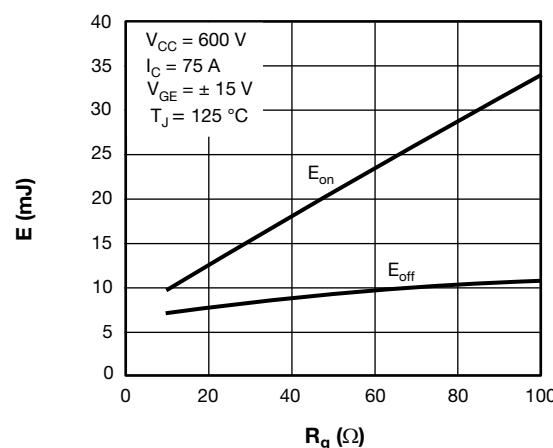


Fig. 4 - IGBT Switching Loss vs. R_g

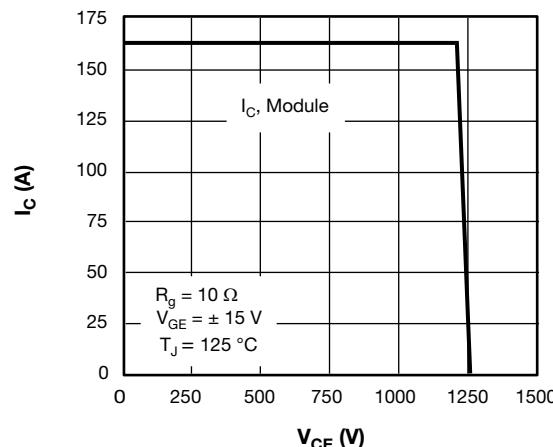


Fig. 5 - RBSOA

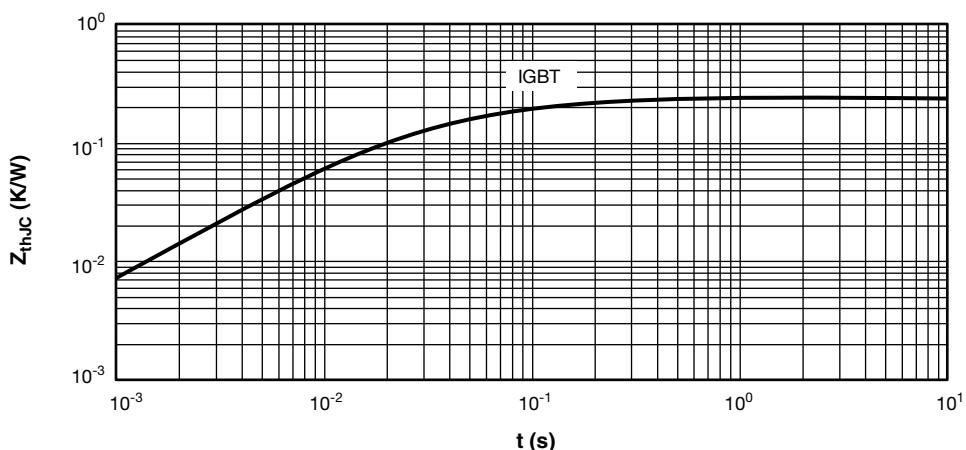


Fig. 6 - IGBT Transient Thermal Impedance

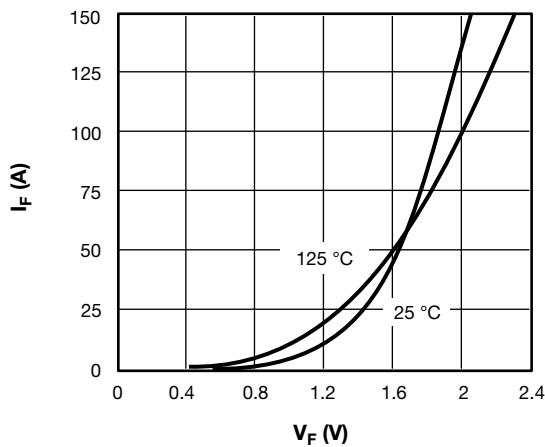


Fig. 7 - Typical Diode Forward Characteristics

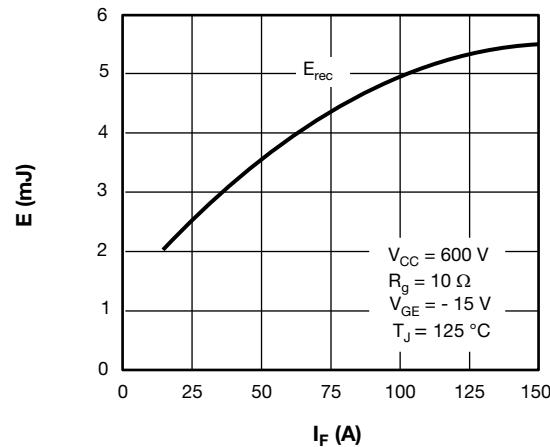


Fig. 8 - Diode Switching Loss vs. I_F

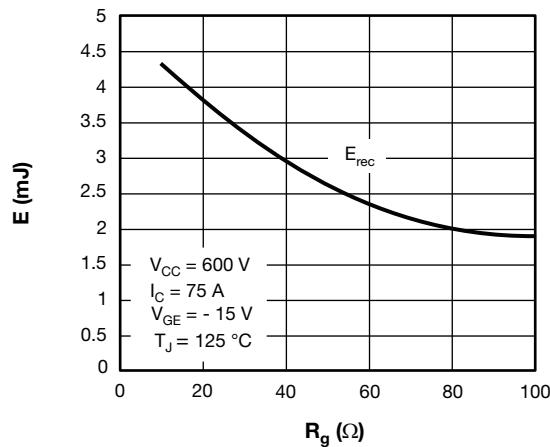


Fig. 9 - Diode Switching Loss vs. R_g

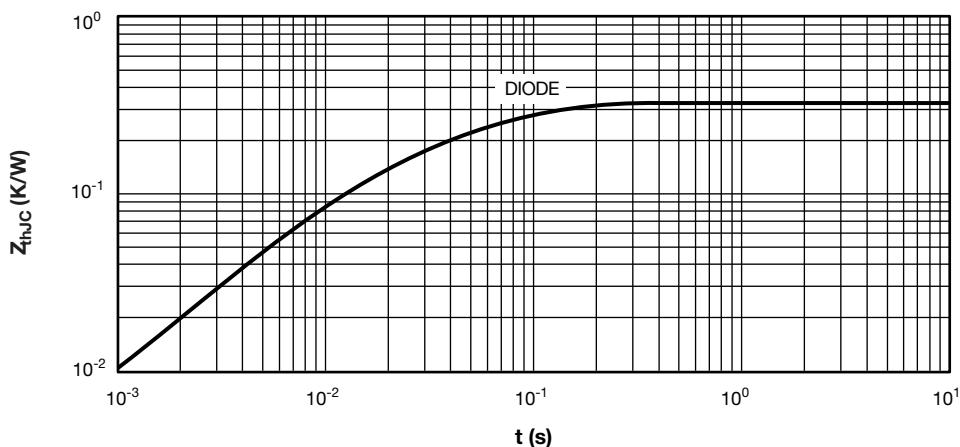
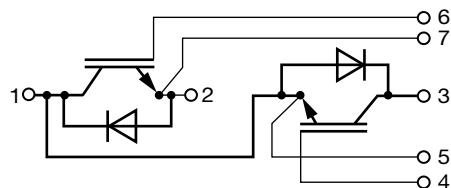


Fig. 10 - Diode Transient Thermal Impedance

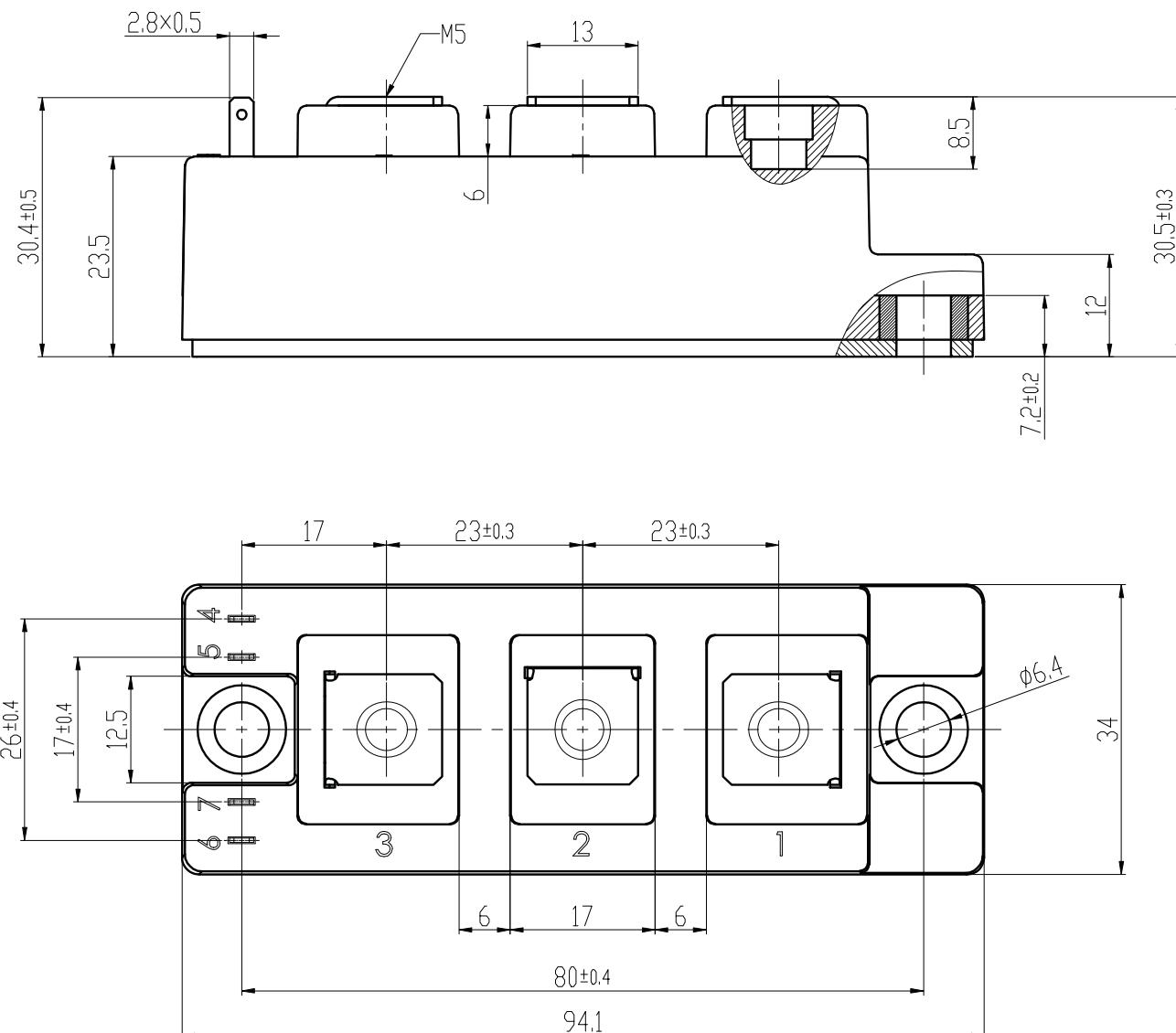
CIRCUIT CONFIGURATION



LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95524

INT-A-PAK

DIMENSIONS in millimeters (inches)



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