

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


**INT-A-PAK**

### FEATURES

- High short circuit capability, self limiting to  $6 \times I_C$
- 10  $\mu$ s short circuit capability
- $V_{CE(on)}$  with positive temperature coefficient
- Rugged with ultrafast performance
- Square RBSOA
- 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](http://www.vishay.com/doc?99912)


**RoHS  
COMPLIANT**

PRODUCT SUMMARY	
$V_{CES}$	1200 V
$I_C$ at $T_C = 80^\circ\text{C}$	75 A
$V_{CE(on)}$ (typical) at $I_C = 75\text{ A}, 25^\circ\text{C}$	3.2 V
Speed	8 kHz to 30 kHz
Package	INT-A-PAK
Circuit	Half bridge

### TYPICAL APPLICATIONS

- Switching mode power supplies
- Inductive heating
- UPS
- 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 general inverters and UPS.

ABSOLUTE MAXIMUM RATINGS ( $T_C = 25^\circ\text{C}$ unless otherwise noted)				
PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS
Collector to emitter voltage	$V_{CES}$		1200	V
Gate to emitter voltage	$V_{GES}$		$\pm 20$	
Collector current	$I_C$	$T_C = 25^\circ\text{C}$	105	A
		$T_C = 80^\circ\text{C}$	75	
Pulsed collector current	$I_{CM}^{(1)}$	$t_p = 1\text{ ms}$	150	
Diode continuous forward current	$I_F$		75	
Diode maximum forward current	$I_{FM}$		150	
Maximum power dissipation	$P_D$	$T_J = 150^\circ\text{C}$	500	
Short circuit withstand time	$t_{SC}$	$T_J = 125^\circ\text{C}$	10	$\mu$ s
RMS isolation voltage	$V_{ISOL}$	$f = 50\text{ Hz}, t = 1\text{ min}$	2500	V
$I^2t$ -value, diode	$I^2t$	$V_R = 0\text{ V}, t = 10\text{ ms}, T_J = 125^\circ\text{C}$	1170	$\text{A}^2\text{s}$

#### Note

<sup>(1)</sup> Repetitive rating: pulse width limited by maximum junction temperature.



IGBT ELECTRICAL SPECIFICATIONS (T <sub>C</sub> = 25 °C unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Collector to emitter breakdown voltage	V <sub>(BR)CES</sub>	T <sub>J</sub> = 25 °C	1200	-	-	V
Collector to emitter voltage	V <sub>CE(on)</sub>	V <sub>GE</sub> = 15 V, I <sub>C</sub> = 75 A, T <sub>J</sub> = 25 °C	-	3.2	-	
		V <sub>GE</sub> = 15 V, I <sub>C</sub> = 75 A, T <sub>J</sub> = 125 °C	-	3.7	-	
Gate to emitter threshold voltage	V <sub>GE(th)</sub>	V <sub>CE</sub> = V <sub>GE</sub> , I <sub>C</sub> = 3 mA, T <sub>J</sub> = 25 °C	4.5	5.1	5.5	
Collector cut-off current	I <sub>CES</sub>	V <sub>CE</sub> = V <sub>CES</sub> , V <sub>GE</sub> = 0 V, T <sub>J</sub> = 25 °C	-	-	2.0	mA
Gate to emitter leakage current	I <sub>GES</sub>	V <sub>GE</sub> = V <sub>GES</sub> , V <sub>CE</sub> = 0 V, T <sub>J</sub> = 25 °C	-	-	400	nA

SWITCHING CHARACTERISTICS						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Turn-on delay time	t <sub>d(on)</sub>	V <sub>CC</sub> = 600 V, I <sub>C</sub> = 75 A, R <sub>g</sub> = 15 Ω, V <sub>GE</sub> = ± 15 V, T <sub>J</sub> = 25 °C	-	160	-	ns
Rise time	t <sub>r</sub>		-	80	-	
Turn-off delay time	t <sub>d(off)</sub>		-	420	-	
Fall time	t <sub>f</sub>		-	110	-	
Turn-on switching loss	E <sub>on</sub>	V <sub>CC</sub> = 600 V, I <sub>C</sub> = 75 A, R <sub>g</sub> = 15 Ω, V <sub>GE</sub> = ± 15 V, T <sub>J</sub> = 125 °C	-	5.7	-	mJ
Turn-off switching loss	E <sub>off</sub>		-	1.9	-	
Turn-on delay time	t <sub>d(on)</sub>		-	140	-	
Rise time	t <sub>r</sub>		-	90	-	
Turn-off delay time	t <sub>d(off)</sub>	V <sub>CC</sub> = 600 V, I <sub>C</sub> = 75 A, R <sub>g</sub> = 15 Ω, V <sub>GE</sub> = ± 15 V, T <sub>J</sub> = 125 °C	-	460	-	ns
Fall time	t <sub>f</sub>		-	150	-	
Turn-on switching loss	E <sub>on</sub>		-	6.8	-	
Turn-off switching loss	E <sub>off</sub>		-	3.2	-	
Input capacitance	C <sub>ies</sub>	V <sub>GE</sub> = 0 V, V <sub>CE</sub> = 30 V, f = 1.0 MHz, T <sub>J</sub> = 25 °C	-	4.3	-	nF
Output capacitance	C <sub>oes</sub>		-	0.40	-	
Reverse transfer capacitance	C <sub>res</sub>		-	0.16	-	
SC data	I <sub>SC</sub>	t <sub>sc</sub> ≤ 10 μs, V <sub>GE</sub> = 15 V, T <sub>J</sub> = 125 °C, V <sub>CC</sub> = 900 V, V <sub>CEM</sub> ≤ 1200 V	-	235	-	A
Stray inductance	L <sub>CE</sub>		-	-	30	nH
Module lead resistance, terminal to chip	R <sub>CC'+EE'</sub>	T <sub>C</sub> = 25 °C	-	0.75	-	mΩ

DIODE ELECTRICAL SPECIFICATIONS (T <sub>C</sub> = 25 °C unless otherwise noted)							
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS	
Diode forward voltage	V <sub>F</sub>	I <sub>F</sub> = 75 A	T <sub>J</sub> = 25 °C	-	1.9	2.3	V
			T <sub>J</sub> = 125 °C	-	2.0	2.4	
Diode reverse recovery charge	Q <sub>rr</sub>	I <sub>F</sub> = 75 A, V <sub>R</sub> = 600 V, dI <sub>F</sub> /dt = -2000 A/μs, V <sub>GE</sub> = -15 V	T <sub>J</sub> = 25 °C	-	100	-	μC
			T <sub>J</sub> = 125 °C	-	125	-	
Diode peak reverse recovery current	I <sub>rr</sub>	I <sub>F</sub> = 75 A, V <sub>R</sub> = 600 V, dI <sub>F</sub> /dt = -2000 A/μs, V <sub>GE</sub> = -15 V	T <sub>J</sub> = 25 °C	-	80	-	A
			T <sub>J</sub> = 125 °C	-	100	-	
Diode reverse recovery energy	E <sub>rec</sub>	I <sub>F</sub> = 75 A, V <sub>R</sub> = 600 V, dI <sub>F</sub> /dt = -2000 A/μs, V <sub>GE</sub> = -15 V	T <sub>J</sub> = 25 °C	-	3.0	-	mJ
			T <sub>J</sub> = 125 °C	-	6.0	-	



THERMAL AND MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Operating junction temperature range	$T_J$		-40	-	150	°C
Storage temperature range	$T_{STG}$		-40	-	125	
Junction to case	$R_{thJC}$	IGBT (per 1/2 module)	-	-	0.25	K/W
		Diode (per 1/2 module)	-	-	0.40	
Case to sink	$R_{thCS}$	Conductive grease applied	-	0.05	-	
Mounting torque		Power terminal screw: M5	2.5 to 5.0			Nm
		Mounting screw: M6	3.0 to 5.0			
Weight of module			160			g

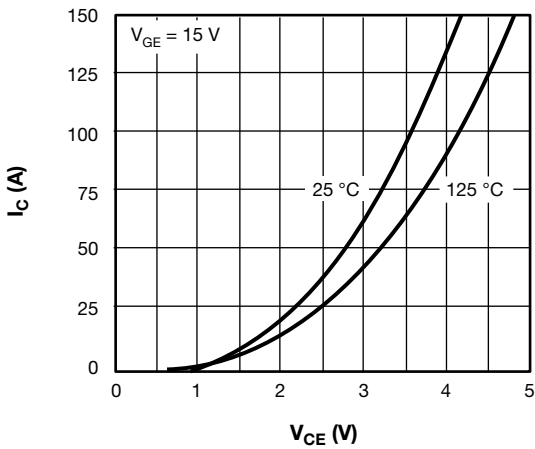


Fig. 1 - Typical Output Characteristics

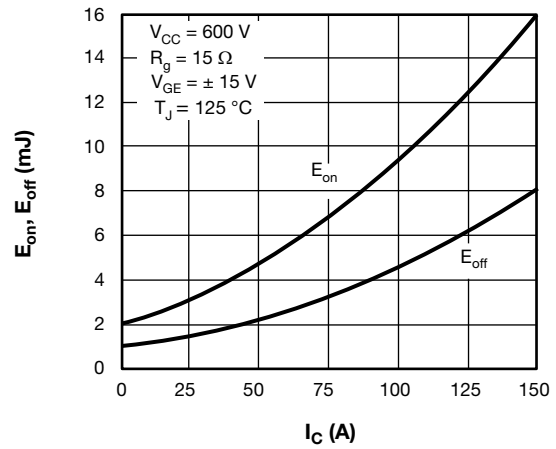


Fig. 3 - Total Switching Loss vs.  $I_C$

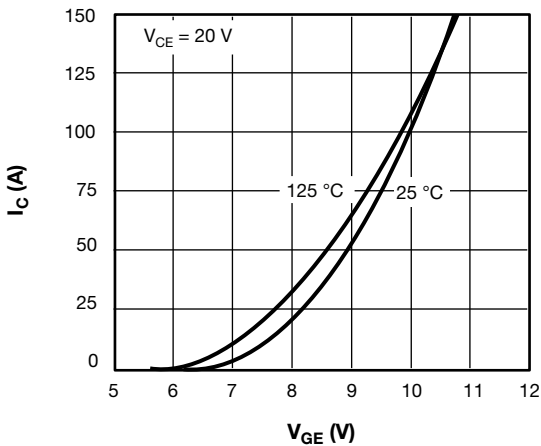


Fig. 2 - Typical Transfer Characteristics

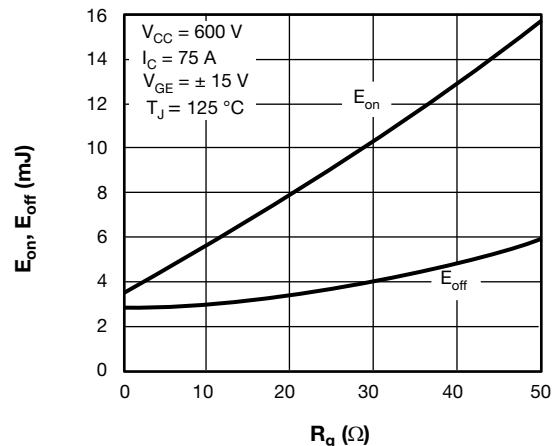


Fig. 4 - Total Switching Loss vs.  $R_g$

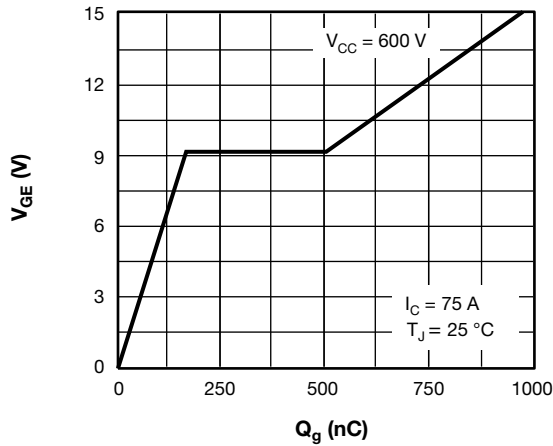


Fig. 5 - Gate Charge Characteristics

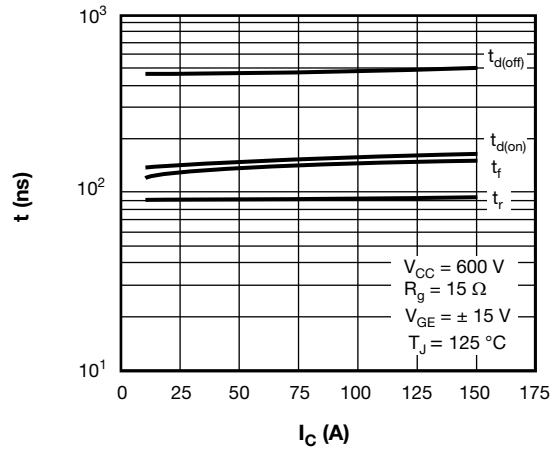


Fig. 7 - Typical Switching Times vs.  $I_C$

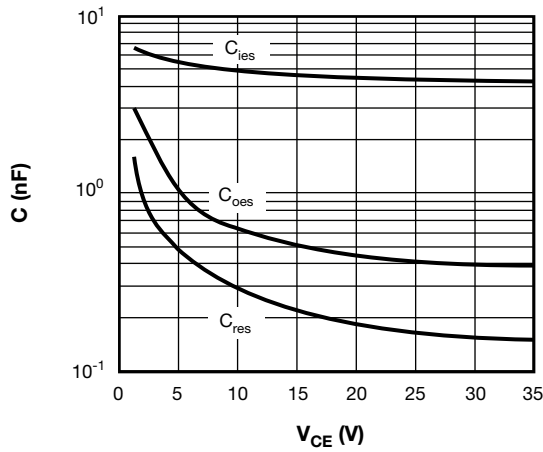


Fig. 6 - Typical Capacitance vs. Collector to Emitter Current

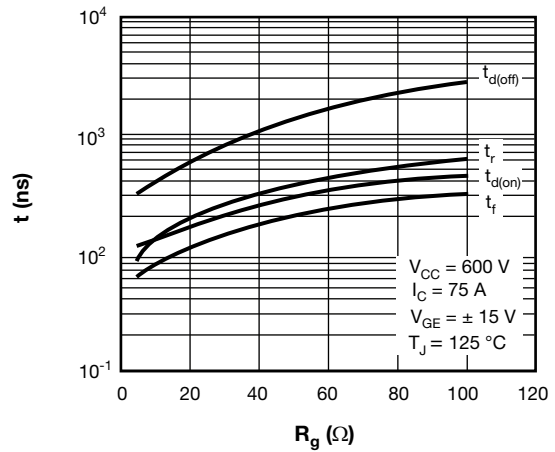


Fig. 8 - Typical Switching Times vs. Gate Resistance  $R_g$

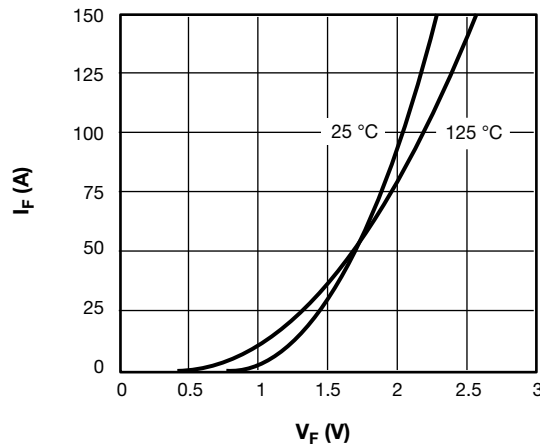


Fig. 9 - Diode Typical Forward Characteristics

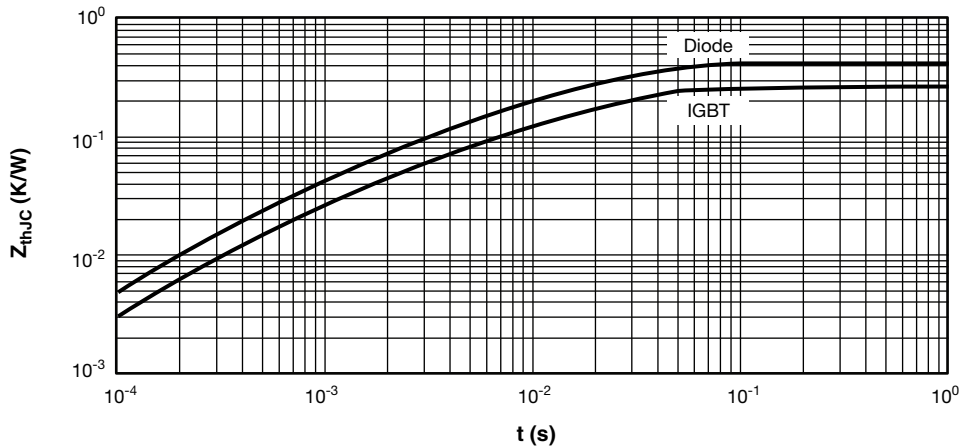
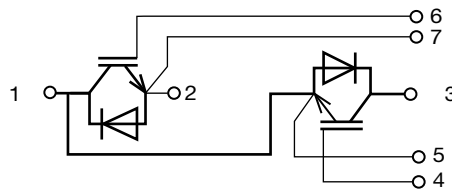


Fig. 10 - Transient Thermal Impedance

**CIRCUIT CONFIGURATION**



LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95524">www.vishay.com/doc?95524</a>



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