

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


**INT-A-PAK**

PRODUCT SUMMARY	
$V_{CES}$	1200 V
$I_C$ at $T_C = 80\text{ }^\circ\text{C}$	75 A
$V_{CE(on)}$ (typical) at $I_C = 75\text{ A}$ , $25\text{ }^\circ\text{C}$	2.08 V
Speed	8 kHz to 30 kHz
Package	INT-A-PAK
Circuit	Chopper high side switch

**FEATURES**

- High short circuit capability, self limiting to  $6 \times I_C$
- 10  $\mu\text{s}$  short circuit capability
- $V_{CE(on)}$  with positive temperature coefficient
- Maximum junction temperature  $150\text{ }^\circ\text{C}$
- 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](http://www.vishay.com/doc?99912)


**RoHS  
COMPLIANT**
**TYPICAL APPLICATIONS**

- AC inverter drives
- 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 general inverters and UPS.

ABSOLUTE MAXIMUM RATINGS ( $T_C = 25\text{ }^\circ\text{C}$ 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	$I_C$	$T_C = 25\text{ }^\circ\text{C}$	150	A
		$T_C = 80\text{ }^\circ\text{C}$	75	
Pulsed collector current	$I_{CM}^{(1)}$	$t_p = 1\text{ ms}$	150	
Diode continuous forward current	$I_F$		75	
Diode maximum forward current	$I_{FM}^{(1)}$		150	
Maximum power dissipation	$P_D$	$T_J = 150\text{ }^\circ\text{C}$	446	
Short circuit withstand time	$t_{sc}$	$T_J = 125\text{ }^\circ\text{C}$	10	$\mu\text{s}$
RMS isolation voltage	$V_{ISOL}$	$f = 50\text{ Hz}$ , $t = 1\text{ min}$	2500	V

**Note**

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

IGBT ELECTRICAL SPECIFICATIONS ( $T_C = 25\text{ }^\circ\text{C}$ unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Collector to emitter breakdown voltage	$V_{(BR)CES}$	$T_J = 25\text{ }^\circ\text{C}$	1200	-	-	V
Collector to emitter voltage	$V_{CE(on)}$	$V_{GE} = 15\text{ V}$ , $I_C = 75\text{ A}$ , $T_J = 25\text{ }^\circ\text{C}$	-	2.08	-	
		$V_{GE} = 15\text{ V}$ , $I_C = 75\text{ A}$ , $T_J = 175\text{ }^\circ\text{C}$	-	2.35	-	
Gate to emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}$ , $I_C = 3.5\text{ mA}$ , $T_J = 25\text{ }^\circ\text{C}$	5.0	6.0	7.5	
Collector cut-off current	$I_{CES}$	$V_{CE} = V_{CES}$ , $V_{GE} = 0\text{ V}$ , $T_J = 25\text{ }^\circ\text{C}$	-	-	1.0	mA
Gate to emitter leakage current	$I_{GES}$	$V_{GE} = V_{GES}$ , $V_{CE} = 0\text{ V}$ , $T_J = 25\text{ }^\circ\text{C}$	-	-	400	nA



SWITCHING CHARACTERISTICS						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Turn-on delay time	$t_{d(on)}$	$V_{CC} = 600\text{ V}, I_C = 75\text{ A}, R_g = 15\ \Omega,$ $V_{GE} = \pm 15\text{ V}, T_J = 25\text{ }^\circ\text{C}$	-	260	-	ns
Rise time	$t_r$		-	30	-	
Turn-off delay time	$t_{d(off)}$		-	420	-	
Fall time	$t_f$		-	70	-	
Turn-on switching loss	$E_{on}$		-	4.70	-	mJ
Turn-off switching loss	$E_{off}$		-	6.20	-	
Turn-on delay time	$t_{d(on)}$	$V_{CC} = 600\text{ V}, I_C = 75\text{ A}, R_g = 4.7\ \Omega,$ $V_{GE} = \pm 15\text{ V}, T_J = 125\text{ }^\circ\text{C}$	-	120	-	ns
Rise time	$t_r$		-	75	-	
Turn-off delay time	$t_{d(off)}$		-	310	-	
Fall time	$t_f$		-	260	-	
Turn-on switching loss	$E_{on}$		-	6.2	-	mJ
Turn-off switching loss	$E_{off}$		-	5.5	-	
Input capacitance	$C_{ies}$	$V_{GE} = 0\text{ V}, V_{CE} = 30\text{ V}, f = 1.0\text{ MHz}$	-	9.45	-	nF
Output capacitance	$C_{oes}$		-	0.34	-	
Reverse transfer capacitance	$C_{res}$		-	0.23	-	
SC data	$I_{SC}$	$t_p \leq 10\ \mu\text{s}, V_{GE} = 15\text{ V}, T_J = 125\text{ }^\circ\text{C},$ $V_{CC} = 900\text{ V}, V_{CEM} \leq 1200\text{ V}$	-	TBD	-	A
Stray inductance	$L_{CE}$		-	-	30	nH
Module lead resistance, terminal to chip	$R_{CC'+EE'}$	$T_C = 25\text{ }^\circ\text{C}$	-	0.75	-	m $\Omega$

DIODE ELECTRICAL SPECIFICATIONS ( $T_C = 25\text{ }^\circ\text{C}$ unless otherwise noted)							
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS	
Forward voltage	$V_F$	$I_F = 75\text{ A}$	$T_J = 25\text{ }^\circ\text{C}$	-	2.1	-	V
			$T_J = 125\text{ }^\circ\text{C}$	-	1.9	-	
Reverse recovery time	$t_{rr}$	$I_F = 75\text{ A}, V_R = 600\text{ V},$ $di_F/dt = -2500\text{ A}/\mu\text{s}$ $V_{GE} = -15\text{ V}$	$T_J = 25\text{ }^\circ\text{C}$	-	70	-	$\mu\text{C}$
			$T_J = 125\text{ }^\circ\text{C}$	-	141	-	
Peak reverse recovery current	$I_{rr}$		$T_J = 25\text{ }^\circ\text{C}$	-	47	-	A
			$T_J = 125\text{ }^\circ\text{C}$	-	65	-	
Reverse recovery energy	$E_{rec}$		$T_J = 25\text{ }^\circ\text{C}$	-	TBD	-	mJ
			$T_J = 125\text{ }^\circ\text{C}$	-	TBD	-	

THERMAL AND MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Operating junction temperature range	$T_J$		-40	-	150	$^\circ\text{C}$
Storage temperature range	$T_{Stg}$		-40	-	125	$^\circ\text{C}$
Junction to case per 1/2 module	$R_{thJC}$	IGBT	-	-	0.28	K/W
		Diode	-	-	0.48	
Case to sink (Conductive grease applied)	$R_{thCS}$		-	0.05	-	
Mounting torque		Power terminal screw: M5	2.5 to 5.0			Nm
		Mounting screw: M6	3.0 to 6.0			
Weight		Weight of module	-	150	-	g

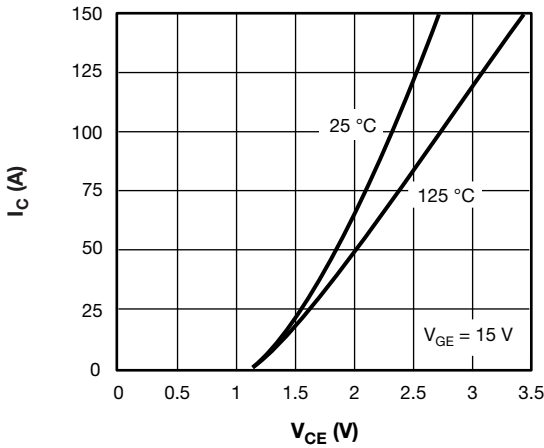


Fig. 1 - Typical Output Characteristics

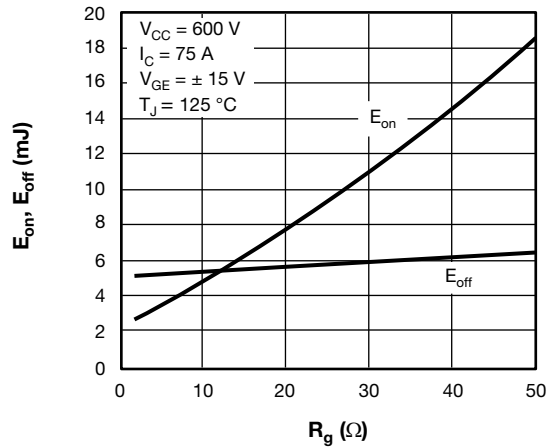


Fig. 4 - Switching Loss vs.  $R_g$

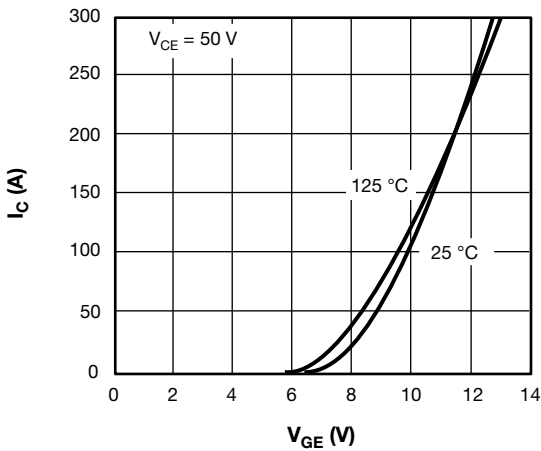


Fig. 2 - Typical Transfer Characteristics

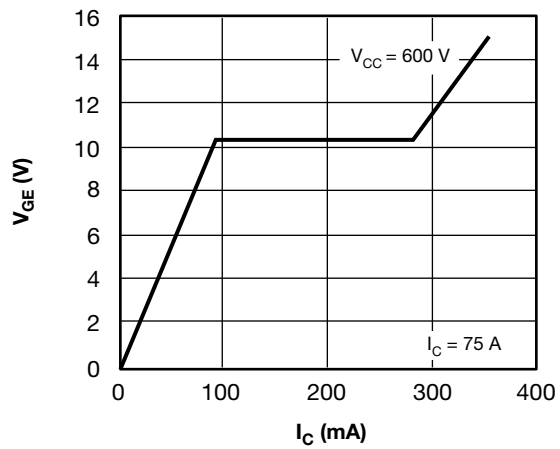


Fig. 5 - Gate Charge Characteristics

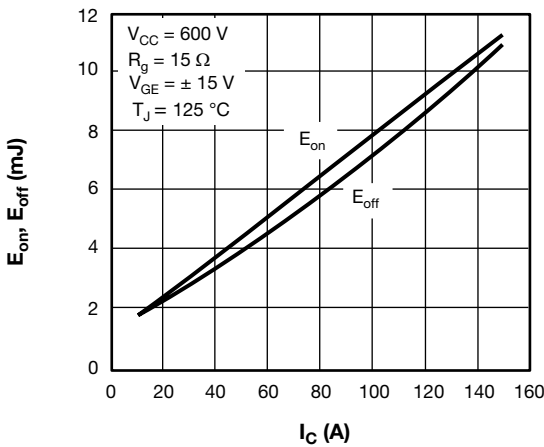


Fig. 3 - Switching Loss vs.  $I_c$

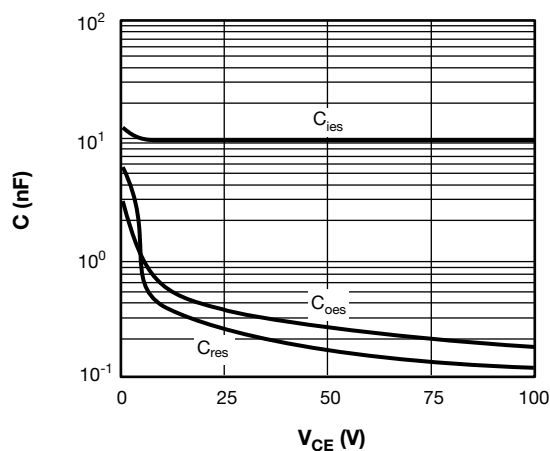


Fig. 6 - Typical Capacitance vs. Collector-Emitter-Voltage

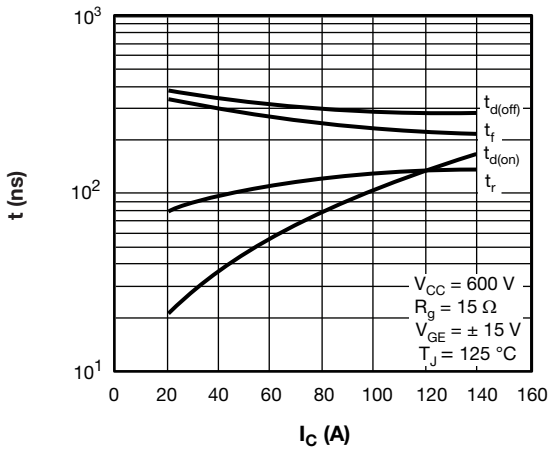


Fig. 7 - Diode Forward Characteristics

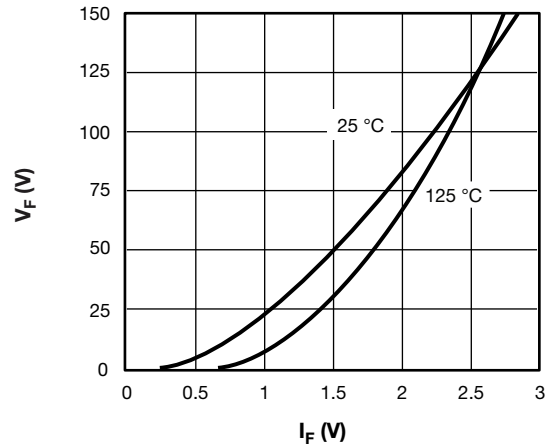


Fig. 9 - Typical Forward Characteristics (Diode)

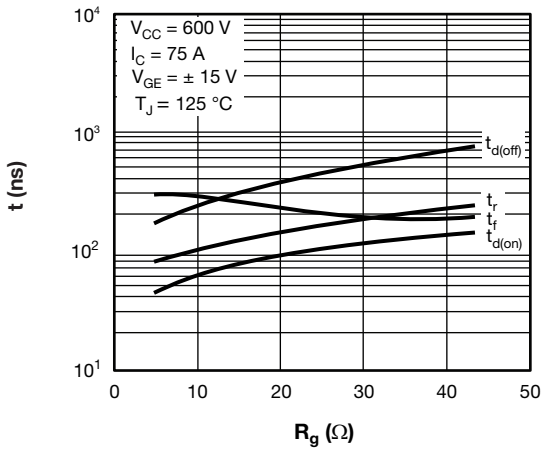


Fig. 8 - Typical Switching Times vs.  $R_g$

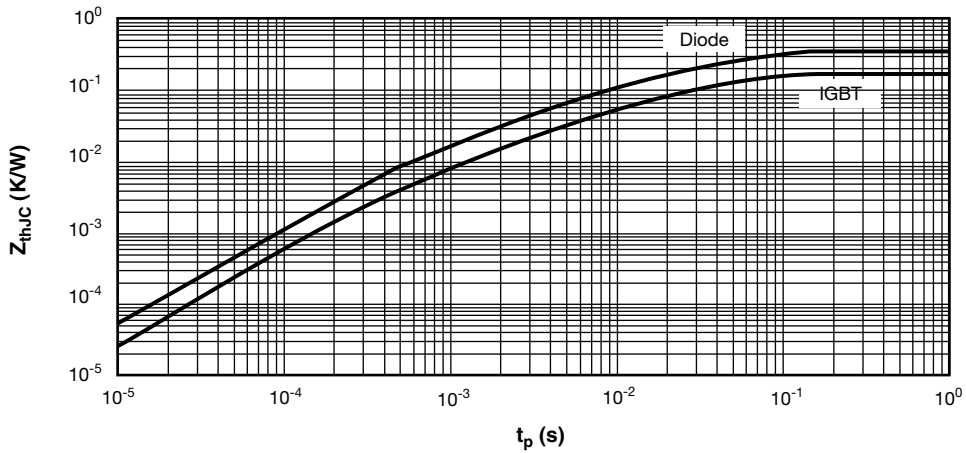
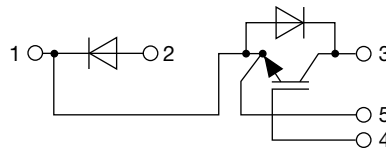


Fig. 10 - Transient Thermal Impedance



**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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