

## Molding Type Module IGBT, 2 in 1 Package, 1200 V and 150 A



Dual INT-A-PAK

### FEATURES

- 10  $\mu$ s short circuit capability
- Low switching losses
- Rugged with ultrafast performance
- $V_{CE(on)}$  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](http://www.vishay.com/doc?99912)


**RoHS  
COMPLIANT**

PRIMARY CHARACTERISTICS	
$V_{CES}$	1200 V
$I_C$ at $T_C = 80\text{ }^\circ\text{C}$	150 A
$V_{CE(on)}$ (typical) at $I_C = 150\text{ A}$ , $T_J = 25\text{ }^\circ\text{C}$	3.10 V
Speed	8 kHz to 30 kHz
Package	Dual INT-A-PAK
Circuit configuration	Half bridge

### TYPICAL APPLICATIONS

- Inductive heating
- Electronic welder
- Switching mode power supplies

### DESCRIPTION

Vishay's IGBT power module provides ultrafast switching speed as well as short circuit ruggedness. It is designed for applications such as electronic welder and inductive heating.

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	$I_C$	$T_C = 25\text{ }^\circ\text{C}$	219	A
		$T_C = 75\text{ }^\circ\text{C}$	150	
Pulsed collector current	$I_{CM}^{(1)}$	$t_p = 1\text{ ms}$	300	
Diode continuous forward current	$I_F$	$T_C = 80\text{ }^\circ\text{C}$	150	
Diode maximum forward current	$I_{FM}^{(1)}$	$t_p = 1\text{ ms}$	300	
Maximum power dissipation	$P_D$	$T_J = 150\text{ }^\circ\text{C}$	1157	
Short circuit withstand time	$T_{SC}$	$T_J = 125\text{ }^\circ\text{C}$	10	$\mu$ s
RMS isolation voltage	$V_{ISOL}$	$f = 50\text{ Hz}$ , $t = 1\text{ min}$	2500	V

#### Note

(1) 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 saturation voltage	$V_{CE(sat)}$	$V_{GE} = 15\text{ V}$ , $I_C = 150\text{ A}$ , $T_J = 25\text{ }^\circ\text{C}$	-	3.00	3.45	
		$V_{GE} = 15\text{ V}$ , $I_C = 150\text{ A}$ , $T_J = 125\text{ }^\circ\text{C}$	-	3.80	-	
Gate to emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}$ , $I_C = 6.0\text{ mA}$ , $T_J = 25\text{ }^\circ\text{C}$	4.5	5.4	6.5	
Collector cut-off current	$I_{CES}$	$V_{CE} = V_{CES}$ , $V_{GE} = 0\text{ V}$ , $T_J = 25\text{ }^\circ\text{C}$	-	-	5.0	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	$t_{d(on)}$	$V_{CC} = 600\text{ V}, I_C = 150\text{ A}, R_g = 6.8\ \Omega,$ $V_{GE} = \pm 15\text{ V}, T_J = 25\text{ }^\circ\text{C}$	-	71	-	ns	
Rise time	$t_r$		-	52	-		
Turn-off delay time	$t_{d(off)}$		-	429	-		
Fall time	$t_f$		-	116	-		
Turn-on switching loss	$E_{on}$			-	9.2	-	mJ
Turn-off switching loss	$E_{off}$			-	7.0	-	
Turn-on delay time	$t_{d(on)}$	$V_{CC} = 600\text{ V}, I_C = 150\text{ A}, R_g = 6.8\ \Omega,$ $V_{GE} = \pm 15\text{ V}, T_J = 125\text{ }^\circ\text{C}$	-	71	-	ns	
Rise time	$t_r$		-	54	-		
Turn-off delay time	$t_{d(off)}$		-	456	-		
Fall time	$t_f$		-	134	-		
Turn-on switching loss	$E_{on}$			-	13.2	-	mJ
Turn-off switching loss	$E_{off}$			-	8.3	-	
Input capacitance	$C_{ies}$	$V_{GE} = 0\text{ V}, V_{CE} = 30\text{ V}, f = 1.0\text{ MHz}$	-	11.0	-	nF	
Output capacitance	$C_{oes}$		-	1.14	-		
Reverse transfer capacitance	$C_{res}$		-	0.50	-		
SC data	$I_{SC}$	$t_p \leq 10\ \mu\text{s}, V_{GE} = 15\text{ V}, T_J = 125\text{ }^\circ\text{C},$ $V_{CC} = 900\text{ V}, V_{CEM} \leq 1200\text{ V}$	-	950	-	A	
Internal gate resistance	$R_g$		-	1.3	-	$\Omega$	
Stray inductance	$L_{CE}$		-	-	30	nH	
Module lead resistance, terminal to chip	$R_{CC'+EE'}$	$T_C = 25\text{ }^\circ\text{C}$	-	0.35	-	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	$V_F$	$I_F = 150\text{ A}, V_{GE} = 0\text{ V}$	$T_J = 25\text{ }^\circ\text{C}$	-	1.80	2.25	V
			$T_J = 125\text{ }^\circ\text{C}$	-	1.75	-	
Reverse recovery charge	$Q_{rr}$		$T_J = 25\text{ }^\circ\text{C}$	-	9.1	-	$\mu\text{C}$
			$T_J = 125\text{ }^\circ\text{C}$	-	20.0	-	
Peak reverse recovery current	$I_{rr}$	$I_F = 150\text{ A}, V_R = 600\text{ V},$ $di_F/dt = -2000\text{ A}/\mu\text{s}$ $V_{GE} = -15\text{ V}$	$T_J = 25\text{ }^\circ\text{C}$	-	153	-	A
			$T_J = 125\text{ }^\circ\text{C}$	-	191	-	
Reverse recovery energy	$E_{rec}$		$T_J = 25\text{ }^\circ\text{C}$	-	3.2	-	mJ
			$T_J = 125\text{ }^\circ\text{C}$	-	7.5	-	

THERMAL AND MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Maximum junction temperature	$T_J$		-	-	150	$^\circ\text{C}$
Operating junction temperature range	TJ		-40	-	125	
Storage temperature range	$T_{STG}$		-40	-	125	
Junction to case	IGBT	$R_{\theta JC}$	-	-	0.108	K/W
	Diode		-	-	0.200	
Case to heatsink	IGBT	$R_{\theta CS}$	-	0.031	-	
	Diode		-	0.057	-	
	Module		-	0.010	-	
Mounting torque		Power terminal screw: M5	2.5	-	5.0	
		Mounting screw: M6	3.0	-	5.0	
Weight		Weight of module	-	300	-	g