COMPLIANT



Vishay Semiconductors

Half Bridge IGBT Power Module, 600 V, 50 A



PRIMARY CHARACTERISTICS					
V_{CES}	600 V				
I_C at $T_C = 80 ^{\circ}C$	50 A				
$V_{CE(on)}$ (typical) at $I_C = 50$ A, 25 °C	1.65 V				
Speed	8 kHz to 30 kHz				
Package	INT-A-PAK				
Circuit configuration	Half bridge				

FEATURES

- Low V_{CE(on)} trench IGBT technology
- 5 µs 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 <u>www.vishay.com/doc?99912</u>

TYPICAL APPLICATIONS

- UPS (uninterruptable power supply)
- 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 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	V	
Collector current I _C	1	T _C = 25 °C	85		
	T _C = 80 °C	50			
Pulsed collector current	I _{CM} ⁽¹⁾	t _p = 1 ms	100	Α	
Diode continuous forward current	I _F	T _C = 80 °C	50		
Diode maximum forward current	I _{FM} ⁽¹⁾	t _p = 1 ms	100		
Maximum power dissipation	P _D	T _J = 175 °C	208	W	
Short circuit withstand time	t _{SC}	T _C = 125 °C	5	μs	
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	-	-		
Collector to emitter voltage	.,	$V_{GE} = 15 \text{ V}, I_{C} = 50 \text{ A}, T_{J} = 25 ^{\circ}\text{C}$	-	1.65	2.10		
Collector to enfitter voltage	V _{CE(on)}	V _{GE} = 15 V, I _C = 50 A, T _J = 175 °C	-	2.05	-	\ \	
Gate to emitter threshold voltage	V _{GE(th)}	$V_{CE} = V_{GE}, I_{C} = 1.4 \text{ mA}, T_{J} = 25 ^{\circ}\text{C}$	4.0	4.9	6.5		
Collector cut-off current	I _{CES}	$V_{CE} = V_{CES}$, $V_{GE} = 0$ V, $T_{J} = 25$ °C	-	-	1.0	mA	
Gate to emitter leakage current	I _{GES}	$V_{GE} = V_{GES}$, $V_{CE} = 0$ V, $T_{J} = 25$ °C	-	-	400	nA	

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SWITCHING CHARACTERISTICS	3					
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Turn-on delay time	t _{d(on)}		-	58	-	ns .
Rise time	t _r		-	31	-	
Turn-off delay time	t _{d(off)}	$V_{CC} = 300 \text{ V}, I_{C} = 50 \text{ A}, R_{g} = 3.3 \Omega, V_{GE} = \pm 15 \text{ V}, T_{J} = 25 ^{\circ}\text{C}$	-	80	-	
Fall time	t _f	$V_{GE} = \pm 15 \text{ V}, T_{J} = 25 \text{ °C}$	-	100	-	
Turn-on switching loss	E _{on}		-	0.41	-	
Turn-off switching loss	E _{off}		-	0.42	-	- mJ
Turn-on delay time	t _{d(on)}		-	64	-	- ns
Rise time	t _r	$V_{CC} = 300 \text{ V}, I_{C} = 50 \text{ A}, R_{g} = 3.3 \Omega, \\ V_{GE} = \pm 15 \text{ V}, T_{J} = 125 ^{\circ}\text{C}$	-	37	-	
Turn-off delay time	t _{d(off)}		-	90	-	
Fall time	t _f		-	117	-	
Turn-on switching loss	E _{on}		-	0.69	-	ml
Turn-off switching loss	E _{off}		-	0.69	-	- mJ
Input capacitance	C _{ies}		-	3.03	-	
Output capacitance	C _{oes}	$V_{GE} = 0 \text{ V}, V_{CE} = 30 \text{ V}, f = 1.0 \text{ MHz}$	-	0.25	-	nF
Reverse transfer capacitance	C _{res}		-	0.09	-	
SC data	I _{SC}	$t_p \leq 5~\mu s,~V_{GE} = 15~V,~T_J = 125~^{\circ}C,\\ V_{CC} = 360~V,~V_{CEM} \leq 600~V$	-	450	-	Α
Stray inductance	L _{CE}		-	-	30	nH
Module lead resistance, terminal to chip	R _{CC'+EE'}		-	0.75	-	mΩ

DIODE ELECTRICAL SPECIFICATIONS (T _C = 25 °C unless otherwise noted)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
Forward voltage	V _F	I _F = 50 A	T _J = 25 °C	ı	1.35	1.75	V
Torward vortage			T _J = 125 °C	ı	1.37	ı	
Davida da cara	Q _{rr}		$T_J = 25 ^{\circ}C$	-	2.3	-	μC
Reverse recovery charge			T _J = 125 °C	-	4.3	-	
Dook roverse recovery ourrest	I _{rr}	$I_{F} = 50 \text{ A, } V_{R} = 300 \text{ V,}$ $R_{G} = 3.3 \Omega$ $V_{GE} = -15 \text{ V}$	T _J = 25 °C	-	33	-	Α
Peak reverse recovery current			T _J = 125 °C	-	58	-	_ A
Davena racavani anarav	E _{rec}		T _J = 25 °C	-	0.56	-	m l
Reverse recovery energy			T _J = 125 °C	-	1.11	-	mJ

THERMAL AND MECHANICAL SPECIFICATIONS							
PARAMETER		SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Maximum junction temperature	e range	TJ		-	-	175	°C
Storage temperature range		T _{Stg}		-40	-	125	°C
Junction to case	IGBT	В		-	-	0.72	
per ½ module	Diode	R _{thJC}		-	-	1.02	K/W
Case to sink (Conductive great	se applied)	R _{thCS}		-	0.05	-	
Mounting torque			Power terminal screw: M5	2.5 to 5.0)	Nm
			Mounting screw: M6		3.0 to 5.0)	INIII
Weight			Weight of module	-	150	-	g

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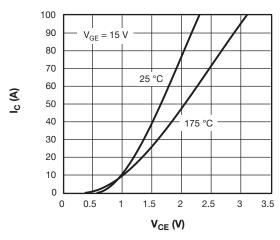


Fig. 1 - IGBT Typical Output Characteristics

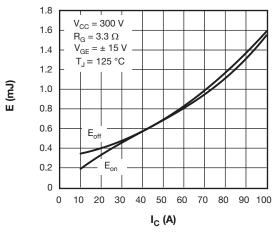


Fig. 2 - IGBT Transfer Characteristics

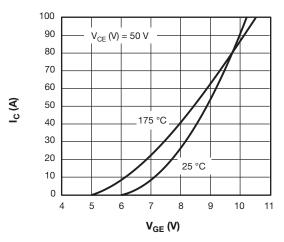


Fig. 3 - IGBT Switching Loss vs. I_C

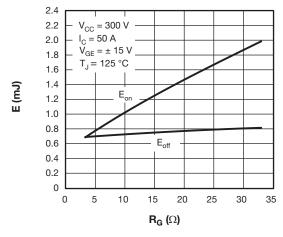
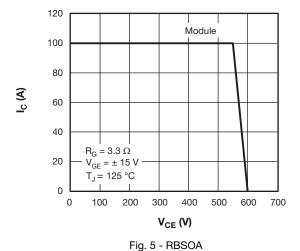


Fig. 4 - IGBT Switching Loss vs. R_G



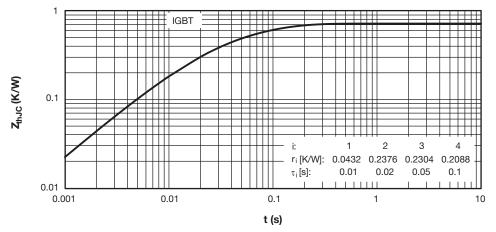


Fig. 6 - IGBT Transient Thermal Impedance

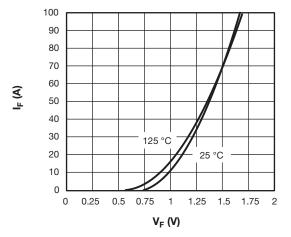


Fig. 7 - Diode Forward Characteristics

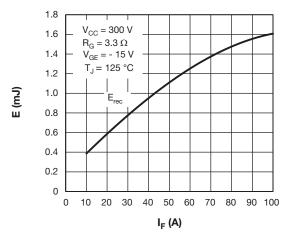


Fig. 8 - Diode Switching Loss vs. I_F

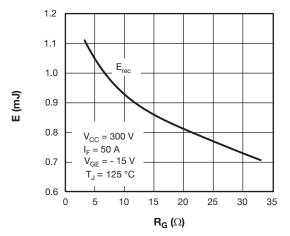


Fig. 9 - Diode Switching Loss vs. R_G

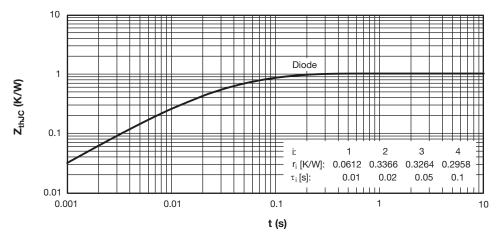
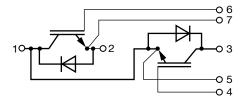


Fig. 10 - Diode Transient Thermal Impedance

CIRCUIT CONFIGURATION

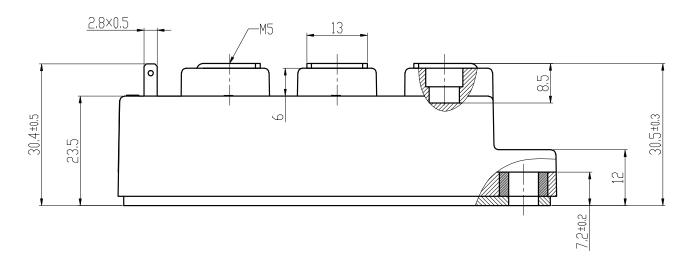


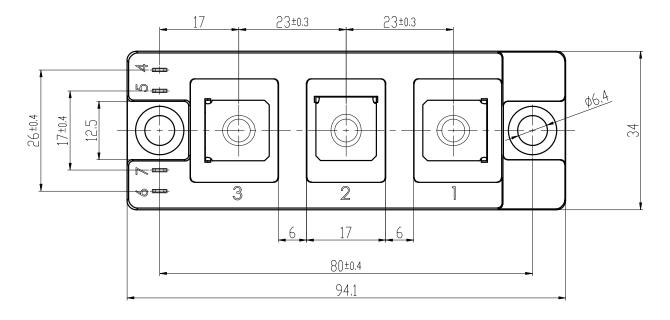
LINKS TO RELATED DOCUMENTS				
Dimensions	www.vishay.com/doc?95524			



INT-A-PAK

DIMENSIONS in millimeters (inches)





Legal Disclaimer Notice



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