

## INT-A-PAK Half Bridge IGBT (Standard Speed IGBT), 200 A


**INT-A-PAK**

### FEATURES

- Gen 4 IGBT technology
- Standard: optimized for hard switching speed
- Very low conduction losses
- Industry standard package
- UL approved file E78996 
- Designed and qualified for industrial level
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS  
COMPLIANT**

### BENEFITS

- Increased operating efficiency
- Direct mounting to heatsink
- Performance optimized as output inverter stage for TIG welding machines

PRODUCT SUMMARY	
$V_{CES}$	600 V
$I_C$ DC	480 A
$V_{CE(on)}$ at 200 A, 25 °C	1.13 V
Speed	DC to 1 kHz
Package	INT-A-PAK
Circuit	Half bridge

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS
Collector to emitter voltage	$V_{CES}$		600	V
Continuous collector current	$I_C$	$T_C = 25\text{ °C}$	480	A
		$T_C = 116\text{ °C}$	200	
Pulsed collector current	$I_{CM}$		800	
Peak switching current	$I_{LM}$		800	
Gate to emitter voltage	$V_{GE}$		± 20	V
RMS isolation voltage	$V_{ISOL}$	Any terminal to case, t = 1 min	2500	
Maximum power dissipation	$P_D$	$T_C = 25\text{ °C}$	830	W
		$T_C = 85\text{ °C}$	430	
Operating junction temperature range	$T_J$		-40 to +150	°C
Storage temperature range	$T_{Stg}$		-40 to +125	

ELECTRICAL SPECIFICATIONS ( $T_J = 25\text{ °C}$ unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Collector to emitter breakdown voltage	$V_{BR(CES)}$	$V_{GE} = 0\text{ V}, I_C = 1\text{ mA}$	600	-	-	V
Collector to emitter voltage	$V_{CE(on)}$	$V_{GE} = 15\text{ V}, I_C = 200\text{ A}$	-	1.13	1.21	
		$V_{GE} = 15\text{ V}, I_C = 200\text{ A}, T_J = 125\text{ °C}$	-	1.08	1.18	
Gate threshold voltage	$V_{GE(th)}$	$I_C = 0.25\text{ mA}$	3	4.5	6	
Collector to emitter leakage current	$I_{CES}$	$V_{GE} = 0\text{ V}, V_{CE} = 600\text{ V}$	-	0.025	1	mA
		$V_{GE} = 0\text{ V}, V_{CE} = 600\text{ V}, T_J = 125\text{ °C}$	-	-	10	
Gate to emitter leakage current	$I_{GES}$	$V_{GE} = \pm 20\text{ V}$	-	-	± 250	nA



SWITCHING CHARACTERISTICS (T <sub>J</sub> = 25 °C unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Total gate charge	Q <sub>g</sub>	I <sub>C</sub> = 200 A V <sub>CC</sub> = 400 V V <sub>GE</sub> = 15 V	-	1600	1700	nC
Gate to emitter charge	Q <sub>ge</sub>		-	260	340	
Gate to collector charge	Q <sub>gc</sub>		-	580	670	
Turn-on switching loss	E <sub>on</sub>	I <sub>C</sub> = 200 A, V <sub>CC</sub> = 480 V, V <sub>GE</sub> = 15 V R <sub>g</sub> = 10 Ω Freewheeling diode: 30EPH06, T <sub>J</sub> = 25 °C	-	30	-	mJ
Turn-off switching loss	E <sub>off</sub>		-	50	-	
Total switching loss	E <sub>ts</sub>		-	80	-	
Turn-on switching loss	E <sub>on</sub>	I <sub>C</sub> = 200 A, V <sub>CC</sub> = 480 V, V <sub>GE</sub> = 15 V R <sub>g</sub> = 10 Ω Freewheeling diode: 30EPH06, T <sub>J</sub> = 125 °C	-	34	-	mJ
Turn-off switching loss	E <sub>off</sub>		-	104	-	
Total switching loss	E <sub>ts</sub>		-	138	151	
Input capacitance	C <sub>ies</sub>	V <sub>GE</sub> = 0 V V <sub>CC</sub> = 30 V f = 1.0 MHz	-	32 500	-	pF
Output capacitance	C <sub>oes</sub>		-	2080	-	
Reverse transfer capacitance	C <sub>res</sub>		-	380	-	

THERMAL AND MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNITS	
Operating junction temperature range	T <sub>J</sub>	-40	-	150	°C	
Storage temperature range	T <sub>Stg</sub>	-40	-	125		
Junction to case per leg	R <sub>thJC</sub>	-	-	0.15	°C/W	
Case to sink	R <sub>thCS</sub>	-	0.1	-		
Mounting torque	case to heatsink	-	-	4	Nm	
	case to terminal 1, 2, 3	-	-	3		
Weight		-	185	-	g	

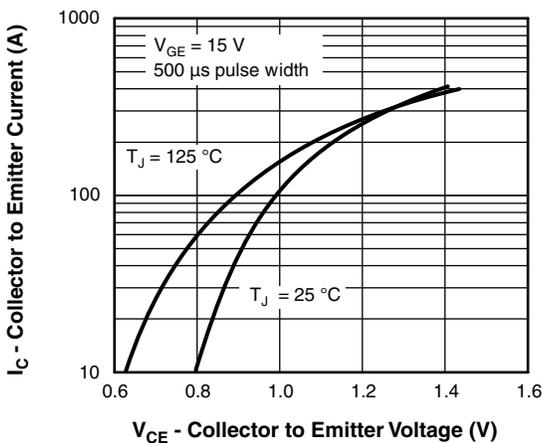


Fig. 1 - Typical Output Characteristics

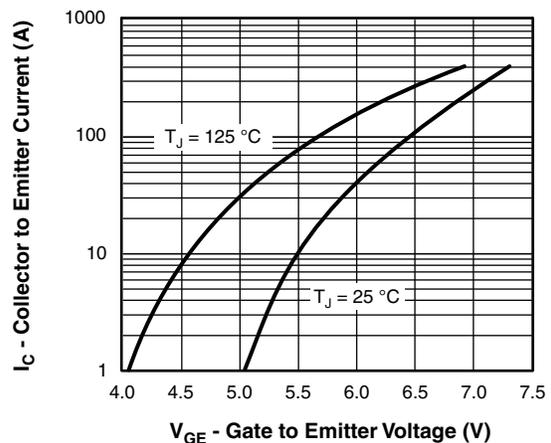


Fig. 2 - Typical Transfer Characteristics

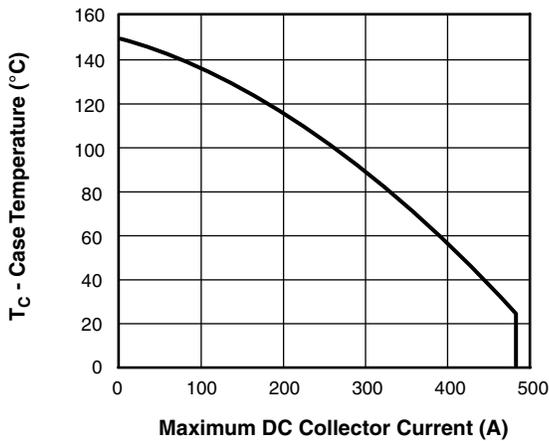


Fig. 3 - Case Temperature vs. Maximum Collector Current

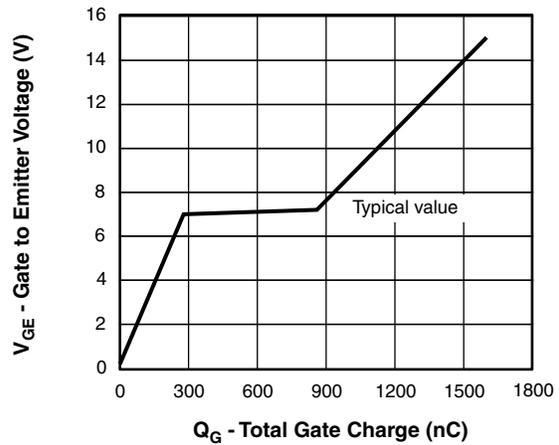


Fig. 5 - Typical Gate Charge vs. Gate to Emitter Voltage

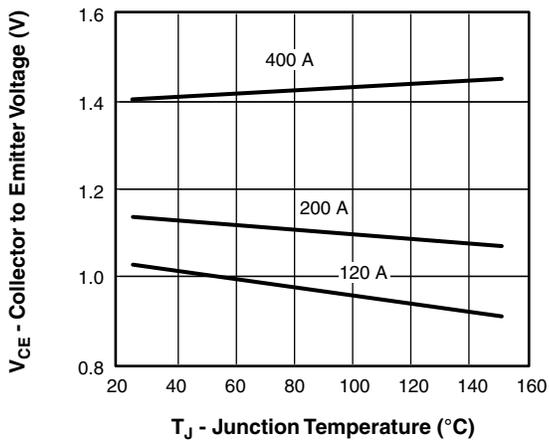


Fig. 4 - Typical Collector to Emitter Voltage vs. Junction Temperature

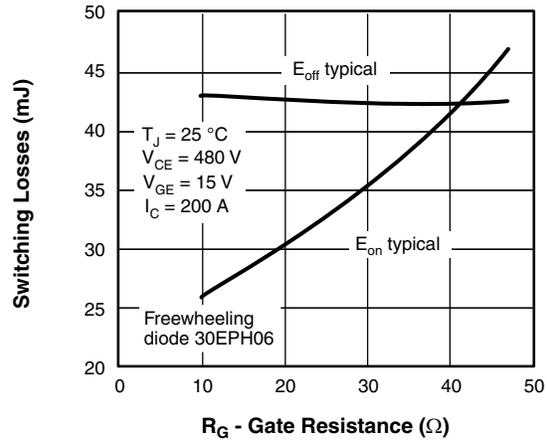


Fig. 6 - Typical Switching Losses vs. Gate Resistance

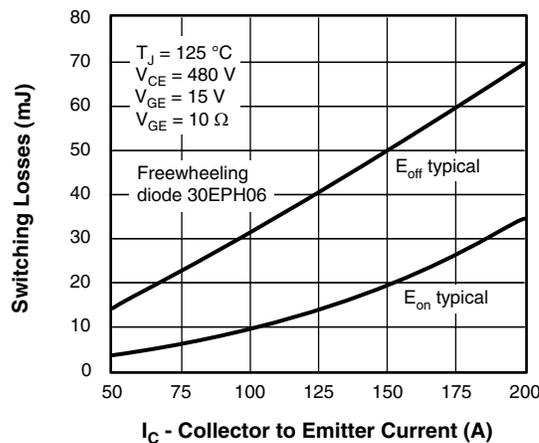
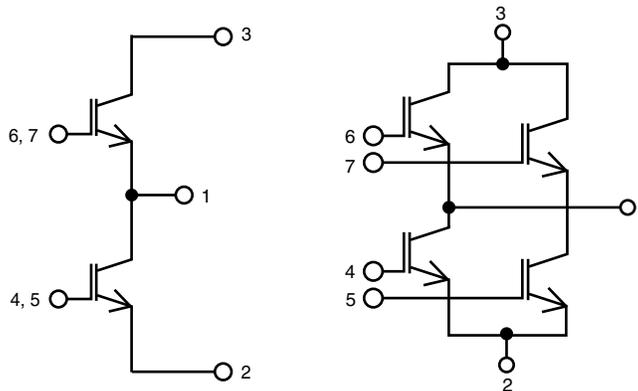


Fig. 7 - Typical Switching Losses vs. Collector to Emitter Current

**ORDERING INFORMATION TABLE**

Device code	<b>VS-</b>	<b>GA</b>	<b>200</b>	<b>H</b>	<b>S</b>	<b>60</b>	<b>S</b>	<b>1</b>	<b>PbF</b>
	①	②	③	④	⑤	⑥	⑦	⑧	⑨

- 1** - Vishay Semiconductors product
- 2** - Essential part number IGBT modules
- 3** - Current rating (200 = 200 A)
- 4** - Circuit configuration (H = Half bridge without f/w diode)
- 5** - INT-A-PAK
- 6** - Voltage code (60 = 600 V)
- 7** - Speed/type (S = Standard speed IGBT)
- 8** - Assy location Italy
- 9** - None = Standard production; PbF = Lead (Pb)-free

**CIRCUIT CONFIGURATION**


Functional Diagram

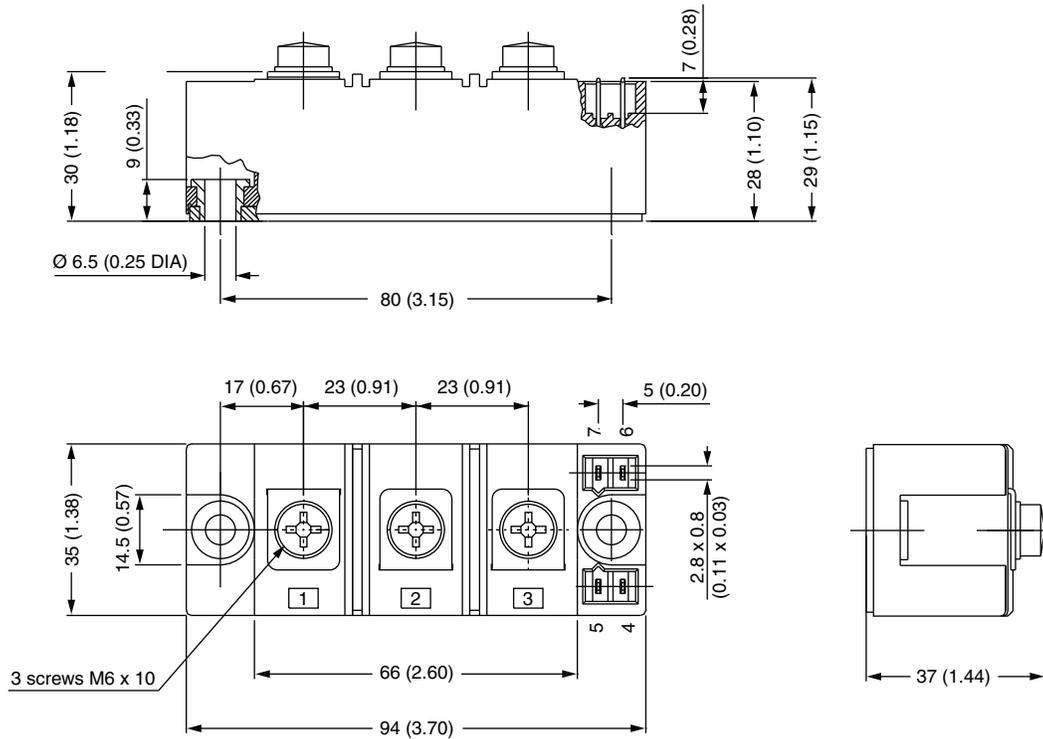
Electrical Diagram

**LINKS TO RELATED DOCUMENTS**

Dimensions	<a href="http://www.vishay.com/doc?95173">www.vishay.com/doc?95173</a>
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## INT-A-PAK IGBT/Thyristor

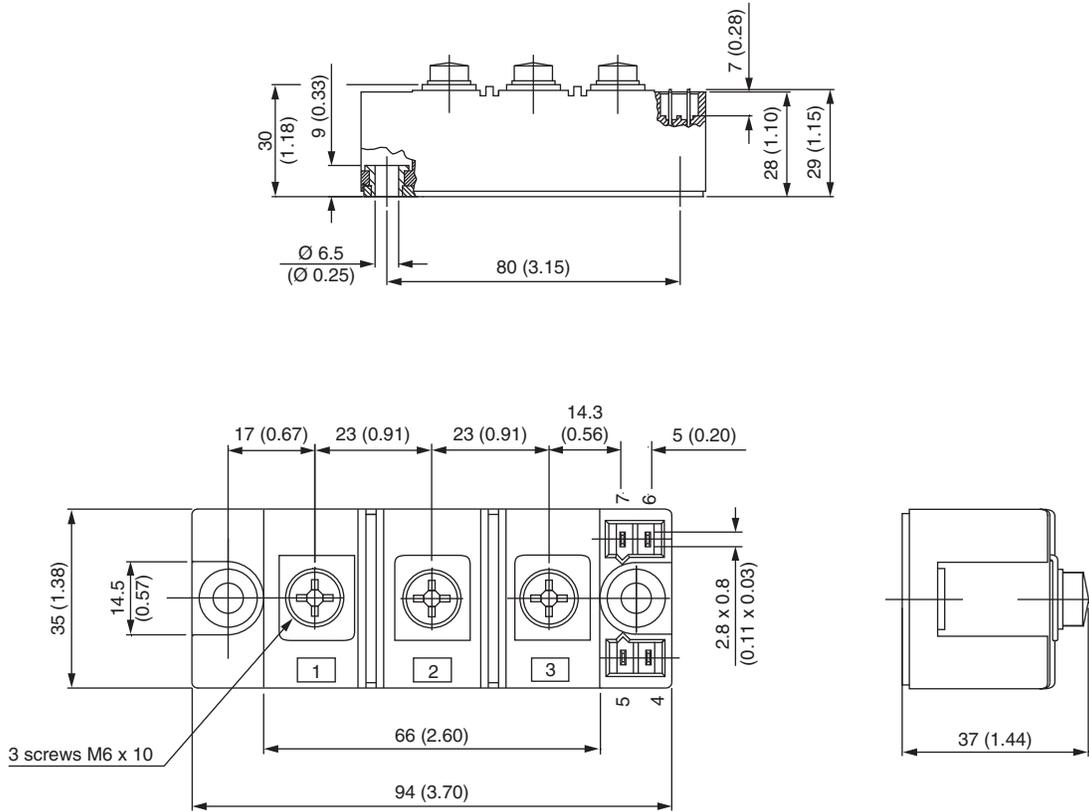
**DIMENSIONS** in millimeters (inches)





## INT-A-PAK IGBT

**DIMENSIONS** in millimeters (inches)





## Disclaimer

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