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[Vishay Semiconductor/Diodes Division](#)
[VS-GA200HS60S1PBF](#)

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www.vishay.com

VS-GA200HS60S1PbF


Vishay Semiconductors

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



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, $t = 1\text{ min}$	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



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SWITCHING CHARACTERISTICS ($T_J = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Total gate charge	Q_g	$I_C = 200\text{ A}$ $V_{CC} = 400\text{ V}$ $V_{GE} = 15\text{ V}$	-	1600	1700	nC
Gate to emitter charge	Q_{ge}		-	260	340	
Gate to collector charge	Q_{gc}		-	580	670	
Turn-on switching loss	E_{on}	$I_C = 200\text{ A}$, $V_{CC} = 480\text{ V}$, $V_{GE} = 15\text{ V}$ $R_g = 10\text{ }\Omega$ Freewheeling diode: 30EPH06, $T_J = 25\text{ }^{\circ}\text{C}$	-	30	-	mJ
Turn-off switching loss	E_{off}		-	50	-	
Total switching loss	E_{ts}		-	80	-	
Turn-on switching loss	E_{on}	$I_C = 200\text{ A}$, $V_{CC} = 480\text{ V}$, $V_{GE} = 15\text{ V}$ $R_g = 10\text{ }\Omega$ Freewheeling diode: 30EPH06, $T_J = 125\text{ }^{\circ}\text{C}$	-	34	-	mJ
Turn-off switching loss	E_{off}		-	104	-	
Total switching loss	E_{ts}		-	138	151	
Input capacitance	C_{ies}	$V_{GE} = 0\text{ V}$ $V_{CC} = 30\text{ V}$ $f = 1.0\text{ MHz}$	-	32 500	-	pF
Output capacitance	C_{oes}		-	2080	-	
Reverse transfer capacitance	C_{res}		-	380	-	

THERMAL AND MECHANICAL SPECIFICATIONS					
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNITS
Operating junction temperature range	T_J	-40	-	150	$^{\circ}\text{C}$
Storage temperature range	T_{Stg}	-40	-	125	
Junction to case per leg	R_{thJC}	-	-	0.15	$^{\circ}\text{C/W}$
Case to sink	R_{thCS}	-	0.1	-	
Mounting torque	case to heatsink	-	-	4	Nm
	case to terminal 1, 2, 3	-	-	3	
Weight		-	185	-	g

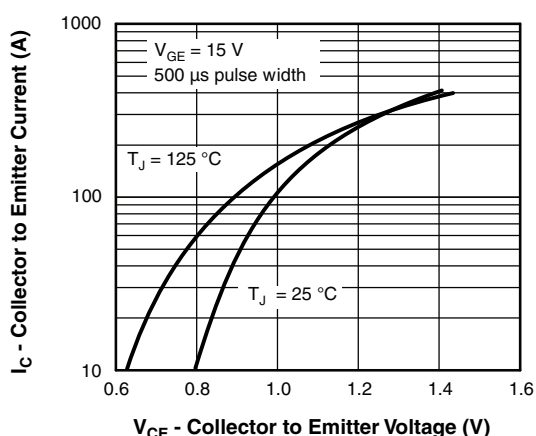


Fig. 1 - Typical Output Characteristics

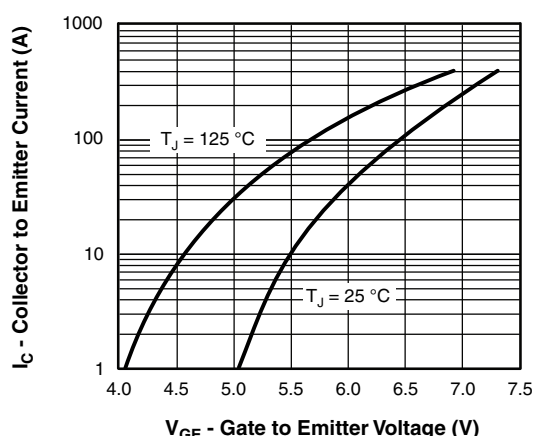


Fig. 2 - Typical Transfer Characteristics



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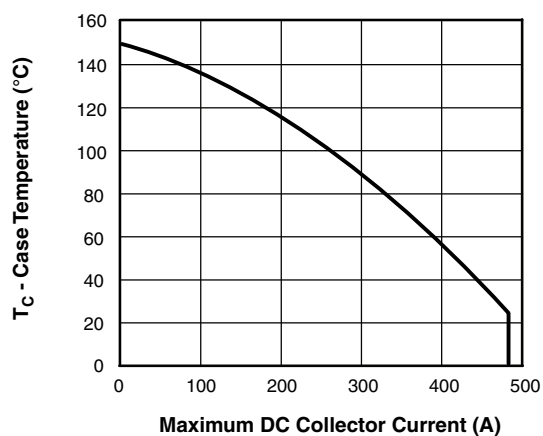


Fig. 3 - Case Temperature vs. Maximum Collector Current

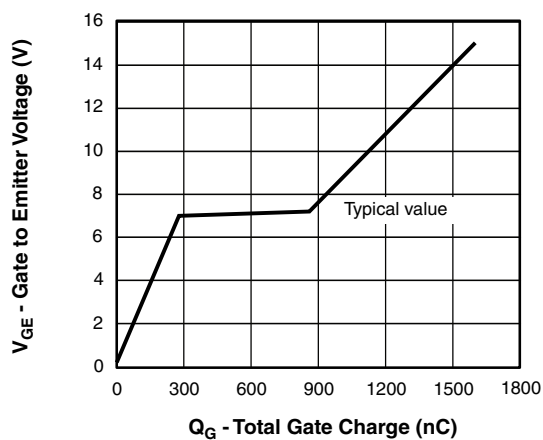


Fig. 5 - Typical Gate Charge vs. Gate to Emitter Voltage

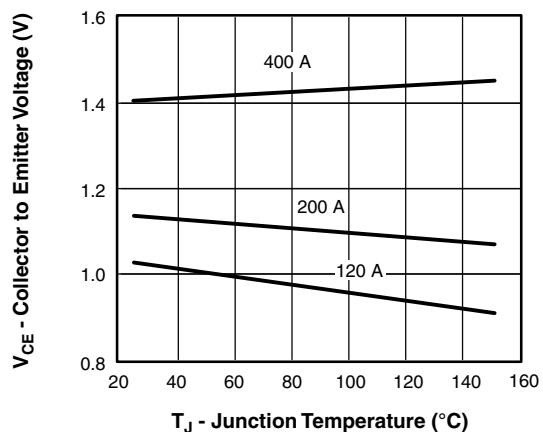


Fig. 4 - Typical Collector to Emitter Voltage vs. Junction Temperature

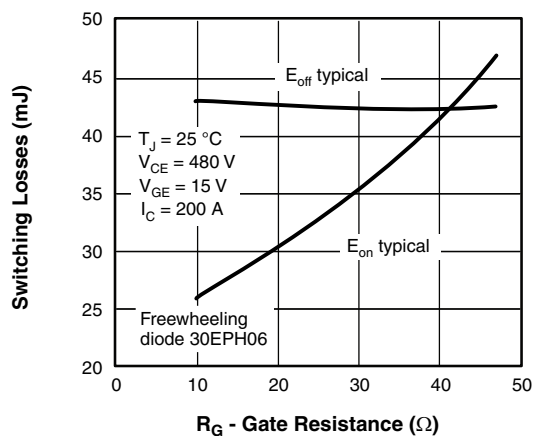


Fig. 6 - Typical Switching Losses vs. Gate Resistance

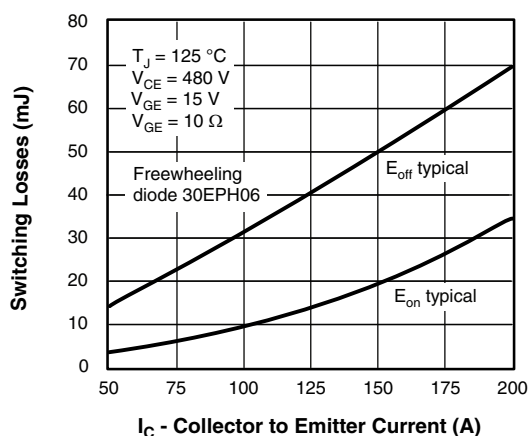


Fig. 7 - Typical Switching Losses vs. Collector to Emitter Current



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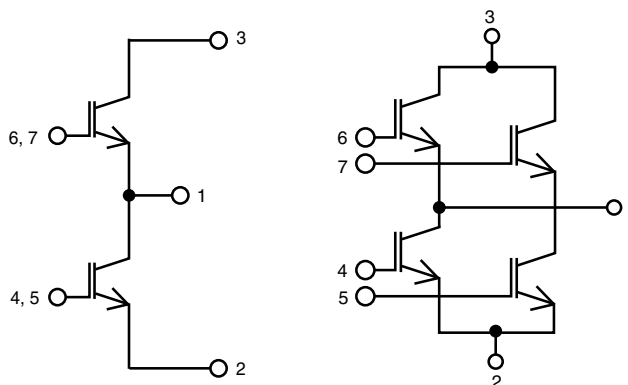
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ORDERING INFORMATION TABLE

Device code	VS-	GA	200	H	S	60	S	1	PbF
	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	www.vishay.com/doc?95173

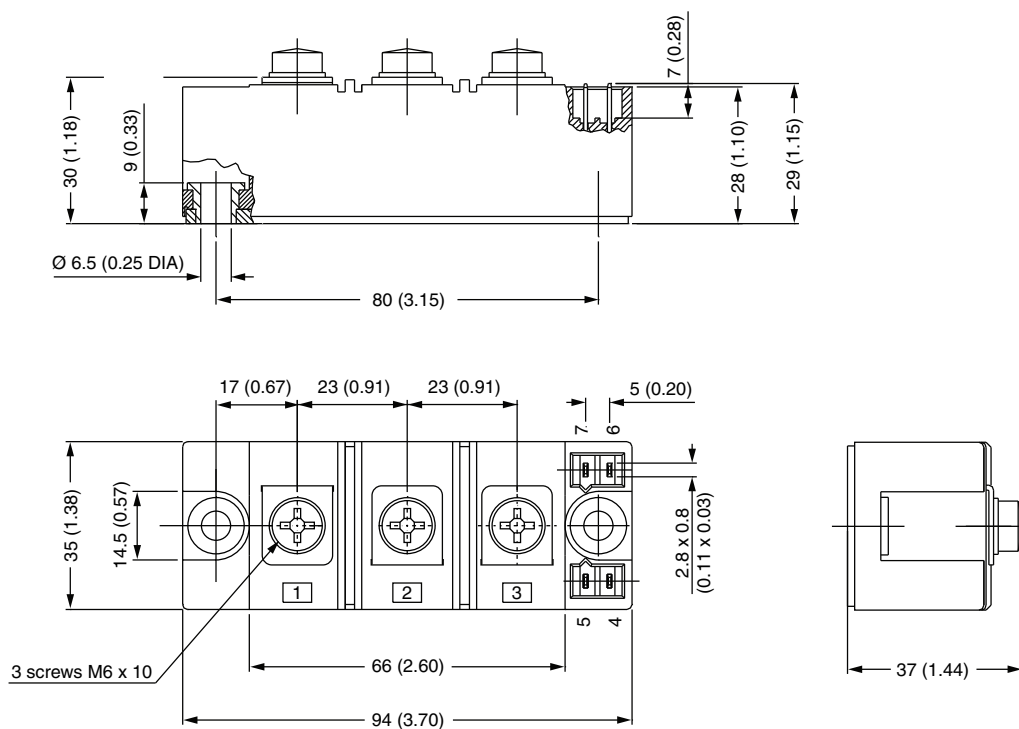


Outline Dimensions

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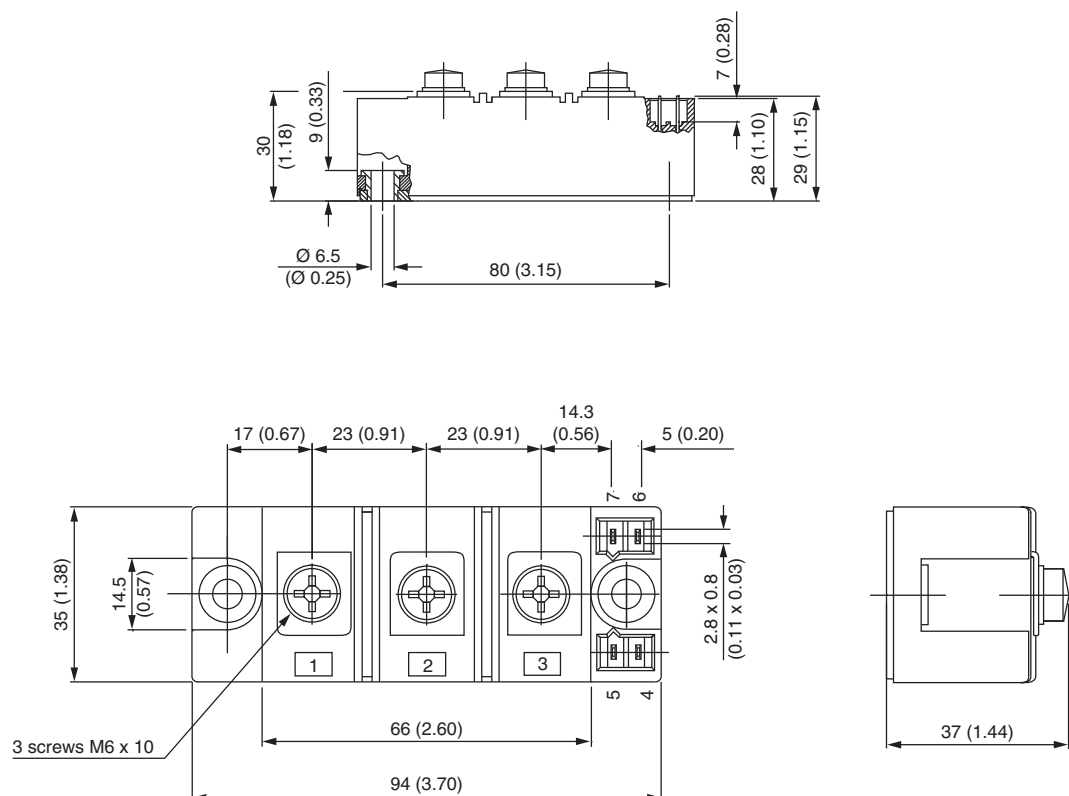
INT-A-PAK IGBT/Thyristor

DIMENSIONS in millimeters (inches)



INT-A-PAK IGBT

DIMENSIONS in millimeters (inches)





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