

“Half-Bridge” IGBT INT-A-PAK, (Standard Speed IGBT), 100 A



INT-A-PAK

PRODUCT SUMMARY	
V_{CES}	600 V
I_C DC	220 A
$V_{CE(on)}$ at 100 A, 25 °C	1.11 V
Speed	DC to 1 kHz
Package	INT-A-PAK
Circuit	Half bridge

FEATURES

- Standard speed PT IGBT technology
- Optimized for hard switching speed
- FRED Pt® antiparallel diodes with fast recovery
- Very low conduction losses
- Al_2O_3 DBC
- UL approved file E78996
- Designed for industrial level
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


**RoHS
COMPLIANT**

BENEFITS

- Optimized for high current inverter stages (AC TIG welding machines)
- Direct mounting to heatsink
- Very low junction to case thermal resistance
- Low EMI

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS
Collector to emitter voltage	V_{CES}		600	V
Continuous collector current	I_C	$T_C = 25\text{ °C}$	220	A
		$T_C = 130\text{ °C}$	100	
Pulsed collector current	I_{CM}		440	
Peak switching current	I_{LM}		440	
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	$T_C = 25\text{ °C}$	780	W
		$T_C = 100\text{ °C}$	312	
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	$V_{CE(on)}$	$V_{GE} = 15\text{ V}, I_C = 100\text{ A}$	-	1.11	1.28	
		$I_C = 200\text{ A}$	-	1.39	-	
		$V_{GE} = 15\text{ V}, I_C = 100\text{ A}, T_J = 125\text{ °C}$	-	1.08	1.22	
Gate threshold voltage	$V_{GE(th)}$	$I_C = 0.25\text{ mA}$	3	-	6	
Collector to emitter leakage current	I_{CES}	$V_{GE} = 0\text{ V}, V_{CE} = 600\text{ V}$	-	-	1	mA
		$V_{GE} = 0\text{ V}, V_{CE} = 600\text{ V}, T_J = 125\text{ °C}$	-	-	10	
Diode forward voltage drop	V_{FM}	$I_C = 100\text{ A}, V_{GE} = 0\text{ V}$	-	1.44	1.96	V
		$I_C = 100\text{ A}, V_{GE} = 0\text{ V}, T_J = 125\text{ °C}$	-	1.25	1.54	
Gate to emitter leakage current	I_{GES}	$V_{GE} = \pm 20\text{ V}$	-	-	± 250	nA



SWITCHING CHARACTERISTICS (T _J = 25 °C unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS	
Total gate charge	Q _g	I _C = 100 A V _{CC} = 400 V V _{GE} = 15 V	-	640	700	nC	
Gate to emitter charge	Q _{ge}		-	108	120		
Gate to collector charge	Q _{gc}		-	230	300		
Rise time	t _r	I _C = 100 A V _{CC} = 480 V V _{GE} = 15 V R _g = 15 Ω T _J = 25 °C	-	0.45	-	μs	
Fall time	t _f		-	1.0	-		
Turn-on switching energy	E _{on}		I _C = 100 A, V _{CC} = 480 V V _{GE} = 15 V, R _g = 15 Ω T _J = 125 °C	-	6	12	mJ
Turn-off switching energy	E _{off}			-	35	40	
Total switching energy	E _{ts}			-	41	52	
Turn-on switching energy	E _{on}			-	6	12	
Input capacitance	C _{ies}	V _{GE} = 0 V V _{CC} = 30 V f = 1.0 MHz	-	16 250	-	pF	
Output capacitance	C _{oes}		-	1040	-		
Reverse transfer capacitance	C _{res}		-	190	-		
Diode reverse recovery time	t _{rr}	I _F = 50 A dI _F /dt = 200 A/μs V _{rr} = 200 V	-	91	155	ns	
Diode peak reverse current	I _{rr}		-	10.6	15	A	
Diode recovery charge	Q _{rr}		-	500	900	nC	
Diode reverse recovery time	t _{rr}	I _F = 50 A dI _F /dt = 200 A/μs V _{rr} = 200 V, T _J = 125 °C	-	180	344	ns	
Diode peak reverse current	I _{rr}		-	17	20.5	A	
Diode recovery charge	Q _{rr}		-	1633	2315	nC	

THERMAL AND MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNITS	
Operating junction temperature range	T _J	-40	-	150	°C	
Storage temperature range	T _{Stg}	-40	-	125		
Junction to case	R _{thJC}	-	-	0.16	°C/W	
				0.48		
Case to sink per module	R _{thCS}	-	0.1	-		
Mounting torque	case to heatsink	-	-	4	Nm	
	case to terminal 1, 2, 3	-	-	3		
Weight		-	185	-	g	

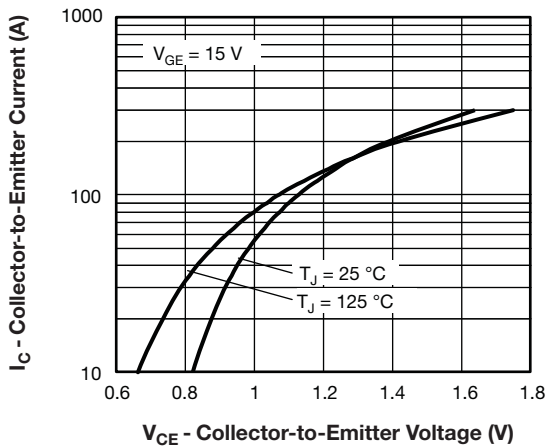


Fig. 1 - Typical Output Characteristics

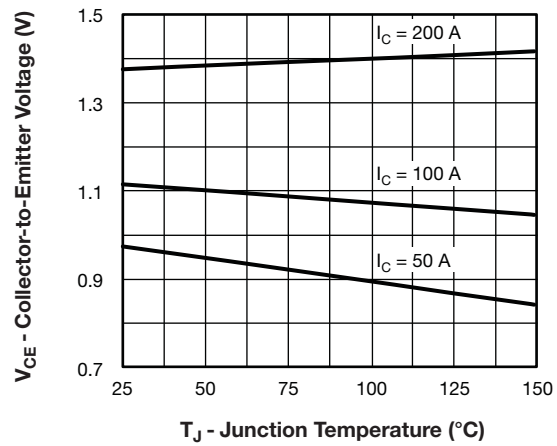


Fig. 4 - Typical Collector to Emitter Voltage vs. Junction Temperature

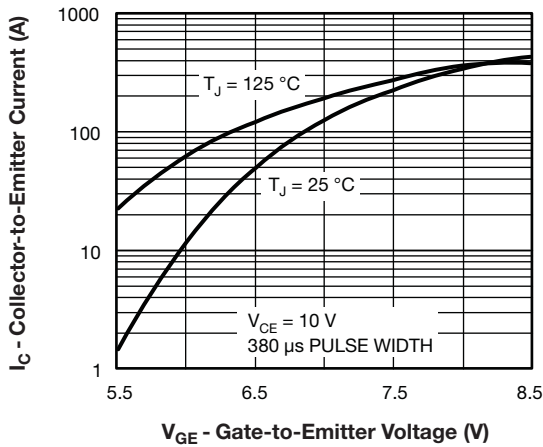


Fig. 2 - Typical Transfer Characteristics

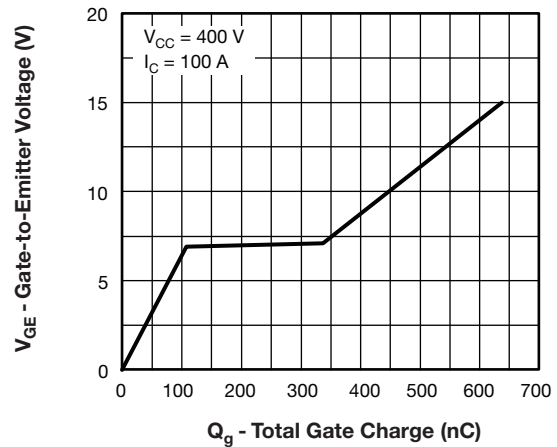


Fig. 5 - Typical Gate Charge vs. Gate to Emitter Voltage

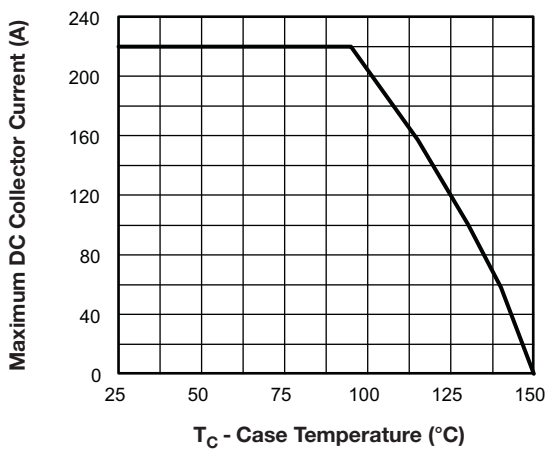


Fig. 3 - Maximum Collector Current vs. Case Temperature

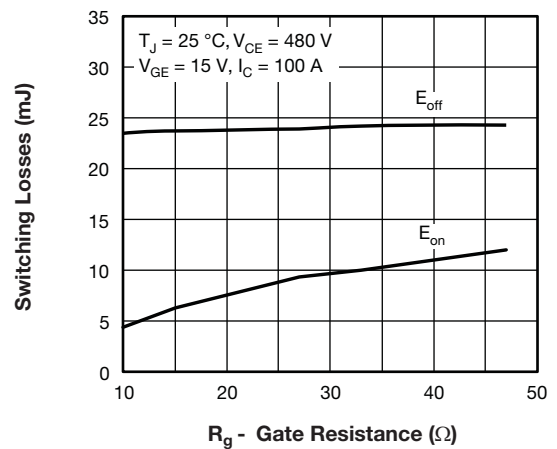


Fig. 6 - Typical Switching Losses vs. Gate Resistance

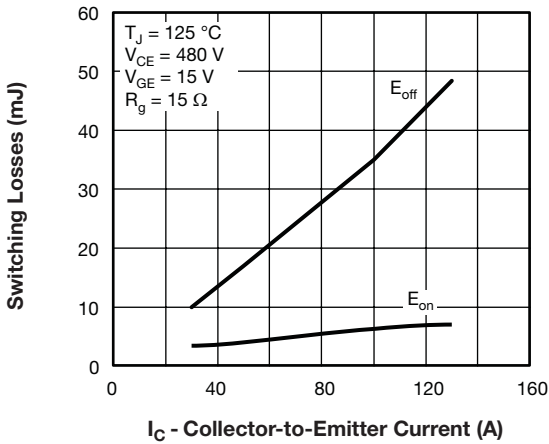


Fig. 7 - Typical Switching Losses vs. Collector to Emitter Current

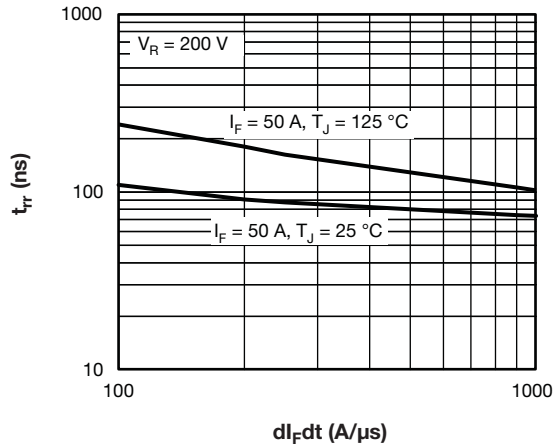


Fig. 9 - Typical Reverse Recovery Time vs. dI_F/dt

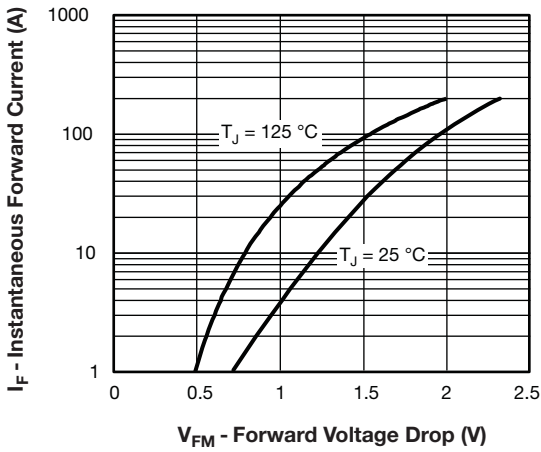


Fig. 8 - Maximum Forward Voltage Drop vs. Instantaneous Forward Current

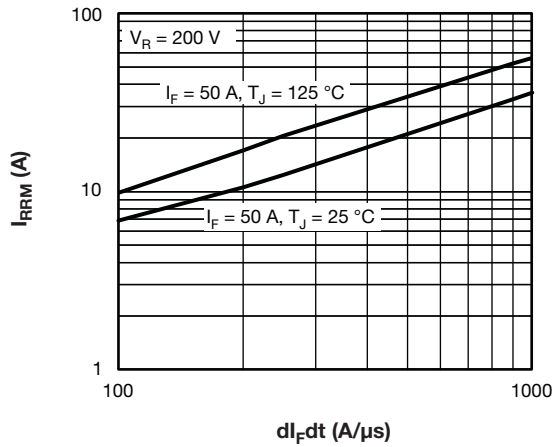


Fig. 10 - Typical Reverse Recovery Current vs. dI_F/dt

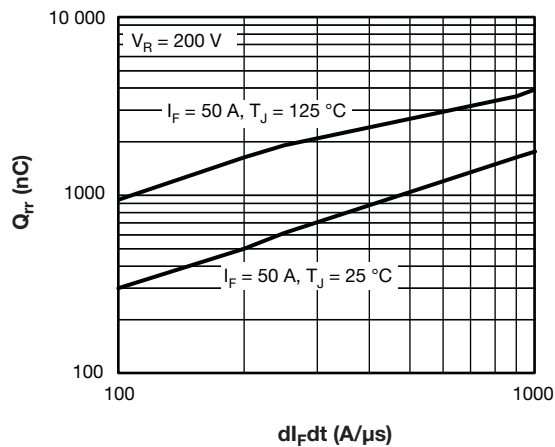
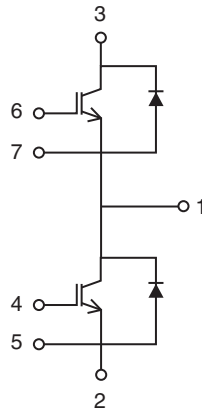


Fig. 11 - Typical Stored Charge vs. dI_F/dt

ORDERING INFORMATION TABLE

Device code	VS-	GA	100	T	S	60	S	F	PbF
	①	②	③	④	⑤	⑥	⑦	⑧	⑨

- 1** - Vishay Semiconductors product
- 2** - Essential part number IGBT modules
- 3** - Current rating (100 = 100 A)
- 4** - Circuit configuration (T = Half bridge)
- 5** - INT-A-PAK
- 6** - Voltage code (60 = 600 V)
- 7** - Speed/type (S = Standard speed IGBT)
- 8** - Diode type
- 9** - None = Standard production; PbF = Lead (Pb)-free

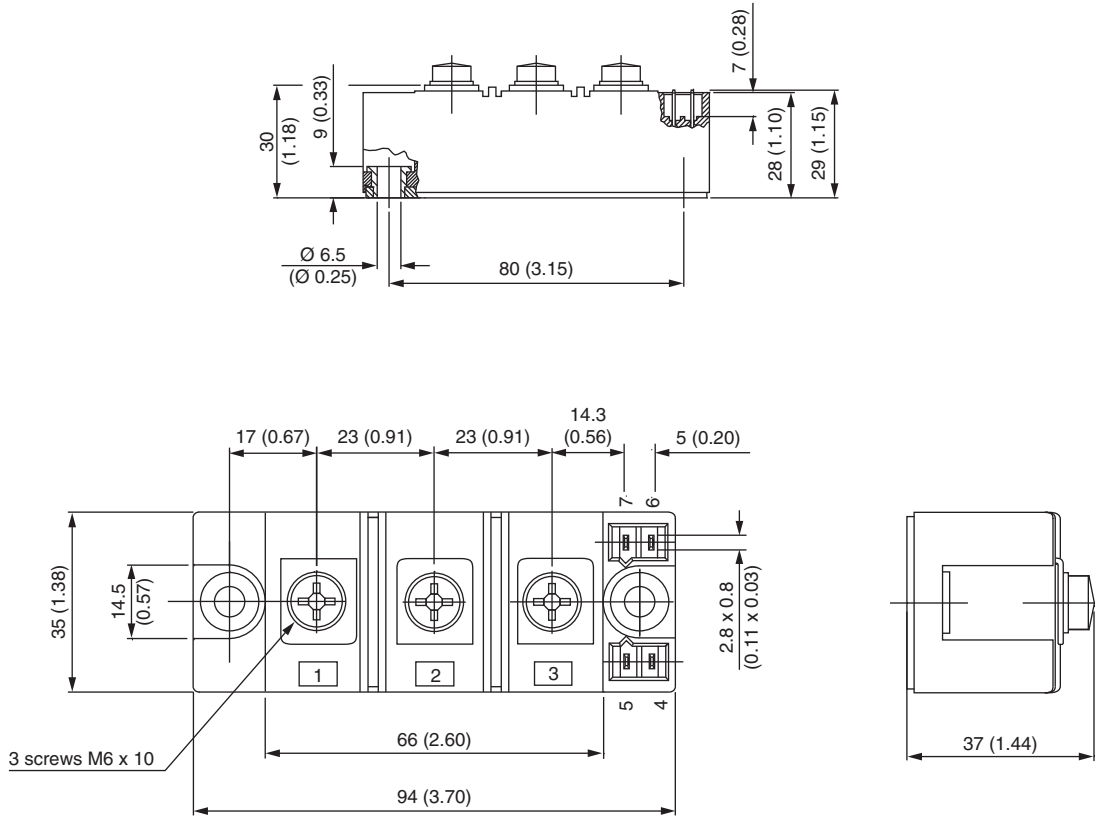
CIRCUIT CONFIGURATION

LINKS TO RELATED DOCUMENTS

Dimensions	www.vishay.com/doc?95173
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INT-A-PAK IGBT

DIMENSIONS in millimeters (inches)





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