

International IOR Rectifier

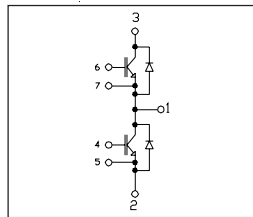
GA100TS60SF

"HALF-BRIDGE" IGBT INT-A-PAK

Standard Speed IGBT

Features

- Standard Speed PT IGBT Technology
- Fred PT Antiparallel diodes with Fast recovery
- Very Low Conduction Losses
- Al_2O_3 DBC
- UL Pending



$V_{CES} = 600\text{V}$
 $I_C = 220\text{A DC}$
 $V_{CE(on)} \text{ typ.} = 1.39\text{V}$
 @ $I_C = 200\text{A } T_J = 25^\circ\text{C}$

Benefits

- Optimized for high current inverter stages (AC TIG welding machines)
- Direct mounting to heatsink
- Hard switching operation frequency up to 1 KHz
- Very low junction-to-case thermal resistance
- Low EMI



Absolute Maximum Ratings

Parameters			Max	Units
V_{CES}	Collector-to-Emitter Voltage		600	V
I_C	Continuous Collector Current	@ $T_C = 25^\circ\text{C}$	220	A
		@ $T_C = 130^\circ\text{C}$	100	
I_{CM}	Pulsed Collector Current		440	
I_{LM}	Peak Switching Current		440	
V_{GE}	Gate-to-Emitter Voltage		± 20	V
V_{ISOL}	RMS Isolation Voltage, Any Terminal to Case, $t = 1 \text{ min}$		2500	
P_D	Maximum Power Dissipation	@ $T_C = 25^\circ\text{C}$	780	W
		@ $T_C = 100^\circ\text{C}$	312	

Electrical Characteristics @ T_J = 25°C (unless otherwise specified)

Parameters	Min	Typ	Max	Units	Test Conditions
V _{BR} CEs Collector-to-Emitter Breakdown Voltage	600			V	V _{GE} = 0V, I _C = 1mA
V _{CE(on)} Collector-to-Emitter Voltage		1.11	1.28		V _{GE} = 15V, I _C = 100A
		1.39			I _C = 200A
		1.08	1.22		V _{GE} = 15V, I _C = 100A, T _J = 125°C
V _{GE(th)} Gate Threshold Voltage	3		6		I _C = 0.25mA
I _{CES} Collector-to-Emitter Leakage Current			1	mA	V _{GE} = 0V, V _{CE} = 600V
			10		V _{GE} = 0V, V _{CE} = 600V, T _J = 125°C
V _{FM} Diode Forward Voltage drop		1.44	1.96	V	I _C = 100A, V _{GE} = 0V
		1.25	1.54		I _C = 100A, V _{GE} = 0V, T _J = 125°C
I _{GES} Gate-to-Emitter Leakage Current			± 250	nA	V _{GE} = ± 20V

Switching Characteristics @ T_J = 25°C (unless otherwise specified)

Parameters	Min	Typ	Max	Units	Test Conditions
Q _g Total Gate Charge		640	700	nC	I _C = 100A
Q _{ge} Gate-Emitter Charge		108	120		V _{CC} = 400V
Q _{gc} Gate-Collector Charge		230	300		V _{GE} = 15V
t _r Rise Time		0.45		μs	I _C = 100A, V _{CC} = 480V, V _{GE} = 15V
t _f Fall Time		1.0			R _g = 15Ω
E _{on} Turn-On Switching Energy		4	6	mJ	I _C = 100A, V _{CC} = 480V, V _{GE} = 15V R _g = 15Ω, T _J = 125°C
E _{off} Turn-Off Switching Energy		23	29		
E _{ts} Total Switching Energy		27	35		
E _{on} Turn-On Switching Energy		6	12	mJ	I _C = 100A, V _{CC} = 480V, V _{GE} = 15V R _g = 15Ω, T _J = 125°C
E _{off} Turn-Off Switching Energy		35	40		
E _{ts} Total Switching Energy		41	52		
C _{ies} Input Capacitance		16250		pF	V _{GE} = 0V
C _{oes} Output Capacitance		1040			V _{CC} = 30V
C _{res} Reverse Transfer Capacitance		190			f = 1.0 MHz
t _{rr} Diode Reverse Recovery Time		91	155	ns	I _F = 50A, dI _F /dt = 200A/μs
I _{rr} Diode Peak Reverse Current		10.6	15	A	V _{RR} = 200V
Q _{rr} Diode Recovery Charge		500	900	nC	
t _{rr} Diode Reverse Recovery Time		180	344	ns	I _F = 50A, dI _F /dt = 200A/μs
I _{rr} Diode Peak Reverse Current		17	20.5	A	V _{RR} = 200V
Q _{rr} Diode Recovery Charge		1633	2315	nC	T _J = 125°C

Thermal- Mechanical Specifications

Parameters	Min	Typ	Max	Units
T _J Operating Junction Temperature Range	- 40		150	°C
T _{STG} Storage Temperature Range	- 40		125	
R _{thJC} Junction-to-Case	per Switch		0.16	°C/ W
	Per Diode		0.48	
R _{thCS} Case-to-Sink	Per Module	0.1		
T Mounting torque	Case to heatsink		4	Nm
	Case to terminal 1, 2, 3		3	
Weight		185		g

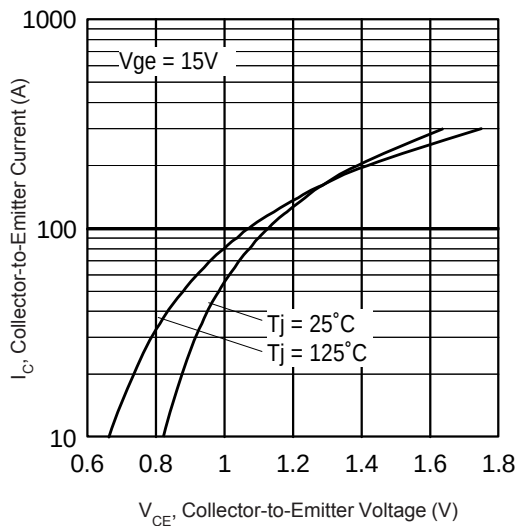


Fig. 1 - Typical Output Characteristics

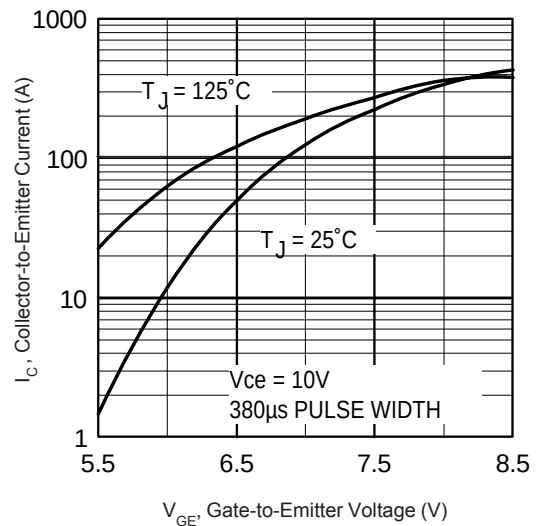


Fig. 2 - Typical Transfer Characteristics

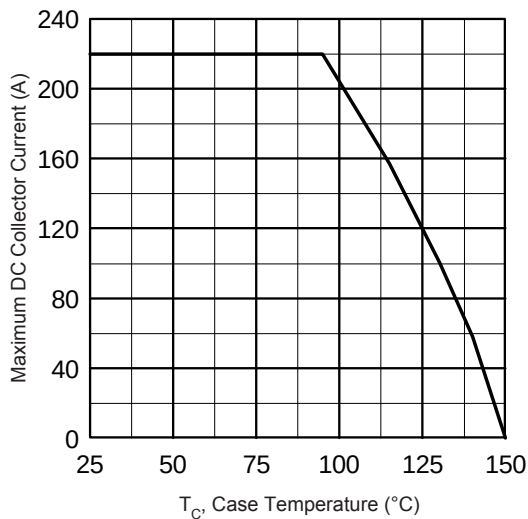


Fig. 3 - Maximum Collector Current vs. Case Temperature

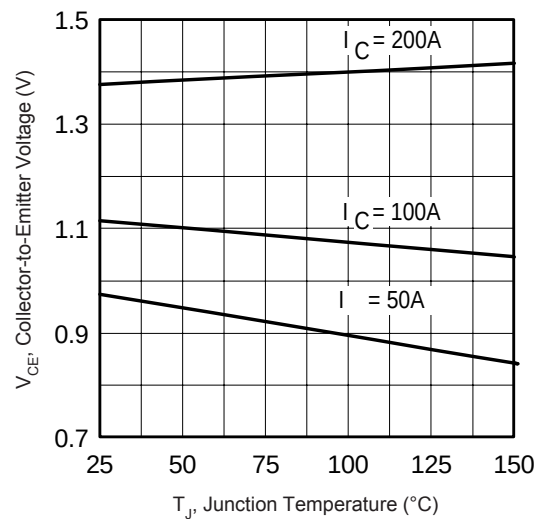


Fig. 4 - Typical Collector-to-Emitter Voltage vs. Junction Temperature

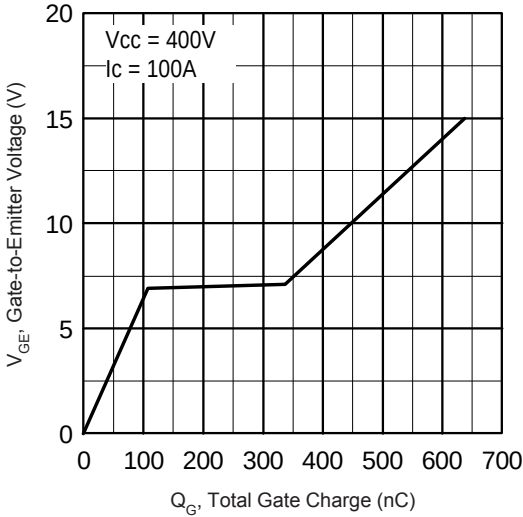


Fig. 5 - Typical Gate Charge vs. Gate-to-Emitter Voltage

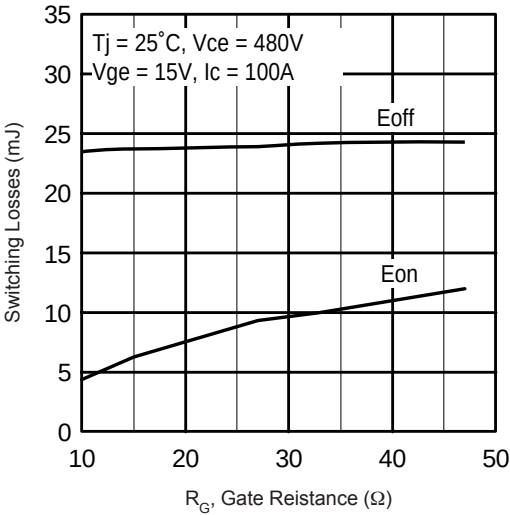


Fig. 6 - Typical Switching Losses vs Gate Resistance

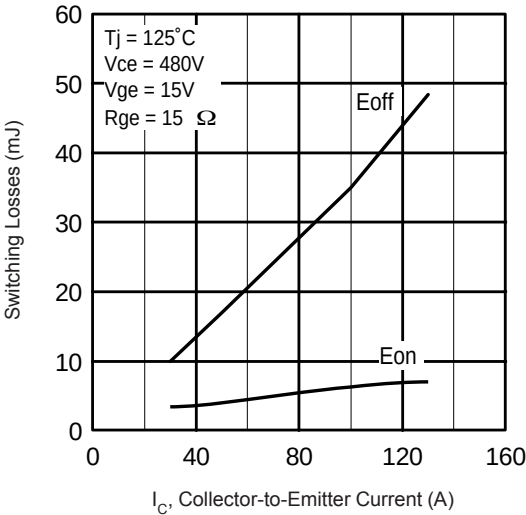


Fig. 7 - Typical Switching Losses vs Collector-to-Emitter Current

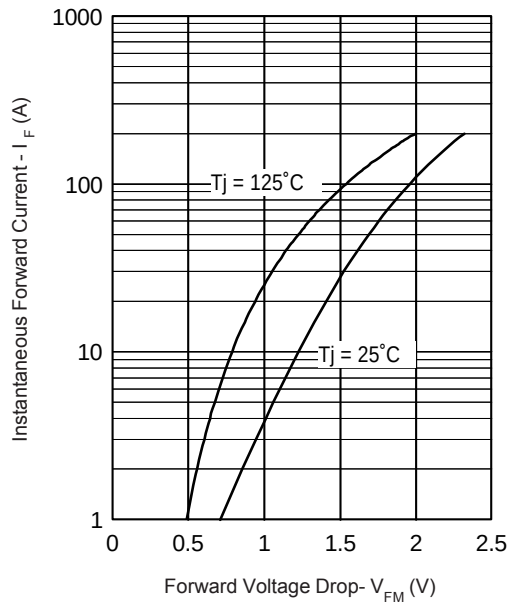


Fig. 8 - Maximum Forward Voltage Drop vs. Instantaneous Forward Current

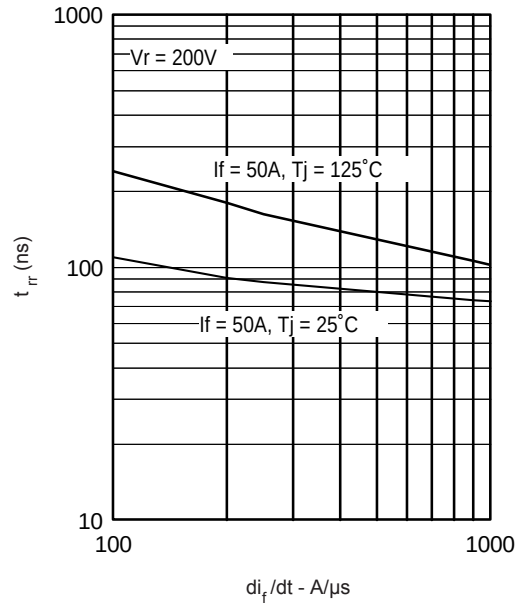


Fig. 9 - Typical Reverse Recovery vs. di_f/dt

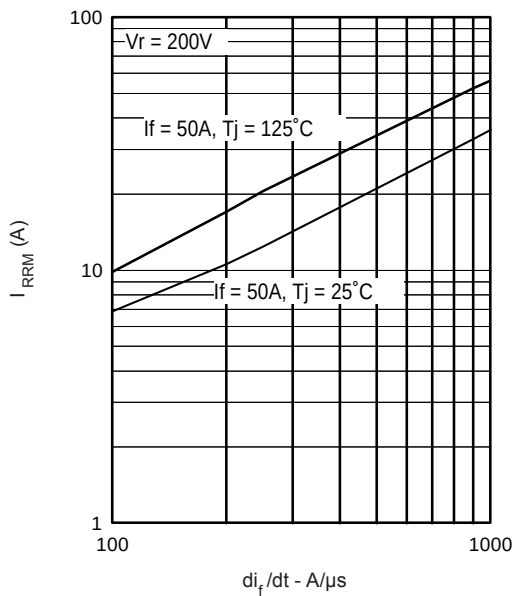


Fig. 10 - Typical Reverse Recovery Current vs. di_f/dt

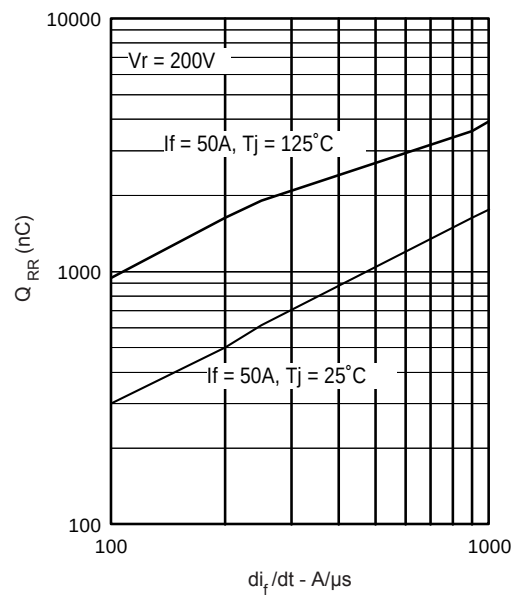
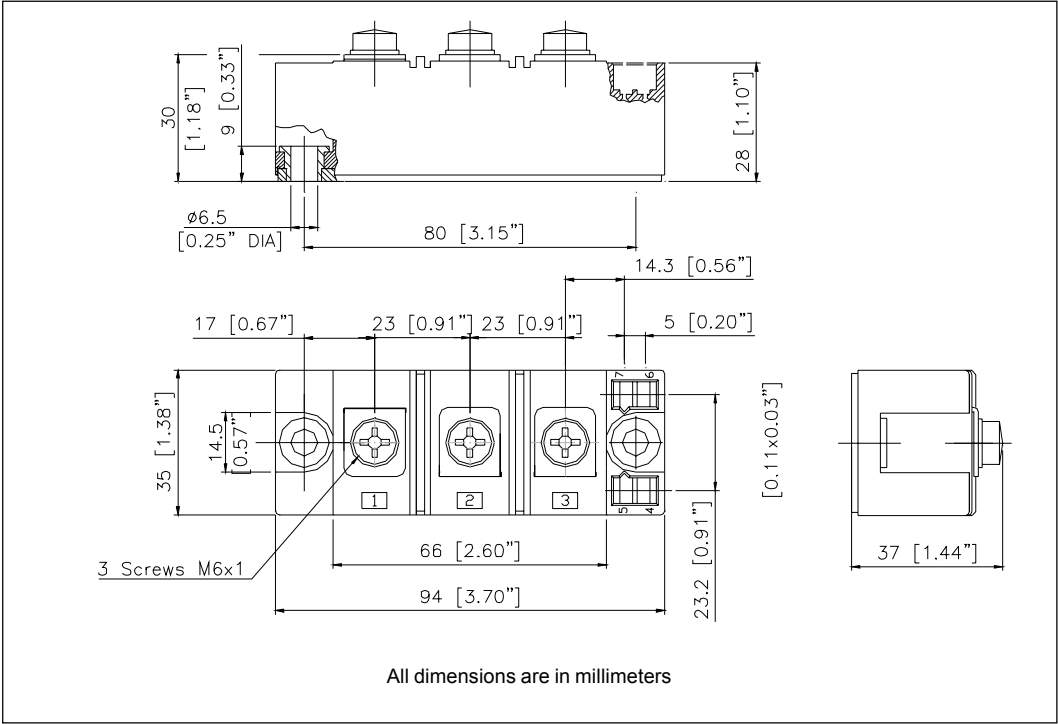


Fig. 11 - Typical Stored Charge vs. di_f/dt

Outline Table



Ordering Information Table

Device Code						
GA	100	T	S	60	S	F
1	2	3	4	5	6	7
1	Essential Part Number IGBT modules					
2	Current rating (100 = 100A)					
3	Circuit Configuration (T = Half Bridge)					
4	Int-A-Pak					
5	Voltage Code (60 = 600V)					
6	Speed/ Type (S = Standard Speed IGBT)					
7	Diode Type					

Data and specifications subject to change without notice.
This product has been designed for Industrial Level.
Qualification Standards can be found on IR's Web site.

International
IOR Rectifier

IR WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105
TAC Fax: (310) 252-7309
Visit us at www.irf.com for sales contact information. 01/06