Bulletin I27119 rev. B 06/02

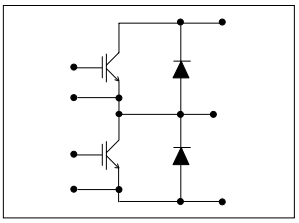
International
IOR Rectifier

GA100TS60SQ

"HALF-BRIDGE" IGBT INT-A-PAK — Standard Speed IGBT

Features

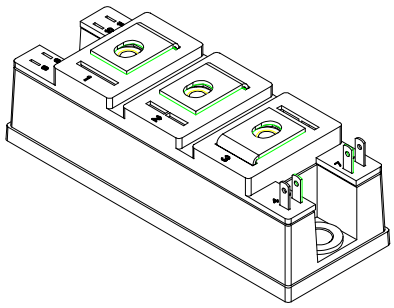
- Generation 4 Standard Speed IGBT Technology
- Quiet/*R* Antiparallel diodes with Fast Soft recovery
- Very Low Conduction Losses
- Industry Standard Package
- Aluminum Nitride DBC
- UL approved (file E78996)



V_{CES} = 600V
I_C = 220A DC
$V_{CE(on)}$ typ. = 1.39V
@ I_C = 200A T_J = 25°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



INT-A-PAK

Absolute Maximum Ratings

	Parameters		Max	Units
V_{CES}	Collector-to-Emitter Voltage		600	V
I_C	Continuos Collector Current	@ T_C = 25°C	220	A
		@ T_C = 130°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 min		2500	
P_D	Maximum Power Dissipation	@ T_C = 25°C	780	W
		@ T_C = 100°C	312	

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

	Parameters	Min	Typ	Max	Units	Test Conditions
V_{BRCES}	Collector-to-Emitter Breakdown Voltage	600			V	V_{GE} = 0V, I_C = 1mA
$V_{CE(on)}$	Collector-to-Emitter Voltage		1.11	1.21		V_{GE} = 15V, I_C = 100A
			1.39			I_C = 200A
			1.08	1.17		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-Emiter Leakage			1	mA	V_{GE} = 0V, V_{CE} = 600V
	Current			10		V_{GE} = 0V, V_{CE} = 600V, T_J = 125°C
V_{FM}	Diode Forward Voltage drop		1.21	1.28	V	I_C = 100A, V_{GE} = 0V
			1.16	1.24		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	
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
E_{off}	Turn-Off Switching Energy		35	40		R_g = 15Ω, T_J = 125°C
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		440	480	ns	I_F = 50A, d_{IF}/dt = 50A/µs
I_{rr}	Diode Peak Reverse Current		15	18	A	V_{RR} = 200V
Q_{rr}	Diode Recovery Charge		3400	4000	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

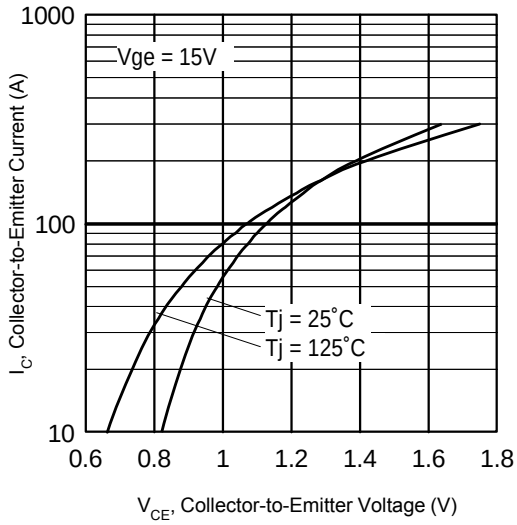


Fig. 1 - Typical Output Characteristics

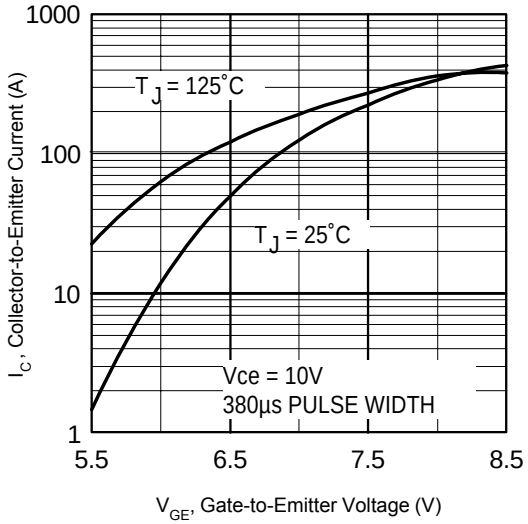


Fig. 2 - Typical Transfer Characteristics

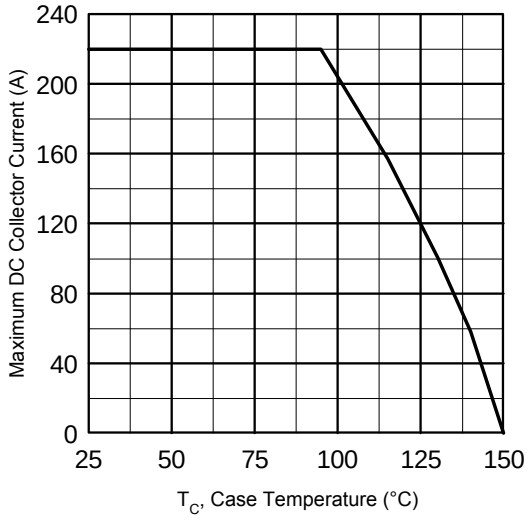


Fig. 3 - Maximum Collector Current vs. Case Temperature

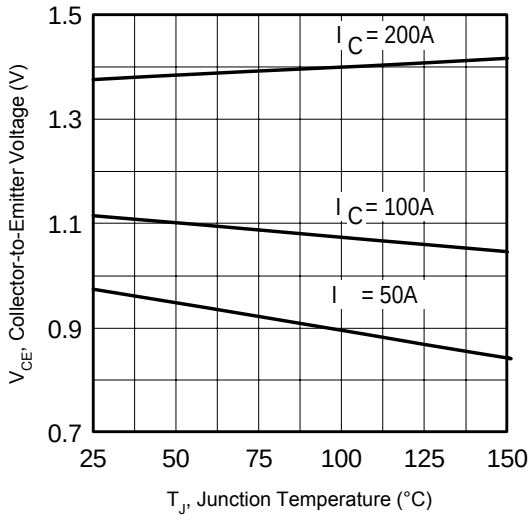


Fig. 4 - Typical Collector-to-Emitter Voltage vs. Junction Temperature

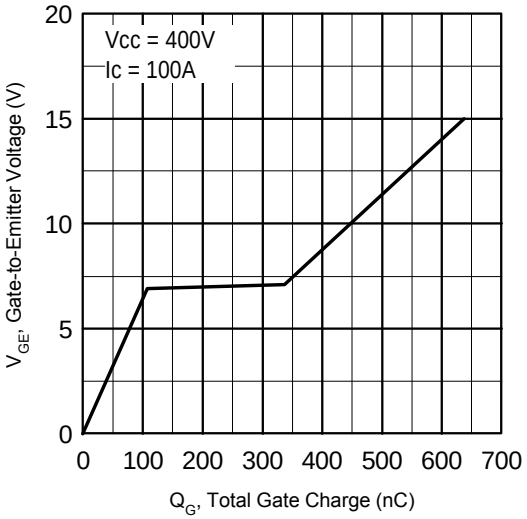


Fig. 5 - Typical Gate Charge vs. Gate-to-Emitter Voltage

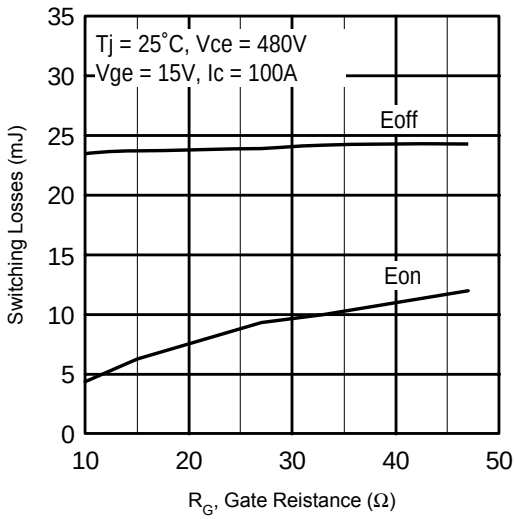


Fig. 6 - Typical Switching Losses vs Gate Resistance

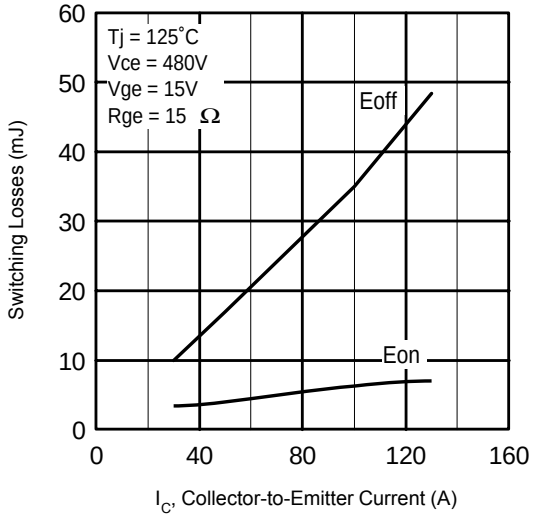


Fig. 7 - Typical Switching Losses vs Collector-to-Emitter Current

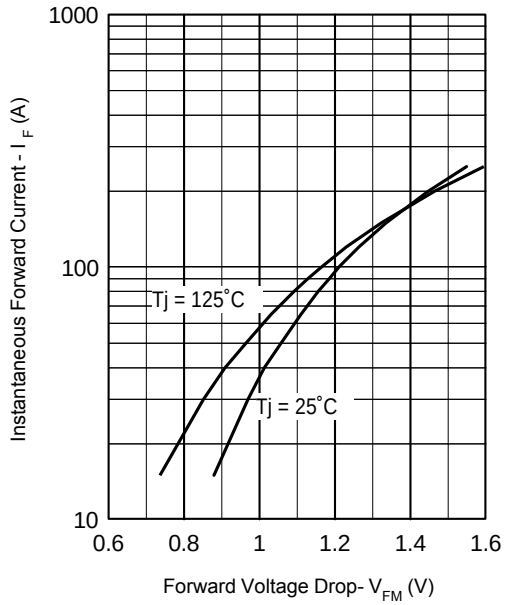


Fig. 8 - Maximum Forward Voltage Drop vs. Instantaneous Forward Current

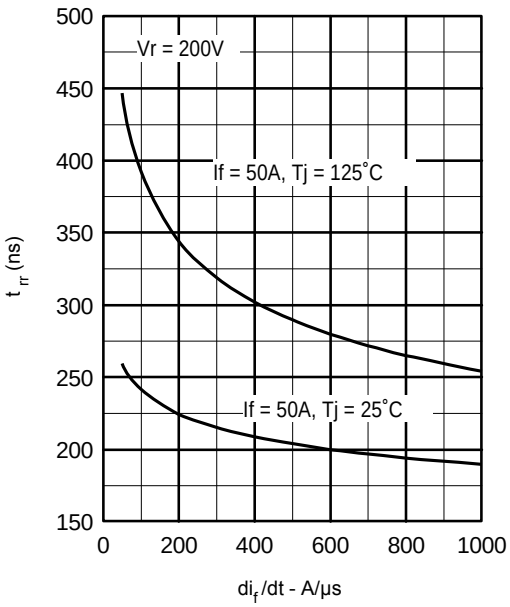


Fig. 9 - Typical Reverse Recovery vs. di_f/dt

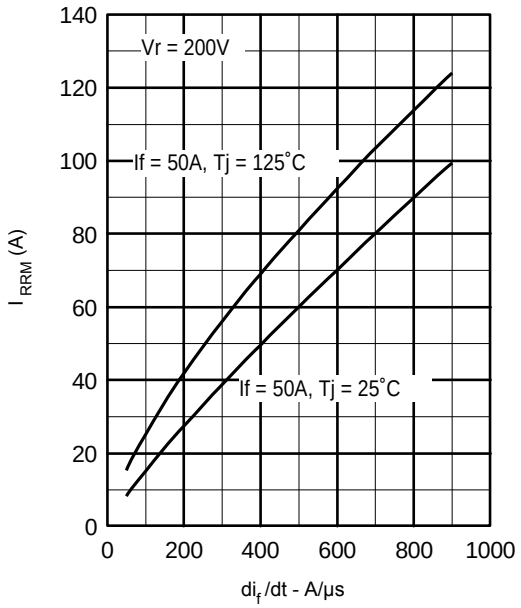


Fig. 10 - Typical Reverse Recovery Current vs. di_f/dt

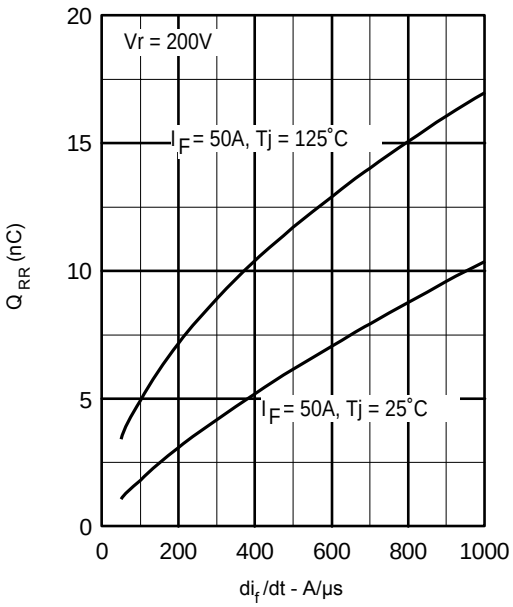
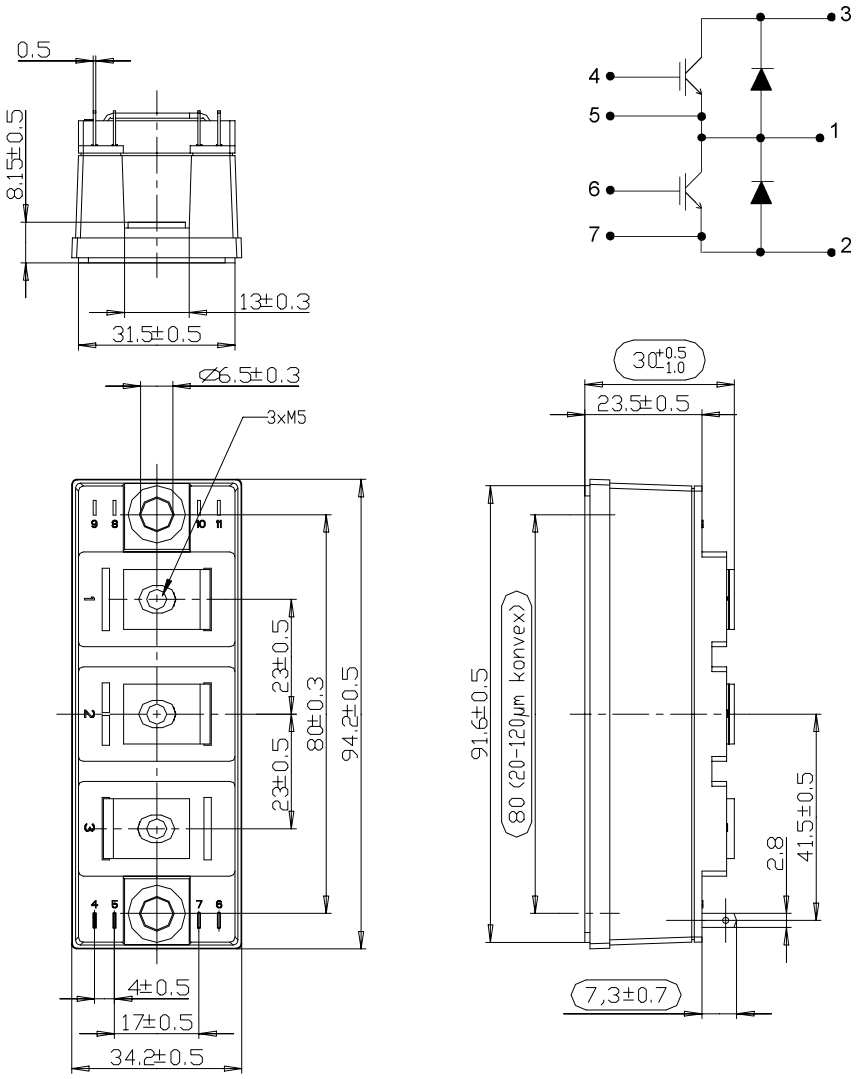


Fig. 11 - Typical Stored Charge vs. di_f/dt

Outline Table

Electrical Diagram

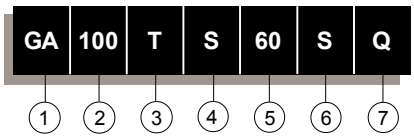


Dimensions in millimeters

Note: unused terminals are not assembled in the package

Ordering Information Table

Device Code



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	(Moat Fast S02)

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

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