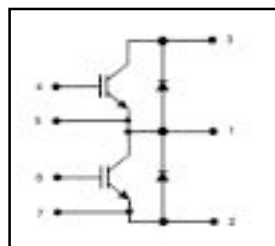


## Features

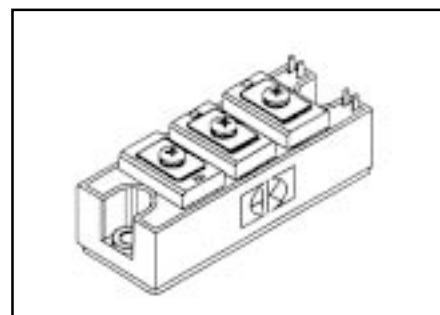
- Low loss, rugged IGBTSP<sup>+</sup> technology
- UltraFast optimized high operating frequencies 8-20 kHz in hard switching, >100 kHz in resonant mode.
- Smooth switching for good EMC
- HEXFRED™ antiparallel diodes with ultra-soft recovery
- Industry standard package
- UL recognition pending
- Short circuit rated 10 μs



$V_{CES}=1200V$   
 $V_{CE(on) typ.}=1.9V$   
 @ $V_{GE}=15V, I_c=100A$

## Benefits

- Increased operating efficiency
- Direct mounting to heatsink
- Performance optimized for power conversion: UPS, SMPS, Welding, Motor Control
- Lower EMI, requires less snubbing



## Absolute Maximum Ratings

	Parameter	Max.	Units
$V_{CES}$	Collector- to- Emitter Voltage	1200	V
$I_c @ T_c=25^{\circ}C$	Continuous Collector Current	145	A
$I_c @ T_c=85^{\circ}C$	Continuous Collector Current	100	
$I_{CM}$	Pulsed collector Current	200	
$I_{LM}$	Peak switching Current	200	
$I_{FM}$	Peak Diode Forward Current	200	
$V_{GE}$	Gate- to- Emitter Voltage	± 20	V
$V_{ISOL}$	RMS Isolation Voltage, Any Terminal To Case, t=1 min	2500	
$P_D @ T_c=25^{\circ}C$	Maximum Power Dissipation	700	W
$P_D @ T_c=85^{\circ}C$	Maximum Power Dissipation	365	
$T_J$	Operating Junction Temperature Range	-40 to +150	°C
$T_{STG}$	Storage Temperature Range	-40 to +125	

## Thermal / Mechanical Characteristics

	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to- Case- IGBT	-	0.18	
$R_{\theta JC}$	Thermal Resistance, Junction-to- Case- Diode	-	0.30	°C/W
$R_{\theta CS}$	Thermal Resistance, Case-to- Sink- Module	0.1	-	
	Mouting Torque, Case-to-Heatsink	-	4.0	N.m
	Mouting Torque, Case-to-Terminal 1,2 & 3	-	3.0	
	Weight of Module	200	-	g

# GA100TS120ST

## Electrical Characteristics @ T<sub>J</sub>=25°C(unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
V <sub>(BR)CES</sub>	Collector-to-Emitter Breakdown Voltage	1200	—	—	V	V <sub>GE</sub> =0V, I <sub>c</sub> =1mA
V <sub>CE(ON)</sub>	Collector-to-Emitter Voltage	1.7	1.8	2.3		V <sub>GE</sub> =15V, I <sub>c</sub> =100A
		—	2.0	—		V <sub>GE</sub> =15V, I <sub>c</sub> =100A, T <sub>J</sub> =125°C
V <sub>GE(th)</sub>	Gate Threshold Voltage	5.0	6.2	7.0		c=4.0mA, V <sub>CE</sub> =V <sub>GE</sub>
DV <sub>GE(th)DTJ</sub>	Temperature Coeff. of Threshold Voltage	—	-11	—	mV/°C	V <sub>CE</sub> =V <sub>GE</sub> , I <sub>c</sub> =1.25mA
g <sub>fe</sub>	Forward Transconductance	—	107	—	S	V <sub>CE</sub> =25V, I <sub>c</sub> =100A
I <sub>CES</sub>	Collector - to - Emitter Leaking Current	—	—	0.1	mA	V <sub>GE</sub> =0V, V <sub>CE</sub> =1200V
		—	0.5	—	mA	V <sub>GE</sub> =0V, V <sub>CE</sub> =1200V, T <sub>J</sub> =125°C
V <sub>FM</sub>	Diode Forward Voltage - Maximum	1.7	1.9	2.3	V	I <sub>F</sub> =100A, V <sub>GE</sub> =0V
		—	1.9	—		I <sub>F</sub> =100A, V <sub>GE</sub> =0V, T <sub>J</sub> =125°C
I <sub>GES</sub>	Gate - to - Emitter Leakage Current	-200	—	200	nA	V <sub>GE</sub> =± 20V, T <sub>J</sub> =125°C

## Dynamic Characteristics - T<sub>J</sub>=125°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
Q <sub>g</sub>	Total gate charge ( turn - on )	—	1050	—	nC	CC= 600V, V <sub>GE</sub> =-15--15V
Q <sub>ge</sub>	Gate - Emitter charge ( turn - on )	—	140	210		I <sub>c</sub> =100A
Q <sub>gc</sub>	Gate - Collector charge ( turn - on )	—	275	412		T <sub>J</sub> =25°C
t <sub>d(on)</sub>	Turn - On Delay Time	—	135	—	nS	R <sub>G</sub> =10Ω
t <sub>r</sub>	Rise Time	—	65	—		I <sub>c</sub> = 100A
t <sub>d(off)</sub>	Turn - Off Delay Time	—	490	—		V <sub>CC</sub> =600V
t <sub>f</sub>	Fall Time	—	60	—		V <sub>GE</sub> =± 15V
E <sub>on</sub>	Turn - On Switching Energy	—	12	—	mJ	Lσ=60nH
E <sub>off(1)</sub>	Turn - Off Switching Energy	—	10.3	—		inductive load
E <sub>ts(1)</sub>	Total Switching Energy	—	22.3	25		
C <sub>ies</sub>	Input Capacitance	—	8.9	—	nF	V <sub>GE</sub> = 0V
C <sub>oes</sub>	Output Capacitance	—	0.65	—		V <sub>CC</sub> = 25V
C <sub>res</sub>	Reverse Transfer Capacitance	—	0.42	—		f=1MHZ, T <sub>J</sub> =25°C
t <sub>rr</sub>	Diode Reverse Recovery Time	—	400	—	nS	I <sub>F</sub> = 100A
I <sub>rr</sub>	Diode Peak Reverse Current	—	70	—	A	T <sub>J</sub> =125°C
Q <sub>rr</sub>	Diode Recovery Charge	—	18	—	μC	Lσ=50nH
di(rec)M/dt	Diode Peak Rate of Fall of Recovery During t <sub>b</sub>	—	1916	—	A/μs	V <sub>CC</sub> =600V, di/dt=1600A/μs Inductive Load
I <sub>sc</sub>	Short circuit current	—	460	—	A	V <sub>CC</sub> =900V, V <sub>GE</sub> =15V t <sub>psc</sub> <10μS, V <sub>CEM</sub> <1200V

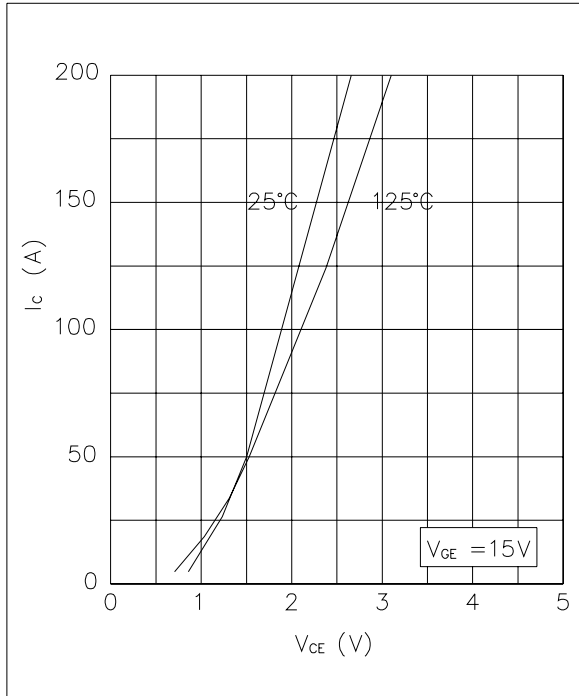


Fig.1 Typical on-state characteristics

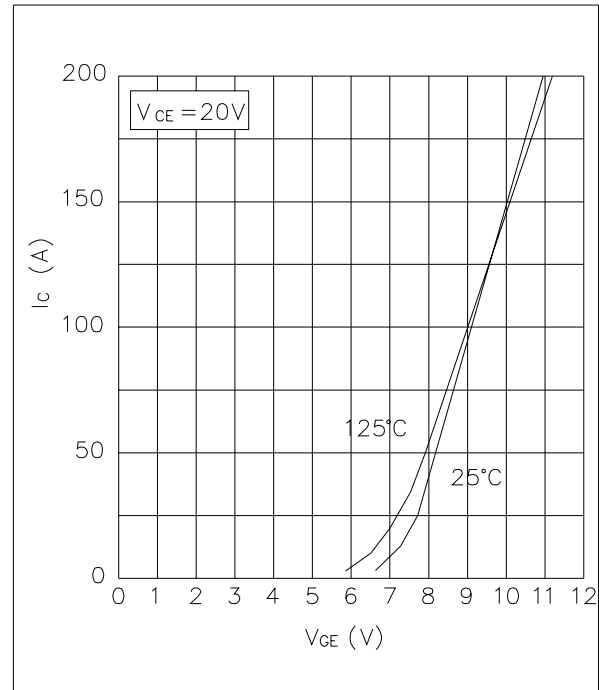


Fig.2 Typical transfer characteristics

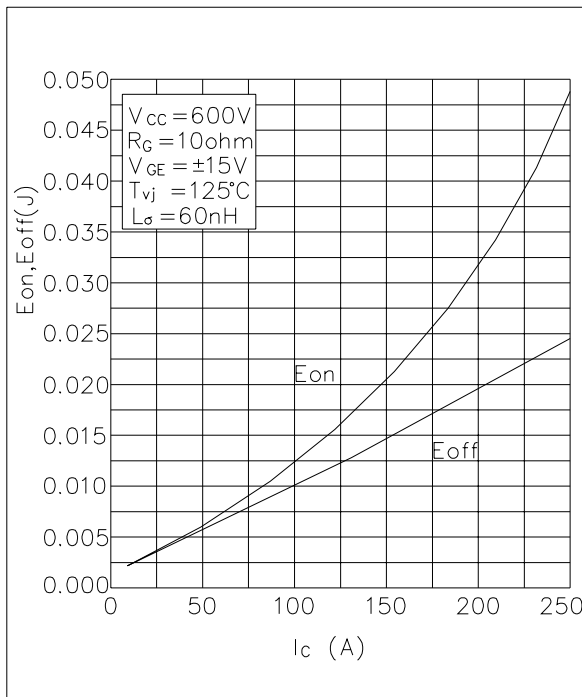


Fig.3 Typical switching characteristics vs collector current

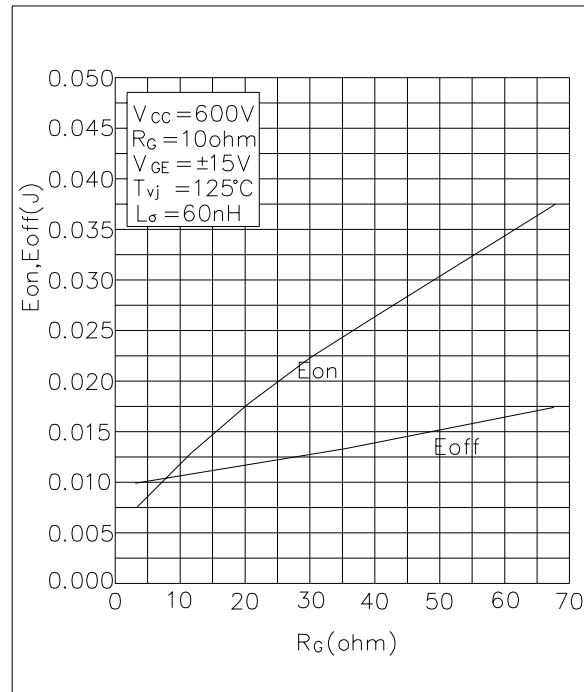
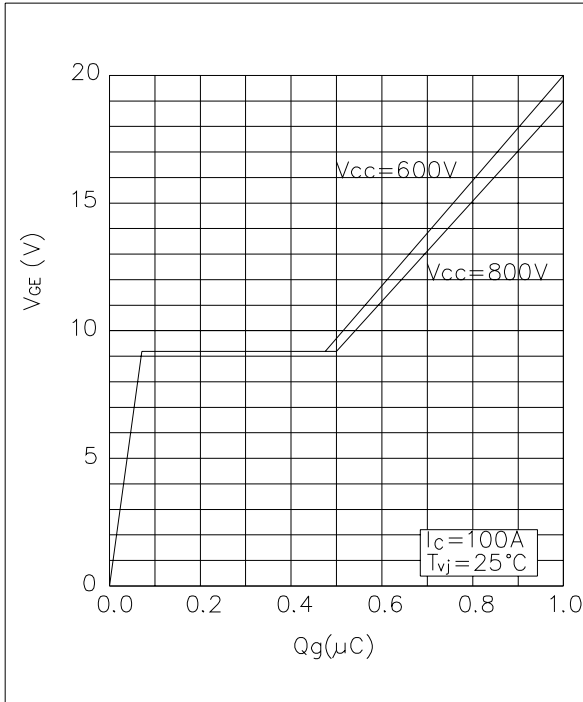
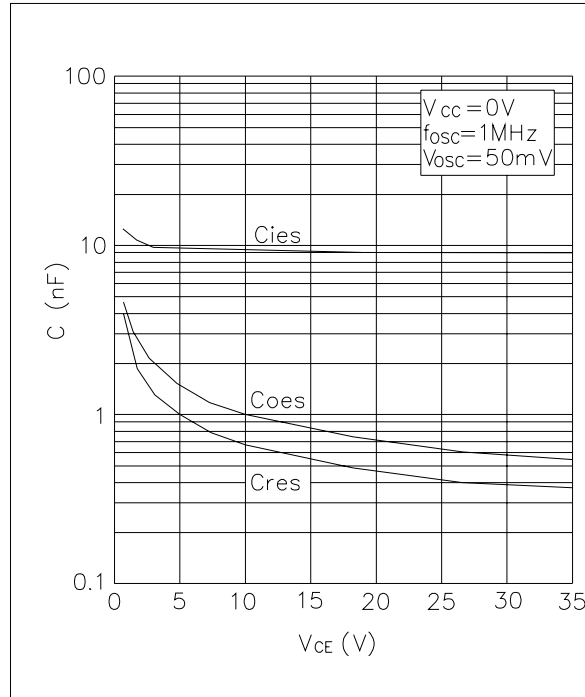


Fig.4 Typical switching characteristics vs gate resistor



**Fig.5 Typical gate charge characteristics**



**Fig.6 Typical capacitances vs collector-emitter voltage**

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