

XI'AN IR-PERI  
 Company

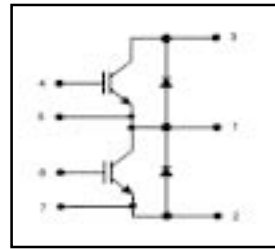
PRELIMINARY

**GA50TS120K**

Short Circuit Rated  
 Ultra-Fast™ Speed IGBT

## Features

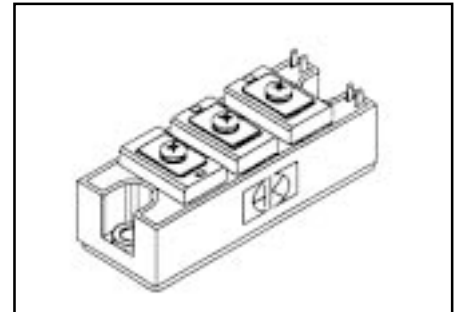
- Generation 5 IGBT NPT technology
- UltraFast optimized high operating frequencies 8-40 kHz in hard switching, >200 kHz in resonant mode.
- Very low conduction and switching losses
- HEXFRED™ antiparallel diodes with ultra-soft recovery
- Industry standard package
- UL recognition pending
- Short circuit rated 10  $\mu$ s



$V_{CES}=1200V$   
 $V_{CE(on) \text{ typ.}}=2.5V$   
 @ $V_{GE}=15V, I_c=50A$

## 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	75	A
$I_c @ T_c=85^\circ C$	Continuous Collector Current	50	
$I_{CM}$	Pulsed collector Current	100	
$I_{LM}$	Peak switching Current	100	
$I_{FM}$	Peak Diode Forward Current	100	
$V_{GE}$	Gate- to- Emitter Voltage	$\pm 20$	V
$V_{ISOL}$	RMS Isolation Voltage, Any Terminal To Case, t=1 min	2500	W
$P_D @ T_c=25^\circ C$	Maximum Power Dissipation	417	
$P_D @ T_c=85^\circ C$	Maximum Power Dissipation	217	
$T_J$	Operating Junction Temperature Range	-40 to +150	$^\circ C$
$T_{STG}$	Storage Temperature Range	-40 to +125	

## Thermal / Mechanical Characteristics

	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to- Case- IGBT	-	0.30	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance, Junction-to- Case- Diode	-	0.70	
$R_{\theta CS}$	Thermal Resistance, Case-to- Sink- Module	0.1	-	N.m
	Mouting Torque, Case-to-Heatsink	-	4.0	
	Mouting Torque, Case-to-Terminal 1,2 & 3	-	3.0	
	Weight of Module	200	-	g

**GA50TS120K****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	—	2.5	—		V <sub>GE</sub> =15V, I <sub>c</sub> =50A
		—	2.7	—		V <sub>GE</sub> =15V, I <sub>c</sub> =50A, T <sub>J</sub> =125°C
V <sub>GE(th)</sub>	Gate Threshold Voltage	4.5	—	5.5		V <sub>CE</sub> =6V, I <sub>c</sub> =500μA
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> =500μA
g <sub>fe</sub>	Forward Ttansconductance	—	72	—	S	V <sub>CE</sub> =25V, I <sub>c</sub> =50A
I <sub>CES</sub>	Collector - to - Emitter Leaking Current	—	—	1.0	mA	V <sub>GE</sub> =0V, V <sub>CE</sub> =1200V
		—	—	10		V <sub>GE</sub> =0V, V <sub>CE</sub> =1200V, T <sub>J</sub> =125°C
V <sub>FM</sub>	Diode Forward Voltage - Maximum	—	2.0	2.5	V	I <sub>F</sub> =50A, V <sub>GE</sub> =0V
		—	1.8	—		I <sub>F</sub> =50A, V <sub>GE</sub> =0V, T <sub>J</sub> =125°C
I <sub>GES</sub>	Gate - to - Emitter Leakage Current	—	—	100	nA	V <sub>GE</sub> =±20V

**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 )	—	397	596	nC	V <sub>CC</sub> = 400V I <sub>c</sub> =60A T <sub>J</sub> =25°C
Q <sub>ge</sub>	Gate - Emitter charge ( turn - on )	—	67	100		
Q <sub>gc</sub>	Gate - Collector charge ( turn - on )	—	132	197		
T <sub>d(on)</sub>	Turn - On Delay Time	—	100	—	nS	R <sub>G1</sub> =15Ω , R <sub>G2</sub> = 0Ω I <sub>c</sub> = 50A V <sub>CC</sub> =720V V <sub>GE</sub> =±15V Inductor load
t <sub>r</sub>	Rise Time	—	90	—		
T <sub>d(off)</sub>	Turn - Off Delay Time	—	287	—		
t <sub>f</sub>	Fall Time	—	60	—		
E <sub>on</sub>	Turn - On Switching Energy	—	10	—	mJ	
E <sub>off(1)</sub>	Total Switching Energy	—	4	—		
E <sub>ts(1)</sub>	Turn - On Switching Energy	—	14	20		
C <sub>ies</sub>	Input Capacitance	—	8933	—	pF	V <sub>GE</sub> = 0V V <sub>CC</sub> = 30V f=1MHZ
C <sub>oes</sub>	Output Capacitance	—	397	—		
C <sub>res</sub>	Reverse Transfer Capacitance	—	77	—		
t <sub>rr</sub>	Diode Reverse Recovery Time	—	101	—	nS	I <sub>c</sub> = 50A
I <sub>rr</sub>	Diode Peak Reverse Current	—	66	—	A	R <sub>G1</sub> =15Ω
Q <sub>rr</sub>	Diode Recovery Charge	—	3616	—	nC	R <sub>G2</sub> =0Ω
di(rec)M/dt	Diode Peak Rate of Fall of Recovery During t <sub>b</sub>	—	999	—	A/μs	V <sub>CC</sub> =720V di/dt=1200A/μs
T <sub>sc</sub>	Short circuit withstand time	10	—	—	μs	V <sub>CC</sub> =720V, V <sub>GE</sub> =±15V Min. R <sub>G1</sub> =15Ω, V <sub>CEP</sub> =1100V