XI'AN IR-PERI

PRELIMINARY

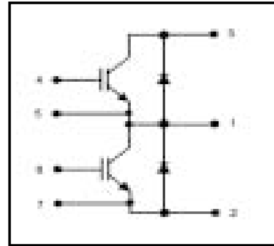
GA300TD60U

" HALF-BRODGE IGBT DOUBLE INT-A -PAK

Ultra-Fast™ Speed IGBT

Features

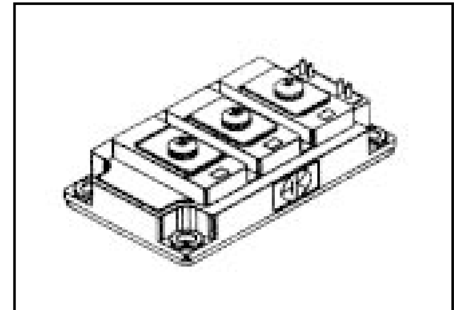
- Generation 4 IGBT PT technology
- UltraFast optimized high operating frequencies 8-40 kHz in hard switching, >200 kHz in resonant mode.
- Very low conduction and switching losses
- HEXFRED ™ antiparallel diodes with ultra-soft recovery
- Industry standard package
- UL recongnition pending



V_{CES}=600V

$V_{CE(on)}$ typ.=1.75V

@V_{GE}=15V,I_C=300A



Benefits

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

Absolute Maximum Ratings

	Parameter	Max.	Units
V_{CES}	Collector- to- Emitter Voltage	600	V
I_C @ Tc=25ºC	Continuous Collector Current	300	A
I_C @ Tc=85ºC	Continuous Collector Current	300	
I_{CM}	Pulsed collector Current	600	
I_{LM}	Peak switching Current	600	
I_{FM}	Peak Diode Forward Current	600	
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=25ºC	Maximum Power Dissipation	1250	W
P_D @ T_C=85ºC	Maximum Power Dissipation	650	
T_J	Operating Junction Temperature Range	-40 to +150	ºC
T_{STG}	Storage Temperature Range	-40 to +125	

Termal / Mechanical Characteristics

	Parameter	Typ.	Max.	Units
$R_{θJC}$	Termal Resistance, Junction-to- Case- IGBT	-	0.10	ºC/W
$R_{θJC}$	Termal Resistance, Junction-to- Case- Diode	-	0.15	
$R_{θCS}$	Termal Resistance, Csar-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	400	-	g

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

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)CES}$	Collector-to-Emitter Breakdown Voltage	600	—	—	V	V_{GE}=0V, I_C=1mA
$V_{CE(ON)}$	Collector-to-Emitter Voltage	—	1.75	—		V_{GE}=15V, I_C=300A
		—	1.90	—		V_{GE}=15V, I_C=300A,T_J=125°C
$V_{GE(th)}$	Gate Threshold Voltage	3.0	—	6.0		I_C=1.75mA
$DV_{GE(th)}DT_J$	Temperature Coeff. of Threshold Voltage	—	-11	—	mV/°C	V_{CE}=V_{GE}, I_C=1.75mA
g_{fe}	Forward Ttansconductance	—	269	—	S	V_{CE}=25V, I_C=300A
I_{CES}	Collector - to - Emitter Leaking Current	—	—	1.0	mA	V_{GE}=0V, V_{CE}=600V
		—	—	10		V_{GE}=0V, V_{CE}=600V, T_J=125°C
V_{FM}	Diode Forward Voltage - Maximum	—	2.0	2.6	V	I_F=300A , V_{GE}=0V
		—	1.9	—		I_F=300A , V_{GE}=0V ,T_J=125°C
I_{GES}	Gate - to - Emitter Leakage Current	—	—	400	nA	V_{GE}=± 20V

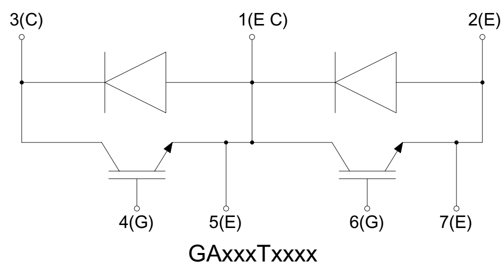
Dynamic Characteristics - T_J=125°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
Q_g	Total gate charge (turn - on)	—	1249	1873	nC	V_{CC}= 400V V_{GE}=15V
Q_{ge}	Gate - Emitter charge (turn - on)	—	173	260		I_C=190A
Q_{gc}	Gate - Collector charge (turn - on)	—	423	635		T_J=25°C
$T_{d(on)}$	Turn - On Delay Time	—	645	—	nS	R_{G1}=27Ω , R_{G2} = 0Ω
t_r	Rise Time	—	282	—		I_C = 300A
$T_{d(off)}$	Turn - Off Delay Time	—	418	—		V_{CC}= 360V
t_f	Fall Time	—	220	—		V_{GE}=± 15V
E_{on}	Turn - On Switching Energy	—	22	—	mJ	
$E_{off(1)}$	Turn - Off Switching Energy	—	25	—		
$E_{ts(1)}$	Total Switching Energy	—	47	60		
C_{ies}	Input Capacitance	—	27755	—	pF	V_{GE} = 0V
C_{oes}	Output Capacitance	—	1735	—		V_{CC} = 30V
C_{res}	Reverse Transfer Capacitance	—	361	—		f=1MHZ
t_{rr}	Diode Reverse Recovery Time	—	200	—	nS	I_C = 300A
I_{rr}	Diode Peak Reverse Current	—	128	—	A	R_{G1}=27Ω
Q_{rr}	Diode Recovery Charge	—	12771	—	nC	R_{G2}=0Ω
di(rec)M/dt	Diode Peak Rate of Fall of Recovery During t_b	—	1691	—	A/µs	V_{CC}=360V di/dt=1300A/µs

Appendix:

Circuit configuration for Half bridge IGBT Modules

T----Half Bridge
H---Chopper High Side
L---Chopper Low Side
T*K---Common Anode Half Bridge



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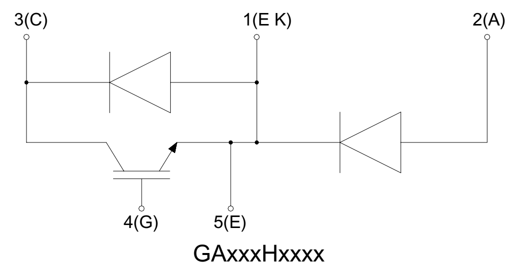

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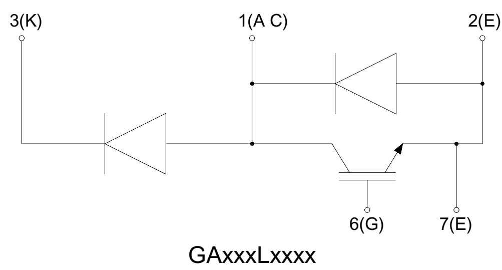

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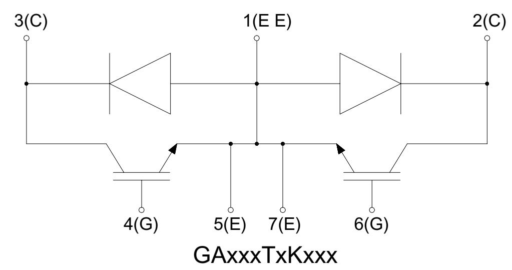

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