

XI'AN IR-PERI



PRELIMINARY

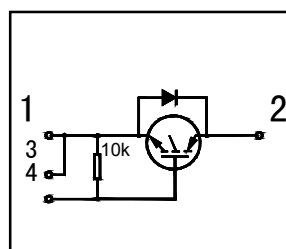
GA400DD60U

“ SINGLE SWITCH ” IGBT DOUBLE INT-A -PAK

Ultra-Fast™ Speed IGBT

Features

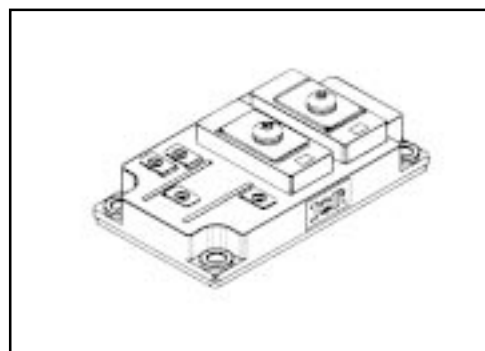
- Generation 4 IGBT technology
- UltraFast optimized high operating frequencies 8-40 kHz in hard switching, >200 kHz in resonant mode.
- Very low conduction and switching losses
- HEXFRED™ antiparallel diodes with ultra-soft recovery
- Industry standard package
- UL recognition pending



$V_{CES}=600V$
 $V_{CE(on) \text{ typ.}}=1.7V$
 @ $V_{GE}=15V, I_c=400A$

Benefits

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



Absolute Maximum Ratings

	Parameter	Max.	Units
V_{CES}	Collector- to- Emitter Voltage	600	V
$I_c @ T_c=25^\circ C$	Continuous Collector Current	480	A
$I_c @ T_c=85^\circ C$	Continuous Collector Current	400	
I_{CM}	Pulsed collector Current	800	
I_{LM}	Peak switching Current	800	
I_{FM}	Peak Diode Forward Current	800	
V_{GE}	Gate- to- Emitter Voltage	± 20	V
V_{ISOL}	RMS Isolation Voltage, Any Terminal To Case, $t=1 \text{ min}$	2500	
$P_D @ T_c=25^\circ C$	Maximum Power Dissipation	1250	W
$P_D @ T_c=85^\circ C$	Maximum Power Dissipation	650	
T_J	Operating Junction Temperature Range	-40 to +150	°C
T_{STG}	Storage Temperature Range	-40 to +125	

Termal / Mechanical Characteristics

	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Termal Resistance, Junction-to- Case- IGBT	-	0.10	°C/W
$R_{\theta JC}$	Termal Resistance, Junction-to- Case- Diode	-	0.20	
$R_{\theta CS}$	Termal Resistance, Csar-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	400	-	g

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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 =5mA
V _{CE(ON)}	Collector-to-Emitter Voltage	—	1.7	2.4		V _{GE} =15V, I _c =400A
		—	1.8	—		V _{GE} =15V, I _c =400A, T _J =125°C
V _{GE(th)}	Gate Threshold Voltage	4.5	—	5.5		I _c =5mA, V _{CE} =6.0V
DV _{GE(th)DTJ}	Temperature Coeff. of Threshold Voltage	—	-11	—	mV/°C	V _{CE} =6.0V, I _c =5mA
g _{fe}	Forward Transconductance	—	481	—	S	V _{CE} =25V, I _c =400A
I _{CES}	Collector - to - Emitter Leaking Current	—	—	2.0	mA	V _{GE} =0V, V _{CE} =600V
		—	—	20		V _{GE} =0V, V _{CE} =600V, T _J =125°C
V _{FM}	Diode Forward Voltage - Maximum	—	2.6	2.9	V	I _F =400A, V _{GE} =0V
		—	2.5	—		I _F =400A, V _{GE} =0V, T _J =125°C
I _{GES}	Gate - to - Emitter Leakage Current	—	—	1000	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)	—	1806	2709	nC	V _{CC} = 400V V _{GE} =15V I _c =270A T _J =25°C
Q _{ge}	Gate - Emitter charge (turn - on)	—	251	376		
Q _{gc}	Gate - Collector charge (turn - on)	—	612	918		
T _{d(on)}	Turn - On Delay Time	—	1033	—	nS	R _{G1} = 15Ω , R _{G2} = 0Ω I _c = 400A V _{CC} = 360V V _{GE} =± 15V
t _r	Rise Time	—	335	—		
T _{d(off)}	Turn - Off Delay Time	—	688	—		
t _f	Fall Time	—	225	—		
E _{on}	Turn - On Switching Energy	—	26	—	mJ	
E _{off(1)}	Turn - Off Switching Energy	—	48	—		
E _{ts(1)}	Total Switching Energy	—	74	89		
C _{ies}	Input Capacitance	—	40136	—	pF	V _{GE} = 0V V _{CC} = 30V f=1MHZ
C _{oes}	Output Capacitance	—	2509	—		
C _{res}	Reverse Transfer Capacitance	—	522	—		
t _{rr}	Diode Reverse Recovery Time	—	232	—	nS	I _c = 400A
I _{rr}	Diode Peak Reverse Current	—	141	—	A	R _{G1} =15Ω
Q _{rr}	Diode Recovery Charge	—	16292	—	nC	R _{G2} =0Ω
di(rec)M/dt	Diode Peak Rate of Fall of Recovery During t _b	—	1641	—	A/μs	V _{CC} =360V di/dt=1300A/μs

Notes:

The thermistor has an average rate of 7mW/°C between 20°C and 125°C.