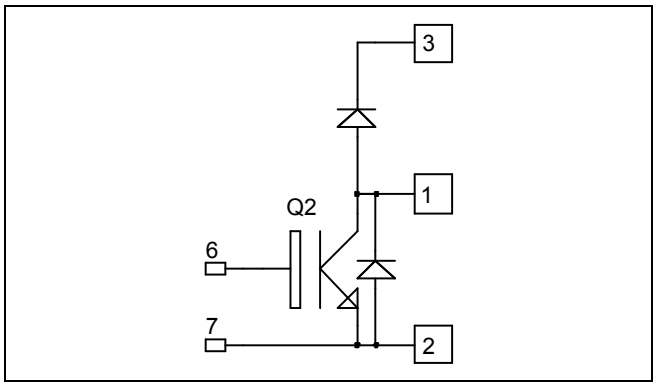
APTGT300DA60D3G

Boost chopper
Trench + Field Stop IGBT3
Power Module

V_{CES} = 600V
I_C = 300A @ Tc = 80°C

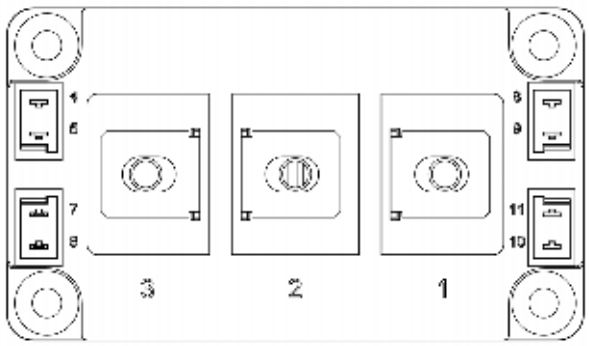


Application

- AC and DC motor control
- Switched Mode Power Supplies
- Power Factor Correction

Features

- Trench + Field Stop IGBT3 Technology
  - Low voltage drop
  - Low tail current
  - Switching frequency up to 20 kHz
  - Soft recovery parallel diodes
  - Low diode VF
  - Low leakage current
  - RBSOA and SCSOA rated
- Kelvin emitter for easy drive
- High level of integration
- M6 power connectors



Benefits

- Stable temperature behavior
- Very rugged
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Easy paralleling due to positive T_C of V_{CEsat}
- RoHS Compliant

All ratings @ T_j = 25°C unless otherwise specified

Absolute maximum ratings

Symbol	*Parameter*		*Max ratings*	*Unit*
V_{CES}	Collector - Emitter Breakdown Voltage		600	V
I_C	Continuous Collector Current	T_C = 25°C	400	A
		T_C = 80°C	300	
I_{CM}	Pulsed Collector Current	T_C = 25°C	600	
V_{GE}	Gate – Emitter Voltage		±20	V
P_D	Maximum Power Dissipation	T_C = 25°C	940	W
RBSOA	Reverse Bias Safe Operating Area	T_j = 125°C	600A @ 520V	

CAUTION: These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.
See application note APT0502 on www.microsemi.com

Electrical Characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
I_{CES}	Zero Gate Voltage Collector Current	V_{GE} = 0V, V_{CE} = 600V				500	µA
$V_{CE(sat)}$	Collector Emitter saturation Voltage	V_{GE} = 15V I_C = 300A	T_j = 25°C		1.5	1.9	V
			T_j = 150°C		1.7		
$V_{GE(th)}$	Gate Threshold Voltage	V_{GE} = V_{CE} , I_C = 4.8 mA		5.0	5.8	6.5	V
I_{GES}	Gate – Emitter Leakage Current	V_{GE} = 20V, V_{CE} = 0V				400	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
C_{ies}	Input Capacitance	V_{GE} = 0V V_{CE} = 25V f = 1MHz			18.5		nF
C_{oes}	Output Capacitance				1.2		
C_{res}	Reverse Transfer Capacitance				0.5		
Q_G	Gate charge	V_{GE}=±15V, I_C=300A V_{CE}=300V			3.2		µC
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) V_{GE} = ±15V V_{Bus} = 300V I_C = 300A R_G = 2.2Ω			110		ns
T_r	Rise Time				50		
$T_{d(off)}$	Turn-off Delay Time				490		
T_f	Fall Time				50		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (150°C) V_{GE} = ±15V V_{Bus} = 300V I_C = 300A R_G = 2.2Ω			130		ns
T_r	Rise Time				60		
$T_{d(off)}$	Turn-off Delay Time				530		
T_f	Fall Time				70		
E_{on}	Turn on Energy	V_{GE} = ±15V V_{Bus} = 300V I_C = 300A R_G = 2.2Ω	T_j = 25°C		3.1		mJ
			T_j = 150°C		3.3		
E_{off}	Turn off Energy		T_j = 25°C		12		
			T_j = 150°C		12.5		
I_{sc}	Short Circuit data	V_{GE} ≤15V ; V_{Bus} = 360V t_p ≤ 6µs ; T_j = 150°C			1500		A

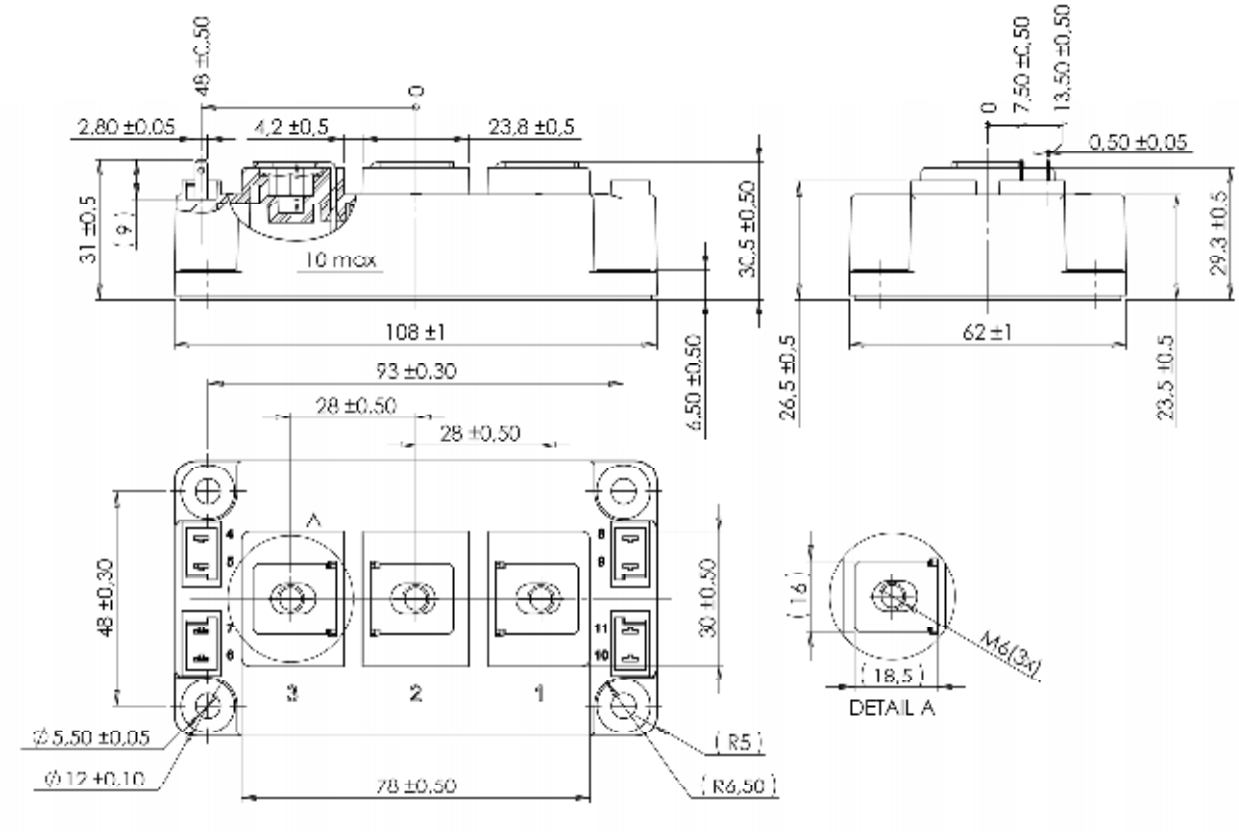
Reverse diode ratings and characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
V_{RRM}	Maximum Peak Repetitive Reverse Voltage			600			V
I_{RRM}	Maximum Reverse Leakage Current	V_R=600V	T_j = 25°C			500	µA
			T_j = 150°C			750	
I_F	DC Forward Current		Tc = 80°C		300		A
V_F	Diode Forward Voltage	I_F = 300A V_{GE} = 0V	T_j = 25°C		1.6	2	V
			T_j = 150°C		1.5		
t_{rr}	Reverse Recovery Time	I_F = 300A V_R = 300V di/dt =4800A/µs	T_j = 25°C		100		ns
			T_j = 150°C		150		
Q_{rr}	Reverse Recovery Charge		T_j = 25°C		14.4		µC
			T_j = 150°C		30.4		
E_{rr}	Reverse Recovery Energy		T_j = 25°C		3.4		mJ
			T_j = 150°C		7.2		

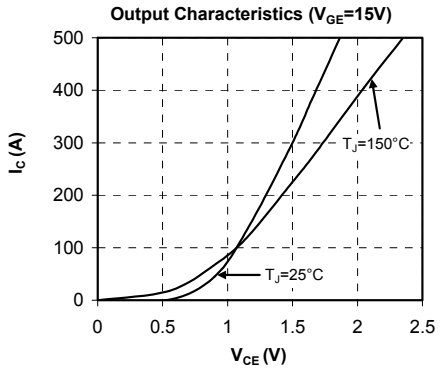
Thermal and package characteristics

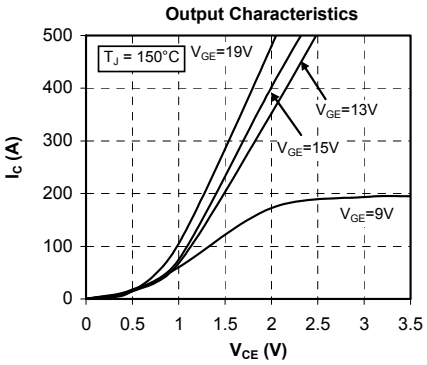
Symbol	*Characteristic*			*Min*	*Typ*	*Max*	*Unit*
R_{thJC}	Junction to Case Thermal Resistance		IGBT			0.16	°C/W
			Diode			0.25	
V_{ISOL}	RMS Isolation Voltage, any terminal to case t =1 min, 50/60Hz			4000			V
T_J	Operating junction temperature range			-40		175	°C
T_{STG}	Storage Temperature Range			-40		125	
T_C	Operating Case Temperature			-40		125	
Torque	Mounting torque	For terminals	M6	3		5	N.m
		To Heatsink	M6	3		5	
Wt	Package Weight					350	g

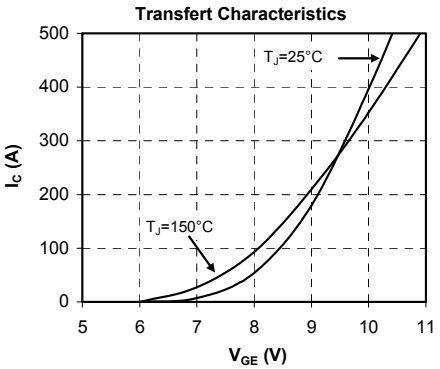
D3 Package outline (dimensions in mm)

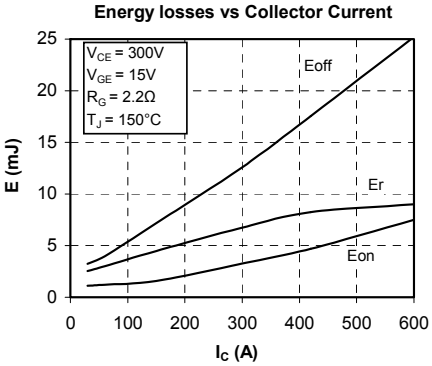


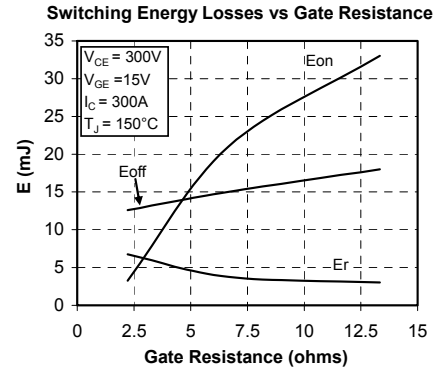
Typical Performance Curve

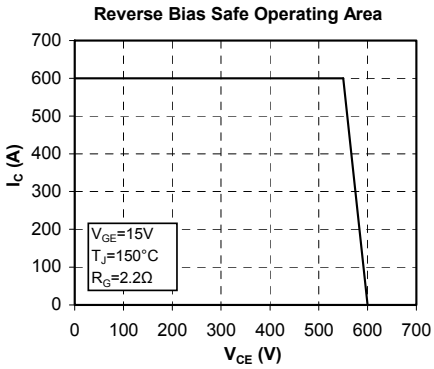


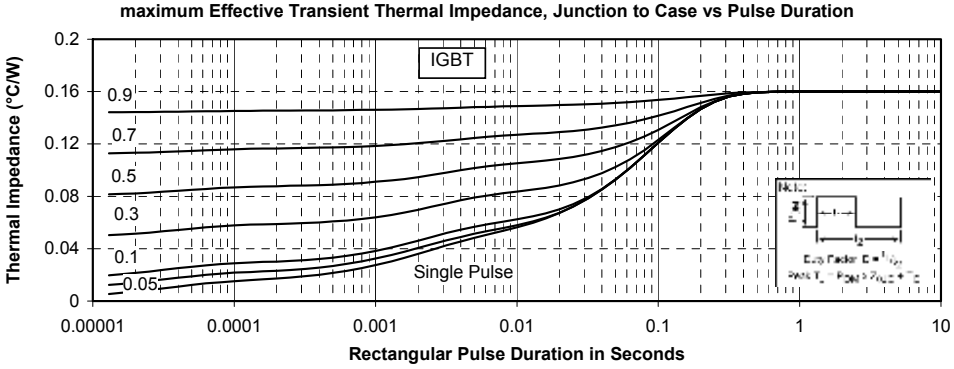




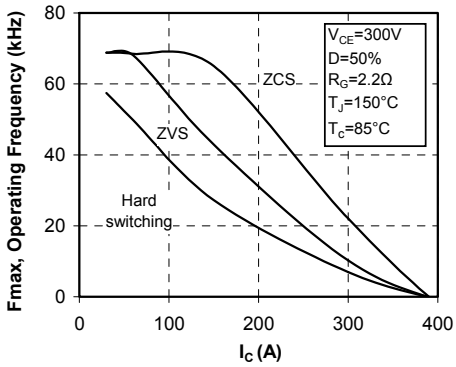




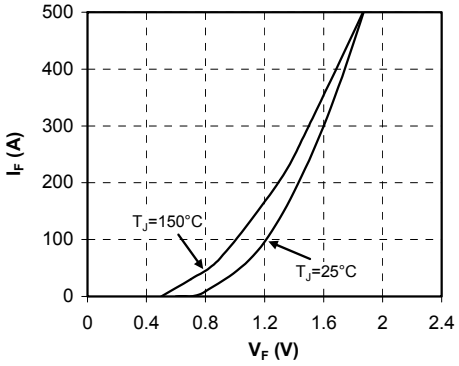




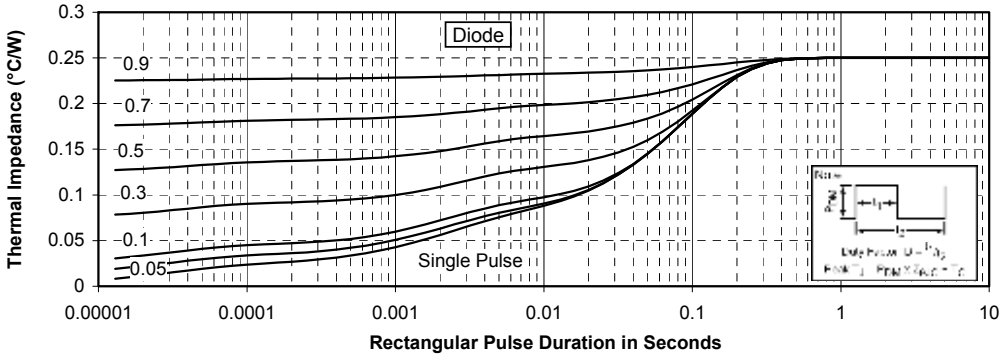
Operating Frequency vs Collector Current



Forward Characteristic of diode



maximum Effective Transient Thermal Impedance, Junction to Case vs Pulse Duration



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