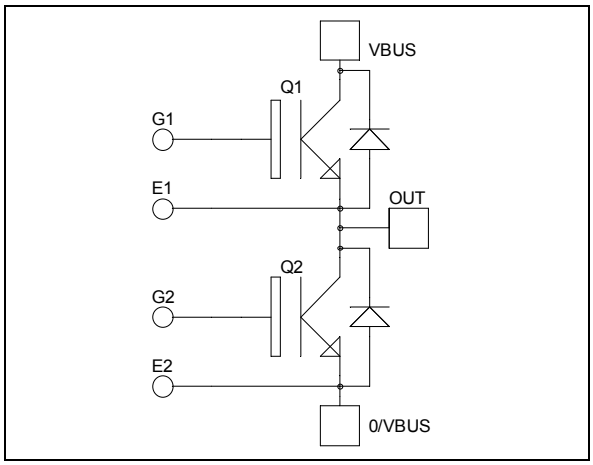
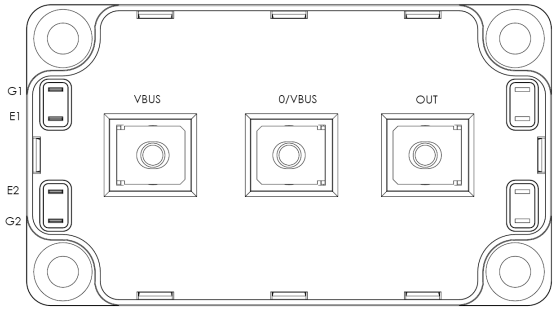
APTGLQ300A120G

Phase leg
High speed Trench + Field Stop
IGBT4 Power module

V_{CES} = 1200V
I_C = 300A @ Tc = 80°C





Application

- Welding converters
- Switched Mode Power Supplies
- Uninterruptible Power Supplies
- Motor control

Features

- **High speed Trench + Field Stop IGBT 4**
  - Low voltage drop
  - Low leakage current
  - Low switching losses
- Kelvin emitter for easy drive
- Very low stray inductance
- M5 power connectors

Benefits

- Outstanding performance at high frequency operation
- Stable temperature behavior
- Very rugged
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Low profile
- RoHS compliant

All ratings @ T_j = 25°C unless otherwise specified

Absolute maximum ratings (Per IGBT)

Symbol	*Parameter*		*Max ratings*	*Unit*
V_{CES}	Collector - Emitter Voltage		1200	V
I_C	Continuous Collector Current	T_C = 25°C	500	A
		T_C = 80°C	300	
I_{CM}	Pulsed Collector Current	T_C = 25°C	960	
V_{GE}	Gate – Emitter Voltage		±20	V
P_D	Power Dissipation		1500	W

CAUTION: These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.

Electrical Characteristics (Per IGBT)

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
I_{CES}	Zero Gate Voltage Collector Current	V_{GE} = 0V, V_{CE} = 1200V				200	µA
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	V_{GE} =15V I_C = 300A	T_j = 25°C	1.78	2.05	2.42	V
			T_j = 150°C		2.6		
$V_{GE(th)}$	Gate Threshold Voltage	V_{GE} = V_{CE} , I_C = 10.4 mA		5.3	5.8	6.3	V
I_{GES}	Gate – Emitter Leakage Current	V_{GE} = 20V, V_{CE} = 0V				480	nA

Dynamic Characteristics (Per IGBT)

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
C_{ies}	Input Capacitance	V_{GE} = 0V V_{CE} = 25V f = 1MHz			17.6		nF
C_{oes}	Output Capacitance				1		
C_{res}	Reverse Transfer Capacitance				0.9		
Q_G	Gate charge	V_{GE} = 15V, I_C = 300A V_{CE} = 960V			1290		nC
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) V_{GE} = ±15V V_{Bus} = 600V I_C = 300A R_G = 1.6Ω			30		ns
T_r	Rise Time				57		
$T_{d(off)}$	Turn-off Delay Time				290		
T_f	Fall Time				16		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (150°C) V_{GE} = ±15V V_{Bus} = 600V I_C = 300A R_G = 1.6Ω			30		ns
T_r	Rise Time				49		
$T_{d(off)}$	Turn-off Delay Time				366		
T_f	Fall Time				48		
E_{on}	Turn on Energy	V_{GE} = ±15V V_{Bus} = 600V I_C = 300A R_G = 1.6Ω	T_j = 150°C		26		mJ
E_{off}	Turn off Energy		T_j = 150°C		16		
R_G	Integrated gate resistor				2.5		Ω
I_{sc}	Short Circuit data	V_{GE} ≤15V ; V_{Bus} = 600V t_p≤10µs ; T_j = 150°C			1000		A
R_{thJC}	Junction to Case Thermal Resistance					0.1	°C/W

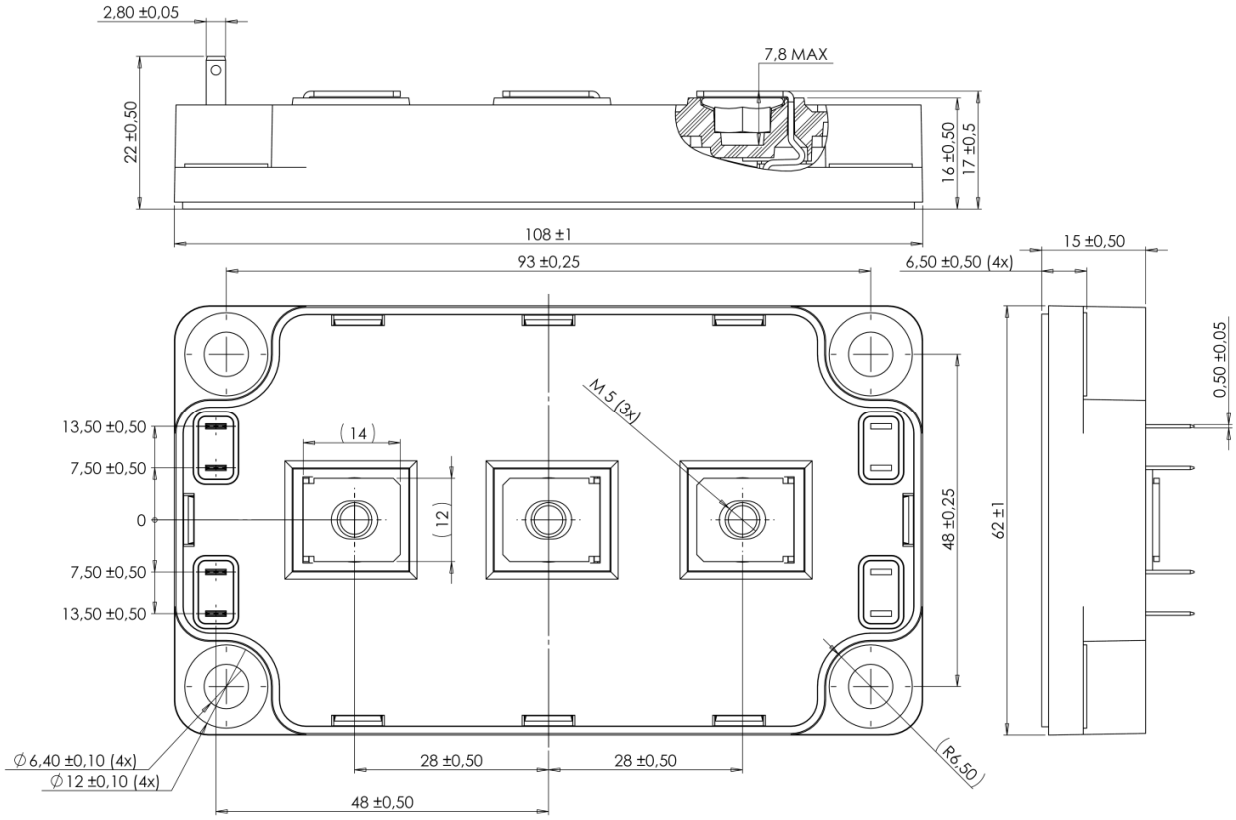
Diode ratings and characteristics (per diode)

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
V_{RRM}	Peak Repetitive Reverse Voltage					1200	V
I_{RM}	Reverse Leakage Current	V_R=1200V				400	µA
I_F	DC Forward Current		Tc =60°C		240		A
V_F	Diode Forward Voltage	I_F = 240A			2.5	3.5	V
		I_F = 480A			3		
		I_F = 240A	T_j = 125°C		1.8		
t_{rr}	Reverse Recovery Time	I_F = 240A V_R = 800V di/dt = 800A/µs	T_j = 25°C		265		ns
			T_j = 125°C		350		
Q_{rr}	Reverse Recovery Charge		T_j = 25°C		2.24		µC
			T_j = 125°C		11.6		
R_{thJC}	Junction to Case Thermal Resistance					0.17	°C/W

Thermal and package characteristics

Symbol	*Characteristic*			*Min*	*Max*	*Unit*
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_{JOP}	Recommended junction temperature under switching conditions			-40	$T_J$max -25	
T_{STG}	Storage Temperature Range			-40	125	
T_C	Operating Case Temperature			-40	125	
Torque	Mounting torque	To heatsink	M6	3	5	N.m
		For terminals	M5	2	3.5	
Wt	Package Weight				300	g

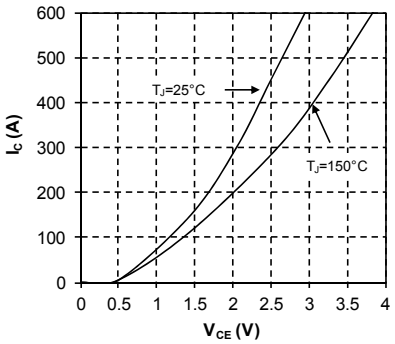
Package outline (dimensions in mm)



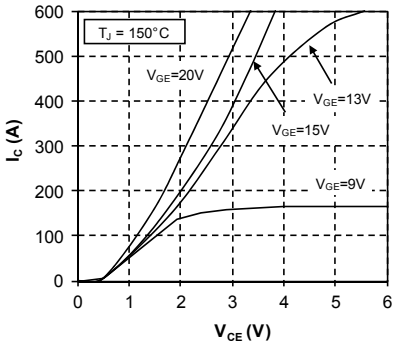
See application note APT0601 - Mounting Instructions for SP6 Power Modules on www.microsemi.com

Typical Performance Curve

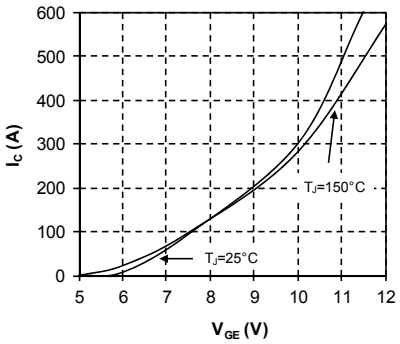
Output Characteristics (V_{GE}=15V)



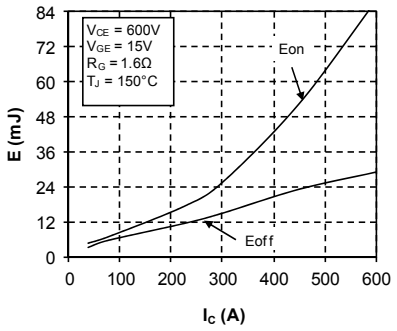
Output Characteristics



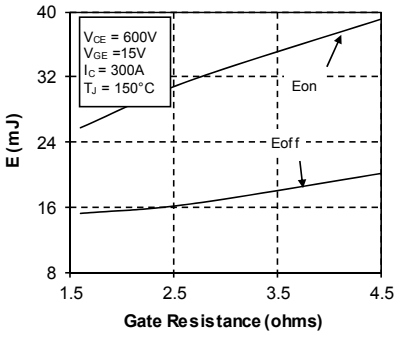
Transfert Characteristics



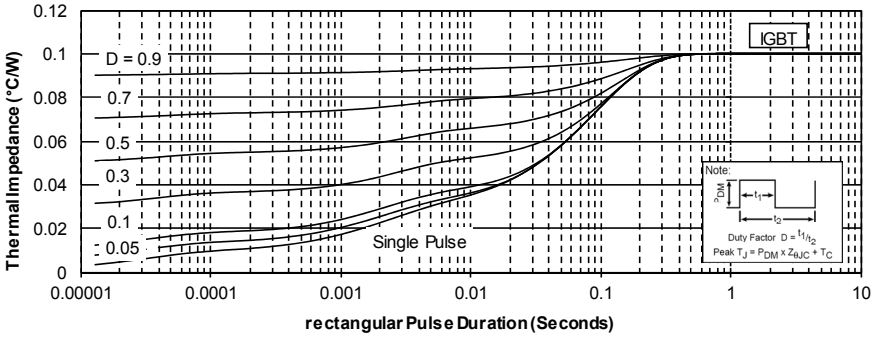
Energy losses vs Collector Current

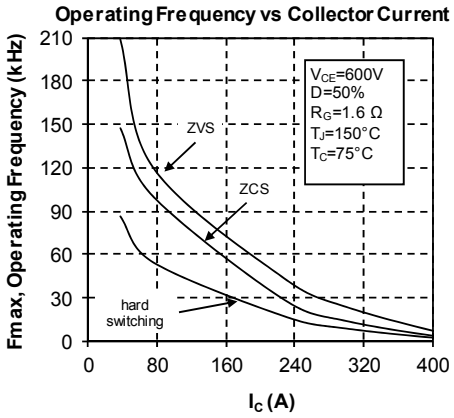


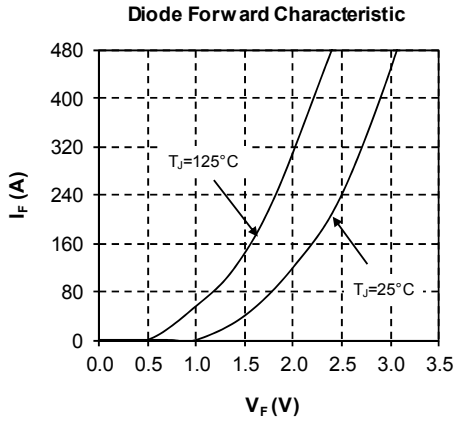
Switching Energy Losses vs Gate Resistance

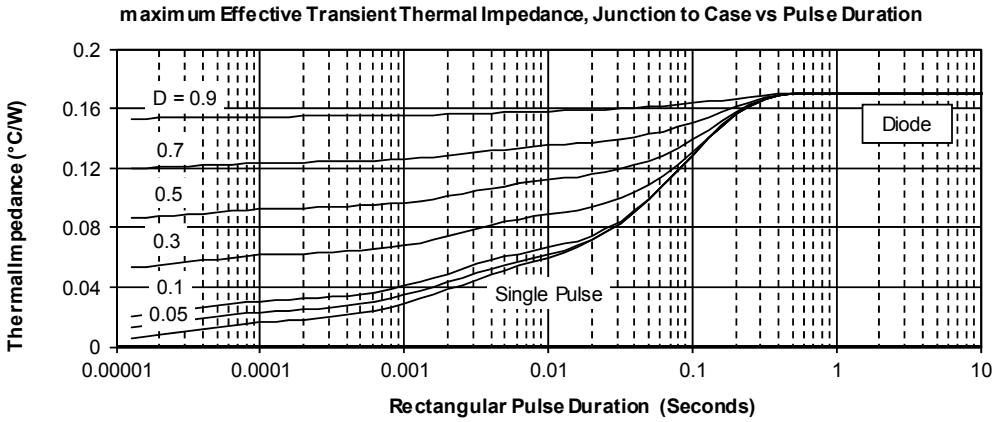


maximum Effective Transient Thermal Impedance, Junction to Case vs Pulse Duration









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