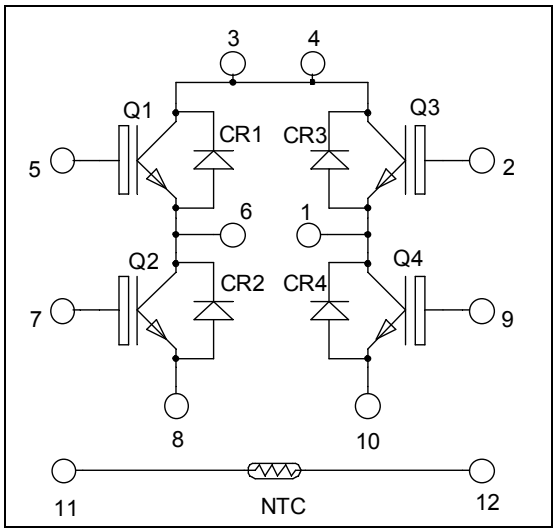
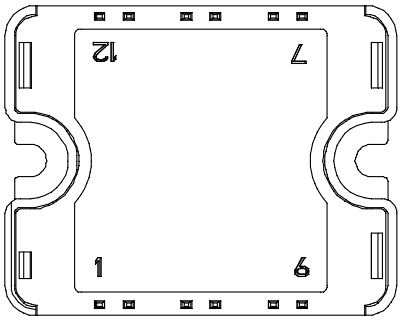
APTGLQ75H65T1G

Full bridge
High speed Trench + Field Stop IGBT4
Power Module

V_{CES} = 650V
I_C = 75A @ Tc = 60°C





Pins 3/4 must be shorted together

Application

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

Features

- ***High speed Trench + Field Stop IGBT 4 Technology***
  - Low voltage drop
  - Low leakage current
  - Low switching losses
  - RBSOA and SCSOA rated
- Very low stray inductance
- High level of integration
- Internal thermistor for temperature monitoring

Benefits

- Outstanding performance at high frequency operation
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Solderable terminals both for power and signal for easy PCB mounting
- 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		650	V
I_C	Continuous Collector Current	T_C = 25°C	100	A
		T_C = 60°C	75	
I_{CM}	Pulsed Collector Current	T_C = 25°C	200	
V_{GE}	Gate – Emitter Voltage		±20	V
P_D	Maximum Power Dissipation		250	W
RBSOA	Reverse Bias Safe Operating Area	T_j = 150°C	150A @ 600V	

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

Electrical Characteristics (per IGBT)

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
I_{CES}	Zero Gate Voltage Collector Current	V_{GE} = 0V, V_{CE} = 650V				100	µA
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	V_{GE} =15V I_C = 75A	T_j = 25°C		1.85	2.3	V
			T_j = 150°C		2.2		
$V_{GE(th)}$	Gate Threshold Voltage	V_{GE} = V_{CE} , I_C = 1.2 mA		4.2	5.1	5.6	V
I_{GES}	Gate – Emitter Leakage Current	V_{GE} = 20V, V_{CE} = 0V				200	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			4620		pF
C_{oes}	Output Capacitance				160		
C_{res}	Reverse Transfer Capacitance				137		
Q_G	Gate charge	V_{GE} = 15V, I_C = 75A V_{CE} = 480V			440		nC
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) V_{GE} = ±15V V_{Bus} = 400V I_C = 75A R_G = 5Ω			19		ns
T_r	Rise Time				33		
$T_{d(off)}$	Turn-off Delay Time				197		
T_f	Fall Time				21		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (150°C) V_{GE} = ±15V V_{Bus} = 400V I_C = 75A R_G = 5Ω			19		ns
T_r	Rise Time				29		
$T_{d(off)}$	Turn-off Delay Time				227		
T_f	Fall Time				22		
E_{on}	Turn on Energy	V_{GE} = ±15V V_{Bus} = 400V I_C = 75A R_G = 5Ω	T_j = 25°C		1.5		mJ
			T_j = 150°C		1.8		
E_{off}	Turn off Energy		T_j = 25°C		1.25		
			T_j = 150°C		1.4		
I_{sc}	Short Circuit data	V_{GE} ≤15V ; V_{Bus} = 400V t_p ≤5µs ; T_j = 150°C			500		A
R_{thJC}	Junction to Case Thermal Resistance					0.6	°C/W

Diode ratings and characteristics (per diode)

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
V_{RRM}	Peak Repetitive Reverse Voltage					650	V
I_{RM}	Reverse Leakage Current	V_R = 650V				100	µA
I_F	DC Forward Current		Tc = 25°C		75		A
V_F	Diode Forward Voltage	I_F = 75A V_{GE} = 0V	T_j = 25°C		1.6	2	V
			T_j = 150°C		1.5		
t_{rr}	Reverse Recovery Time	I_F = 75A V_R = 400V di/dt =2000A/µs	T_j = 25°C		100		ns
			T_j = 150°C		150		
Q_{rr}	Reverse Recovery Charge		T_j = 25°C		3.6		µC
			T_j = 150°C		7.6		
E_{rr}	Reverse Recovery Energy		T_j = 25°C		0.85		mJ
			T_j = 150°C		1.8		
R_{thJC}	Junction to Case Thermal Resistance					0.98	°C/W

Temperature sensor NTC (see application note APT0406 on www.microsemi.com).

Symbol	Characteristic		Min	Typ	Max	Unit
R_{25}	Resistance @ 25°C			50		kΩ
$\Delta R_{25}/R_{25}$				5		%
$B_{25/85}$	T_{25} = 298.15 K			3952		K
$\Delta B/B$		T_C=100°C		4		%

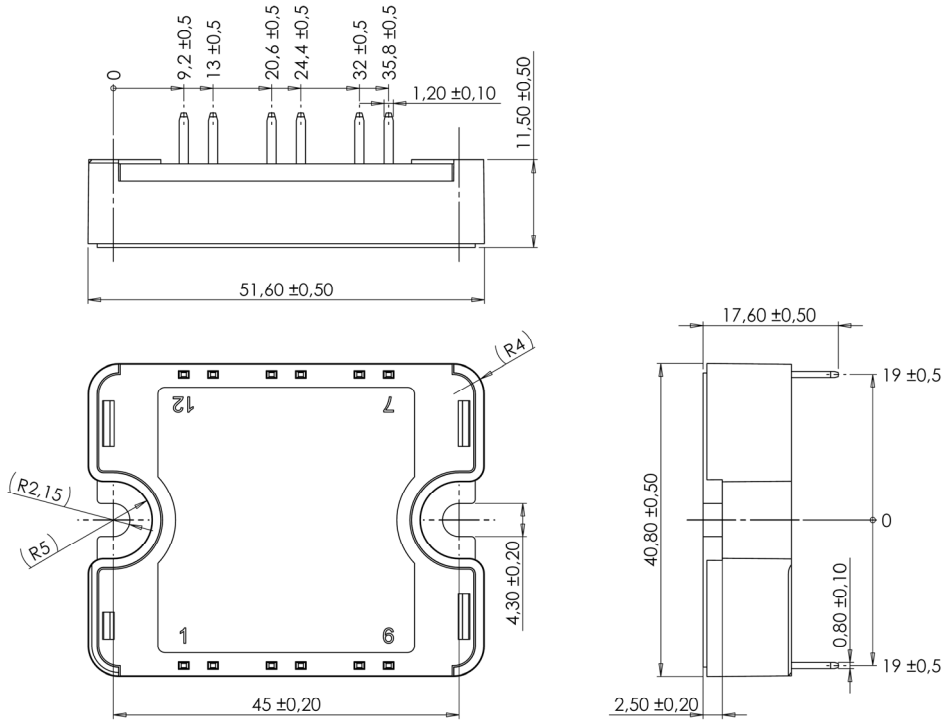
$$R_T = \frac{R_{25}}{\exp\left[B_{25/85}\left(\frac{1}{T_{25}} - \frac{1}{T}\right)\right]}$$

T: Thermistor temperature
R_T: Thermistor value at T

Thermal and package characteristics

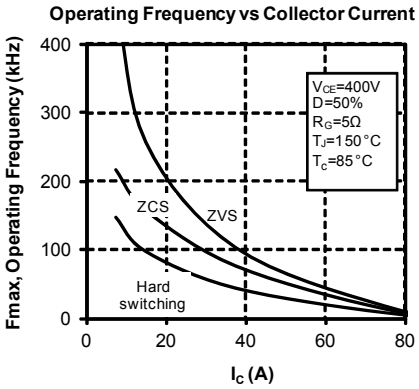
Symbol	Characteristic			Min	Max	Unit
V_{ISOL}	RMS Isolation Voltage, any terminal to case t =1 min, 50/60Hz			4000		V
T_J	Operating junction temperature range			-40	175	°C
T_{JOP}	Recommended junction temperature under switching conditions			-40	$T_J$max -25	
T_{STG}	Storage Temperature Range			-40	125	
T_C	Operating Case Temperature			-40	100	
Torque	Mounting torque	To heatsink	M4	2	3	N.m
Wt	Package Weight				80	g

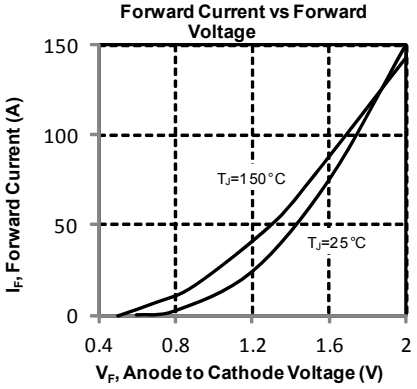
Package outline (dimensions in mm)

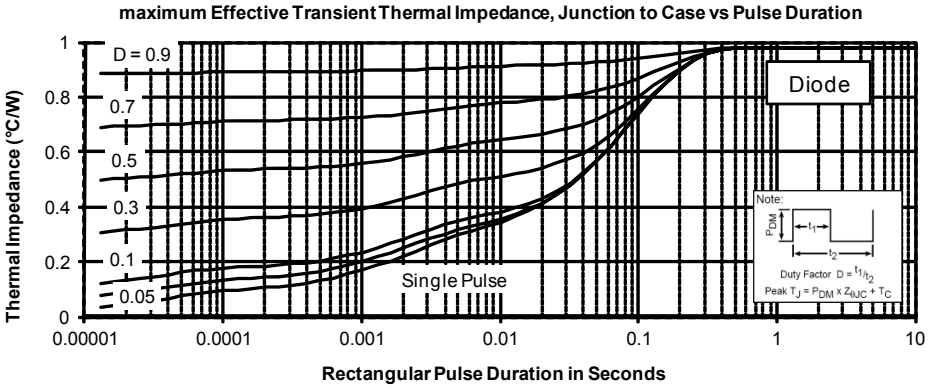


See application note 1904 - Mounting Instructions for SP1 Power Modules on www.microsemi.com

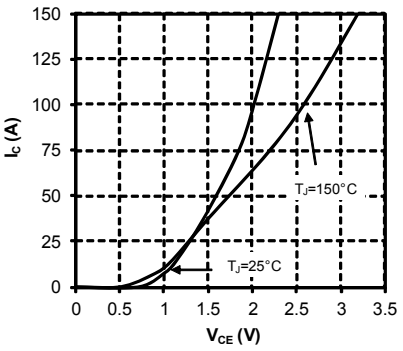
Typical performance curve



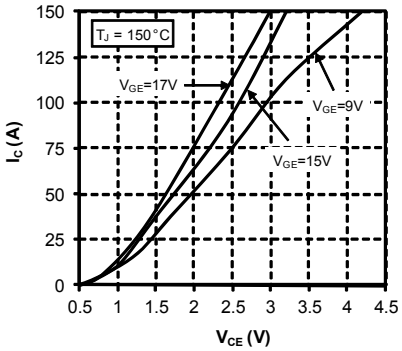




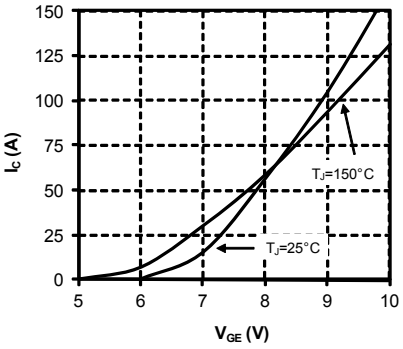
Output Characteristics (V_{GE}=15V)



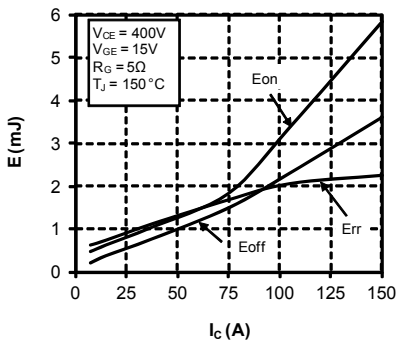
Output Characteristics



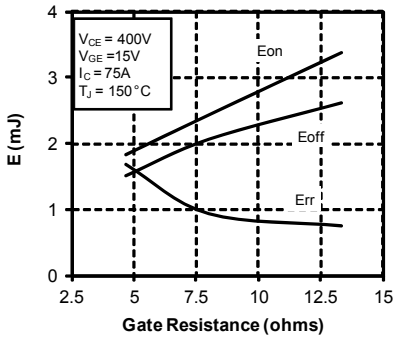
Transfert Characteristics



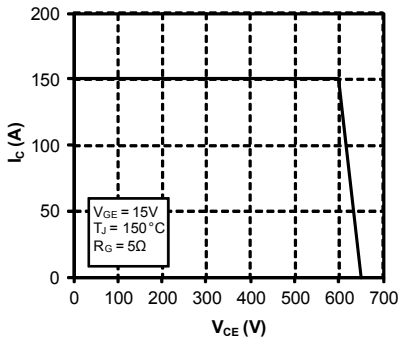
Energy losses vs Collector Current



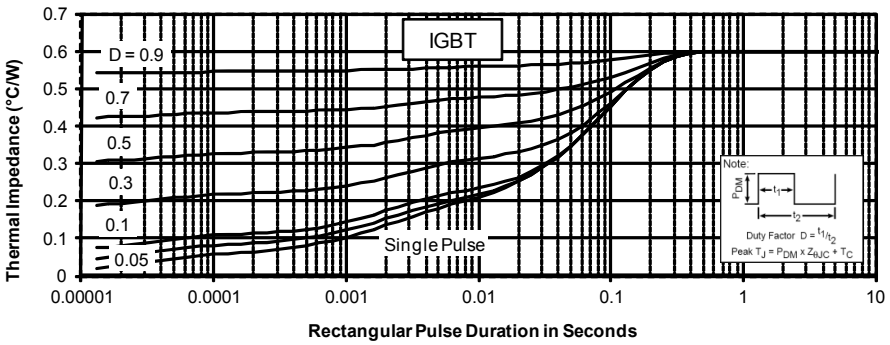
Switching Energy Losses vs Gate Resistance



Reverse Bias Safe Operating Area



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



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