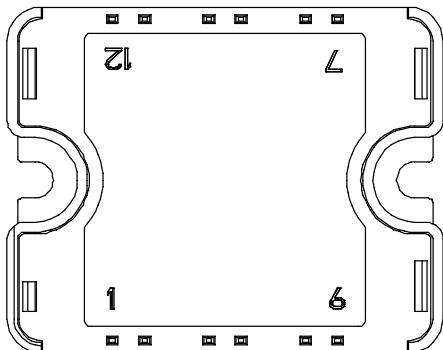
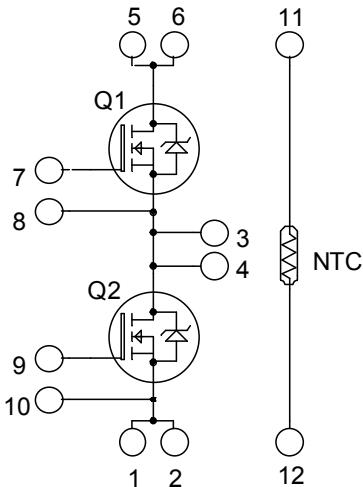


*Phase leg*  
*Super Junction MOSFET*  
*Power Module*

**V<sub>DSS</sub> = 600V**  
**R<sub>DSon</sub> = 70mΩ max @ T<sub>j</sub> = 25°C**  
**I<sub>D</sub> = 39A @ T<sub>c</sub> = 25°C**



Pins 1/2 ; 3/4 ; 5/6 must be shorted together

#### Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V <sub>DSS</sub>	Drain - Source Breakdown Voltage	600	V
I <sub>D</sub>	Continuous Drain Current	T <sub>c</sub> = 25°C	A
		T <sub>c</sub> = 80°C	
I <sub>DM</sub>	Pulsed Drain current	160	
V <sub>GS</sub>	Gate - Source Voltage	±20	V
R <sub>DSon</sub>	Drain - Source ON Resistance	70	mΩ
P <sub>D</sub>	Maximum Power Dissipation	T <sub>c</sub> = 25°C	W
I <sub>AR</sub>	Avalanche current (repetitive and non repetitive)		
E <sub>AR</sub>	Repetitive Avalanche Energy	1	mJ
E <sub>AS</sub>	Single Pulse Avalanche Energy	1800	

 **CAUTION:** These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed. See application note APT0502 on [www.microsemi.com](http://www.microsemi.com)

All ratings @  $T_j = 25^\circ\text{C}$  unless otherwise specified

### Electrical Characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{GS} = 0\text{V}$ , $V_{DS} = 600\text{V}$	$T_j = 25^\circ\text{C}$			25	$\mu\text{A}$
		$V_{GS} = 0\text{V}$ , $V_{DS} = 600\text{V}$	$T_j = 125^\circ\text{C}$			250	
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10\text{V}$ , $I_D = 39\text{A}$				70	$\text{m}\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}$ , $I_D = 2.7\text{mA}$		2.1	3	3.9	$\text{V}$
$I_{GSS}$	Gate – Source Leakage Current	$V_{GS} = \pm 20\text{ V}$ , $V_{DS} = 0\text{V}$				$\pm 100$	$\text{nA}$

### Dynamic Characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
$C_{iss}$	Input Capacitance	$V_{GS} = 0\text{V}$ $V_{DS} = 25\text{V}$ $f = 1\text{MHz}$			7		$\text{nF}$
$C_{oss}$	Output Capacitance				2.56		
$C_{rss}$	Reverse Transfer Capacitance				0.21		
$Q_g$	Total gate Charge	$V_{GS} = 10\text{V}$ $V_{Bus} = 300\text{V}$ $I_D = 39\text{A}$			259		$\text{nC}$
$Q_{gs}$	Gate – Source Charge				29		
$Q_{gd}$	Gate – Drain Charge				111		
$T_{d(on)}$	Turn-on Delay Time	<b>Inductive Switching @ 125°C</b> $V_{GS} = 15\text{V}$ $V_{Bus} = 400\text{V}$ $I_D = 39\text{A}$ $R_G = 5\Omega$			21		$\text{ns}$
$T_r$	Rise Time				30		
$T_{d(off)}$	Turn-off Delay Time				283		
$T_f$	Fall Time				84		
$E_{on}$	Turn-on Switching Energy	<b>Inductive switching @ 25°C</b> $V_{GS} = 15\text{V}$ , $V_{Bus} = 400\text{V}$ $I_D = 39\text{A}$ , $R_G = 5\Omega$			670		$\mu\text{J}$
$E_{off}$	Turn-off Switching Energy				980		
$E_{on}$	Turn-on Switching Energy	<b>Inductive switching @ 125°C</b> $V_{GS} = 15\text{V}$ , $V_{Bus} = 400\text{V}$ $I_D = 39\text{A}$ , $R_G = 5\Omega$			1096		$\mu\text{J}$
$E_{off}$	Turn-off Switching Energy				1206		

### Source - Drain diode ratings and characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
$I_S$	Continuous Source current (Body diode)		$T_c = 25^\circ\text{C}$		39		$\text{A}$
			$T_c = 80^\circ\text{C}$		29		
$V_{SD}$	Diode Forward Voltage	$V_{GS} = 0\text{V}$ , $I_S = - 39\text{A}$				1.2	$\text{V}$
$dv/dt$	Peak Diode Recovery ①					6	$\text{V/ns}$
$t_{rr}$	Reverse Recovery Time	$I_S = - 39\text{A}$ $V_R = 350\text{V}$ $di_S/dt = 100\text{A}/\mu\text{s}$		$T_j = 25^\circ\text{C}$		580	$\text{ns}$
$Q_{rr}$	Reverse Recovery Charge			$T_j = 25^\circ\text{C}$		23	$\mu\text{C}$

①  $dv/dt$  numbers reflect the limitations of the circuit rather than the device itself.

$I_S \leq - 39\text{A}$     $di/dt \leq 100\text{A}/\mu\text{s}$     $V_R \leq V_{DSS}$     $T_j \leq 150^\circ\text{C}$

August, 2007

APTC60AM70T1G – Rev 0

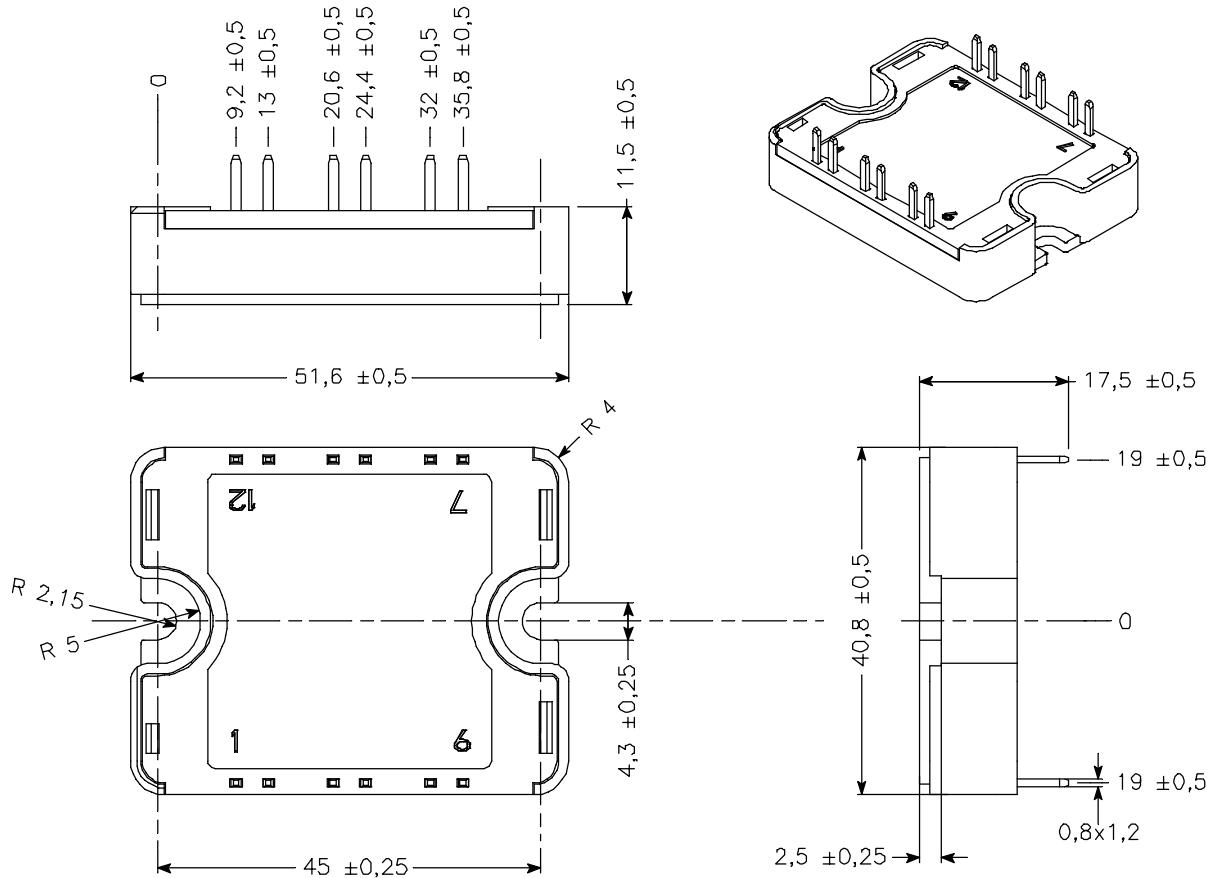
**Thermal and package characteristics**

Symbol	Characteristic		Min	Typ	Max	Unit
R <sub>thJC</sub>	Junction to Case Thermal Resistance			0.5	0.5	°C/W
V <sub>ISOL</sub>	RMS Isolation Voltage, any terminal to case t=1 min, I isol<1mA, 50/60Hz	2500				V
T <sub>J</sub>	Operating junction temperature range	-40		150		°C
T <sub>STG</sub>	Storage Temperature Range	-40		125		
T <sub>C</sub>	Operating Case Temperature	-40		100		
Torque	Mounting torque	To heatsink	M4	2.5	4.7	N.m
Wt	Package Weight			80	80	g

**Temperature sensor NTC** (see application note APT0406 on www.microsemi.com for more information).

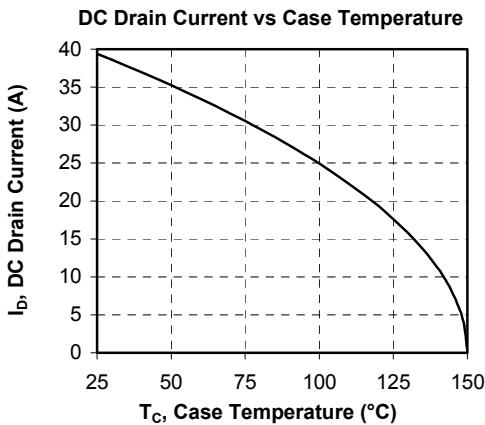
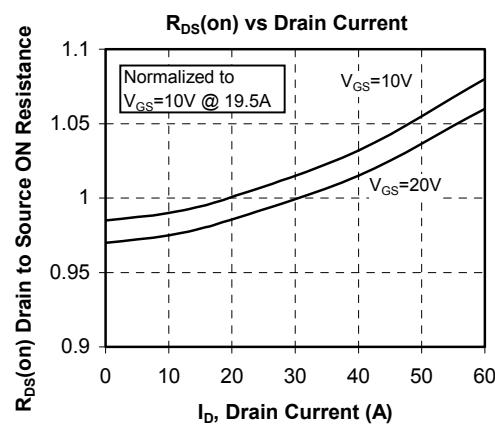
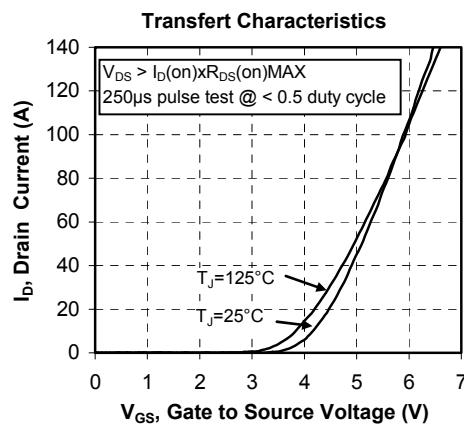
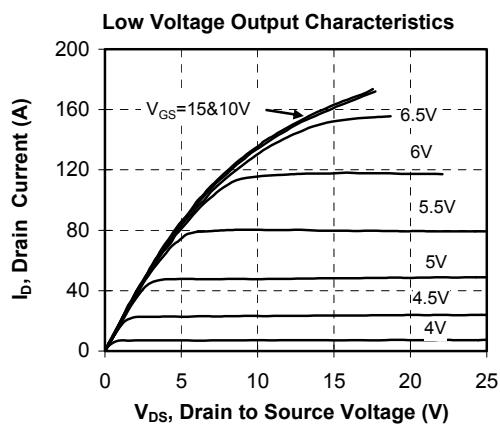
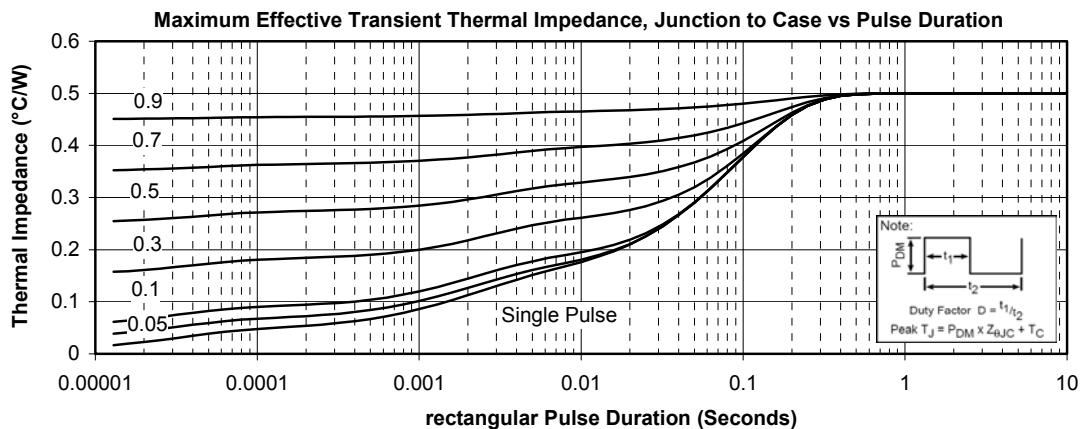
Symbol	Characteristic		Min	Typ	Max	Unit
R <sub>25</sub>	Resistance @ 25°C			50		kΩ
B <sub>25/85</sub>	T <sub>25</sub> = 298.15 K			3952		K

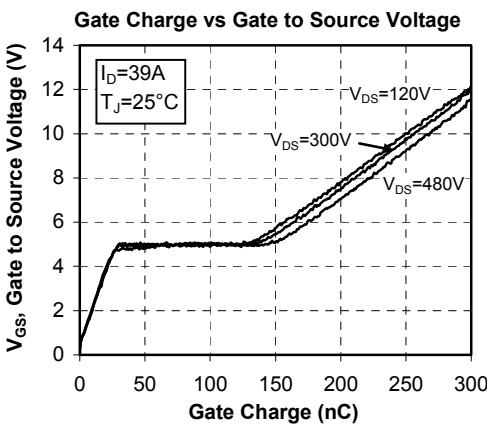
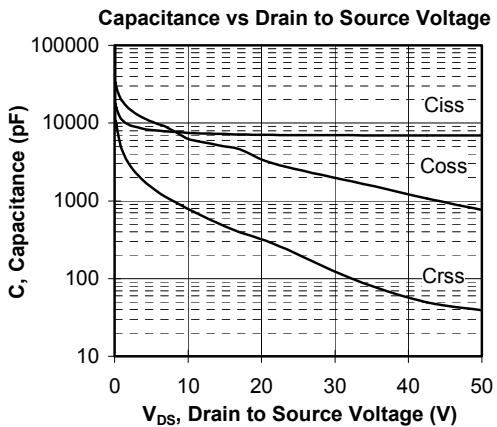
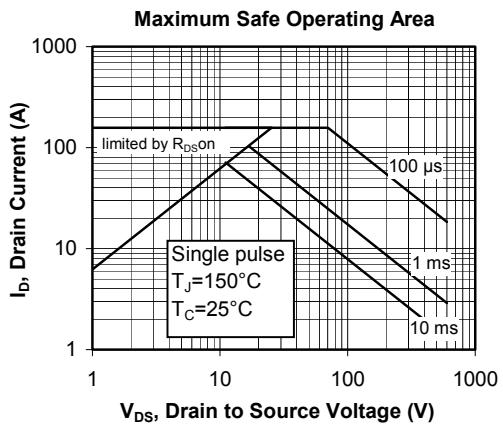
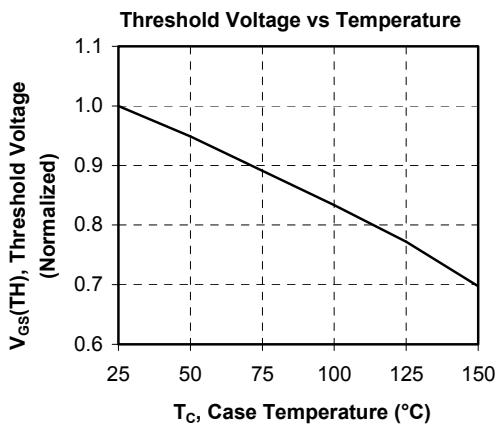
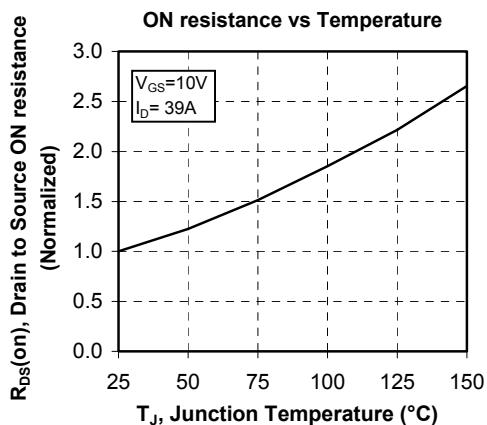
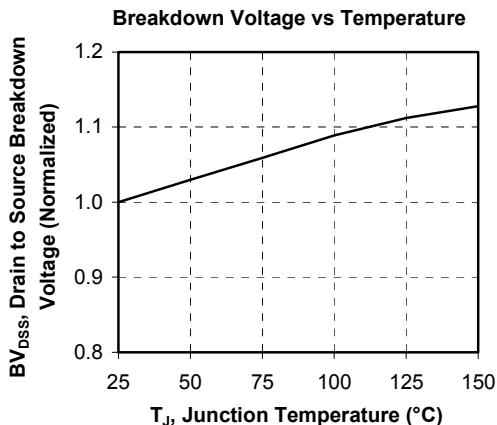
$$R_T = \frac{R_{25}}{\exp\left[B_{25/85}\left(\frac{1}{T_{25}} - \frac{1}{T}\right)\right]} \quad T: \text{ Thermistor temperature} \\ R_T: \text{ Thermistor value at } T$$

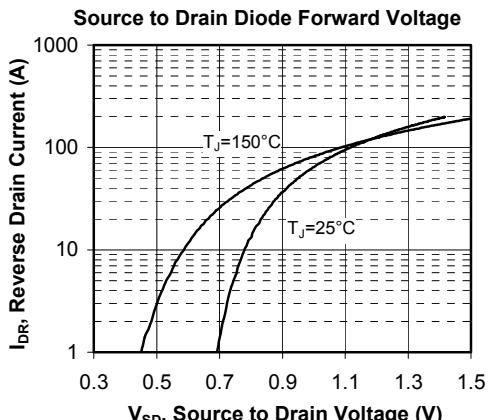
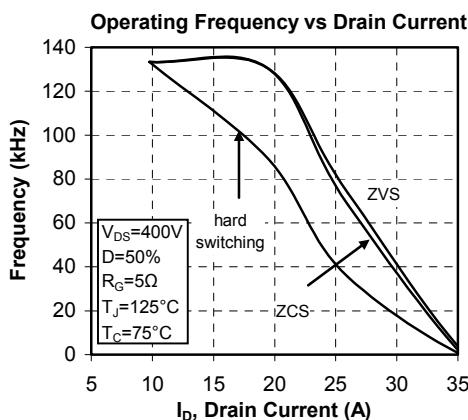
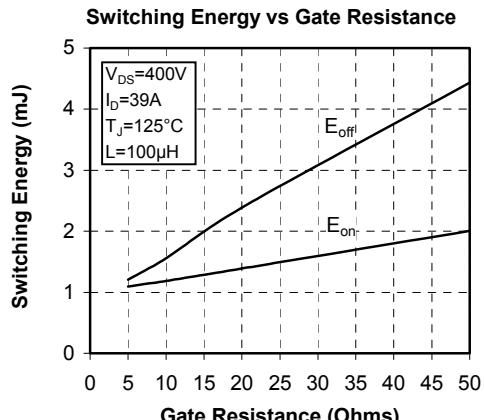
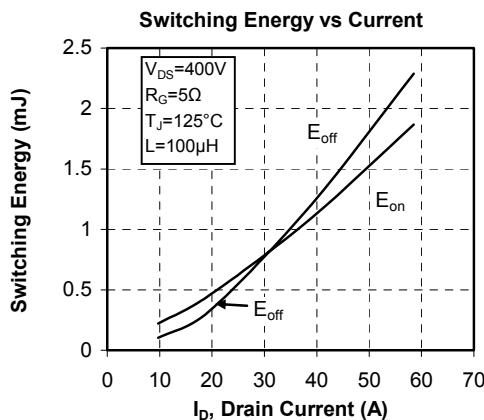
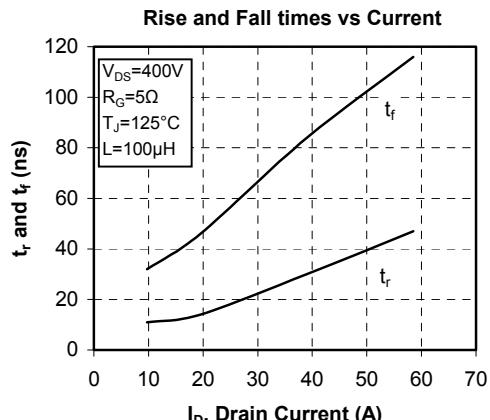
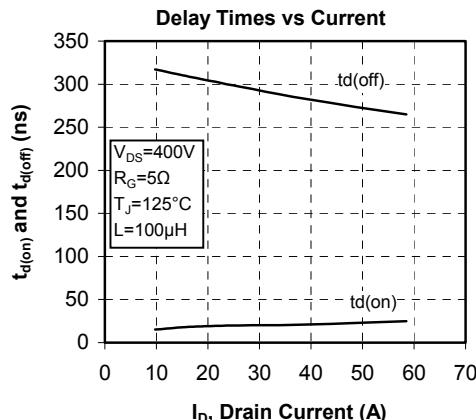
**SP1 Package outline** (dimensions in mm)


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

### Typical Performance Curve







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