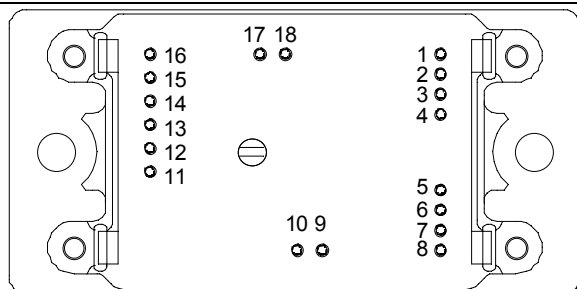
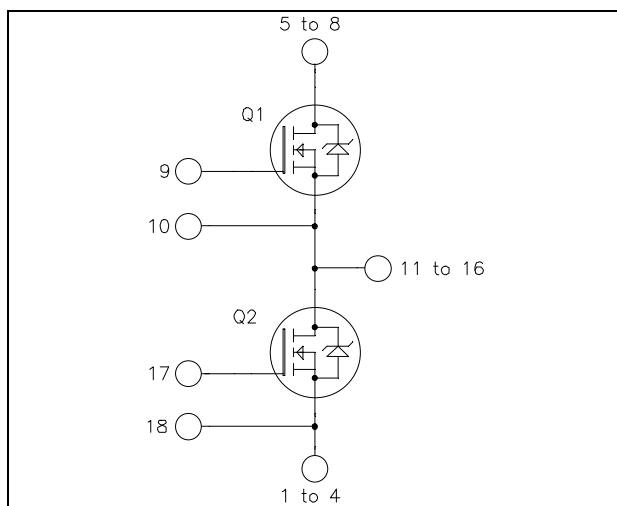


## Phase leg Super Junction MOSFET Power Module

$$V_{DSS} = 600V$$

$$R_{DSon} = 24m\Omega \text{ max @ } T_j = 25^\circ C$$

$$I_D = 95A \text{ @ } T_c = 25^\circ C$$



Pins 1/2/3/4 ; 5/6/7/8 ; 11/12/13/14/15/16  
must be shorted together

### Application

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

### Features

- CoolMOST™
  - Ultra low  $R_{DSon}$
  - Low Miller capacitance
  - Ultra low gate charge
  - Avalanche energy rated
  - Very rugged
- Very low stray inductance
- Kelvin source for easy drive
- High level of integration

### Benefits

- Outstanding performance at high frequency operation
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Low profile
- RoHS Compliant

**All ratings @  $T_j = 25^\circ C$  unless otherwise specified**

### Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
$V_{DSS}$	Drain - Source Breakdown Voltage	600	V
$I_D$	Continuous Drain Current	$T_c = 25^\circ C$	95
		$T_c = 80^\circ C$	70
$I_{DM}$	Pulsed Drain current	260	A
$V_{GS}$	Gate - Source Voltage	$\pm 20$	V
$R_{DSon}$	Drain - Source ON Resistance	24	$m\Omega$
$P_D$	Maximum Power Dissipation	$T_c = 25^\circ C$	462
$I_{AR}$	Avalanche current (repetitive and non repetitive)	15	A
$E_{AR}$	Repetitive Avalanche Energy	3	mJ
$E_{AS}$	Single Pulse Avalanche Energy	1900	

**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)

**Electrical Characteristics**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{GS} = 0V, V_{DS} = 600V$			350	$\mu A$
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10V, I_D = 47.5A$			24	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 5mA$	2.1	3	3.9	V
$I_{GSS}$	Gate – Source Leakage Current	$V_{GS} = \pm 20V, V_{DS} = 0V$			200	nA

**Dynamic Characteristics**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$C_{iss}$	Input Capacitance	$V_{GS} = 0V; V_{DS} = 25V$		14.4		nF
$C_{oss}$	Output Capacitance	$f = 1MHz$		17		
$Q_g$	Total gate Charge	$V_{GS} = 10V$ $V_{Bus} = 300V$ $I_D = 95A$		300		nC
$Q_{gs}$	Gate – Source Charge			68		
$Q_{gd}$	Gate – Drain Charge			102		
$T_{d(on)}$	Turn-on Delay Time	<b>Inductive Switching (125°C)</b> $V_{GS} = 10V$ $V_{Bus} = 400V$ $I_D = 95A$ $R_G = 2.5\Omega$		21		ns
$T_r$	Rise Time			30		
$T_{d(off)}$	Turn-off Delay Time			100		
$T_f$	Fall Time			45		
$E_{off}$	Turn-off Switching Energy	<b>Inductive switching</b> $V_{GS} = 10V; V_{Bus} = 400V$ $I_D = 95A; R_G = 2.5\Omega$	$T_j = 25^\circ C$	1040		$\mu J$
			$T_j = 125^\circ C$	1270		
$R_{thJC}$	Junction to Case Thermal Resistance				0.27	$^\circ C/W$

**Source - Drain diode ratings and characteristics**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$I_S$	Continuous Source current (Body diode)	$T_c = 25^\circ C$		95		A
		$T_c = 80^\circ C$		70		
$V_{SD}$	Diode Forward Voltage	$V_{GS} = 0V, I_S = -95A$			1.2	V
$dv/dt$	Peak Diode Recovery ❶				4	V/ns
$t_{rr}$	Reverse Recovery Time	$I_S = -95A$ $V_R = 350V$	$T_j = 25^\circ C$	600		ns
$Q_{rr}$	Reverse Recovery Charge	$di_S/dt = 200A/\mu s$	$T_j = 25^\circ C$	34		$\mu C$

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

$$I_S \leq -95A \quad di/dt \leq 200A/\mu s \quad V_R \leq V_{DSS} \quad T_j \leq 150^\circ C$$

**Thermal and package characteristics**

Symbol	Characteristic			Min	Typ	Max	Unit
V <sub>ISOL</sub>	RMS Isolation Voltage, any terminal to case t =1 min, 50/60Hz			4000			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		3	N.m
Wt	Package Weight					75	g



Technical drawing of a mechanical part, showing three views: Top View, Front View, and Side View. Dimensions are given in millimeters (mm) with tolerances.

**Top View Dimensions:**

- Overall Width:  $66 \pm 1$
- Overall Height:  $51 \pm 0.2$
- Distance between top holes:  $16.75 \pm 0.50$
- Distance between bottom holes:  $16.75 \pm 0.50$
- Distance between side holes:  $12.70 \pm 0.50$
- Distance between side holes:  $15.60 \pm 0.50$
- Distance between side holes:  $18.95 \pm 0.50$
- Distance between side holes:  $19.85 \pm 0.50$
- Distance between side holes:  $33.50 \pm 0.50$
- Overall Width (bottom):  $55 \pm 0.20$
- Overall Height (left):  $22.50 \pm 0.50$
- Overall Height (left):  $19.80 \pm 0.50$
- Overall Height (left):  $17.10 \pm 0.50$
- Overall Height (left):  $14.40 \pm 0.50$
- Overall Height (left):  $11.70 \pm 0.50$
- Overall Height (left):  $9 \pm 0.50$
- Overall Height (left):  $11.25 \pm 0.50$
- Overall Height (right):  $22.50 \pm 0.50$
- Overall Height (right):  $20.20 \pm 0.50$
- Overall Height (right):  $17.90 \pm 0.50$
- Overall Height (right):  $15.60 \pm 0.50$
- Overall Height (right):  $6.90 \pm 0.50$
- Overall Height (right):  $4.60 \pm 0.50$
- Overall Height (right):  $2.30 \pm 0.50$
- Overall Height (right):  $0$

**Front View Dimensions:**

- Overall Width:  $66 \pm 1$
- Overall Height:  $21 \pm 0.50$
- Distance between top holes:  $16.75 \pm 0.50$
- Distance between bottom holes:  $16.75 \pm 0.50$
- Distance between side holes:  $12.70 \pm 0.50$
- Distance between side holes:  $15.60 \pm 0.50$
- Distance between side holes:  $18.95 \pm 0.50$
- Distance between side holes:  $19.85 \pm 0.50$
- Distance between side holes:  $33.50 \pm 0.50$
- Overall Width (bottom):  $55 \pm 0.20$
- Overall Height (left):  $22.50 \pm 0.50$
- Overall Height (left):  $19.80 \pm 0.50$
- Overall Height (left):  $17.10 \pm 0.50$
- Overall Height (left):  $14.40 \pm 0.50$
- Overall Height (left):  $11.70 \pm 0.50$
- Overall Height (left):  $9 \pm 0.50$
- Overall Height (left):  $11.25 \pm 0.50$
- Overall Height (right):  $22.50 \pm 0.50$
- Overall Height (right):  $20.20 \pm 0.50$
- Overall Height (right):  $17.90 \pm 0.50$
- Overall Height (right):  $15.60 \pm 0.50$
- Overall Height (right):  $6.90 \pm 0.50$
- Overall Height (right):  $4.60 \pm 0.50$
- Overall Height (right):  $2.30 \pm 0.50$
- Overall Height (right):  $0$

**Side View Dimensions:**

- Overall Width:  $21.2 \pm 1$
- Overall Height:  $22.50 \pm 1$
- Distance between top holes:  $6 \pm 0.10$
- Distance between bottom holes:  $6 \pm 0.10$
- Distance between side holes:  $12.70 \pm 0.50$
- Distance between side holes:  $15.60 \pm 0.50$
- Distance between side holes:  $18.95 \pm 0.50$
- Distance between side holes:  $19.85 \pm 0.50$
- Distance between side holes:  $33.50 \pm 0.50$
- Overall Width (bottom):  $55 \pm 0.20$
- Overall Height (left):  $22.50 \pm 0.50$
- Overall Height (left):  $19.80 \pm 0.50$
- Overall Height (left):  $17.10 \pm 0.50$
- Overall Height (left):  $14.40 \pm 0.50$
- Overall Height (left):  $11.70 \pm 0.50$
- Overall Height (left):  $9 \pm 0.50$
- Overall Height (left):  $11.25 \pm 0.50$
- Overall Height (right):  $22.50 \pm 0.50$
- Overall Height (right):  $20.20 \pm 0.50$
- Overall Height (right):  $17.90 \pm 0.50$
- Overall Height (right):  $15.60 \pm 0.50$
- Overall Height (right):  $6.90 \pm 0.50$
- Overall Height (right):  $4.60 \pm 0.50$
- Overall Height (right):  $2.30 \pm 0.50$
- Overall Height (right):  $0$

**Maximum Effective Transient Thermal Impedance, Junction to Case vs Pulse Duration**

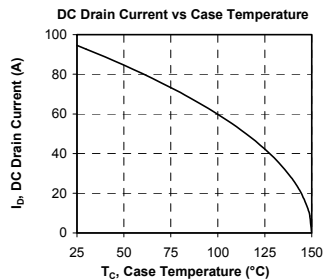
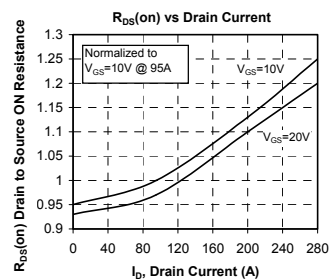
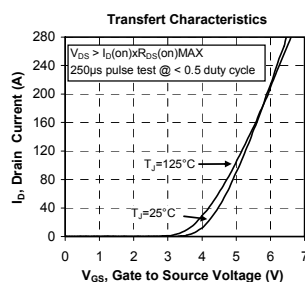
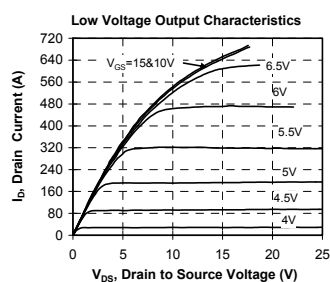
Thermal Impedance ( $^{\circ}\text{C}/\text{W}$ )

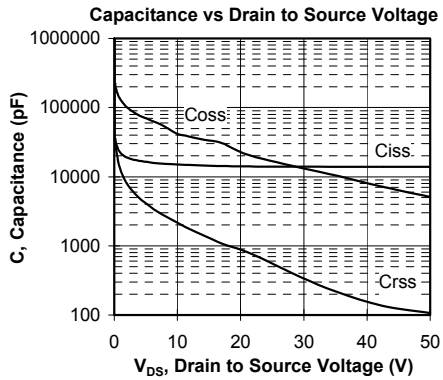
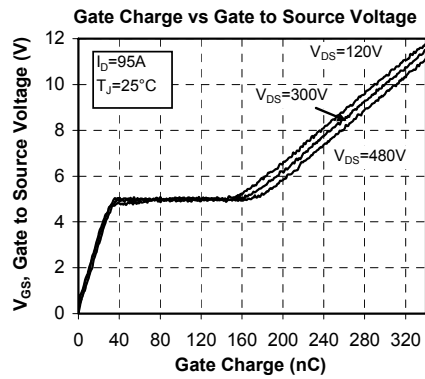
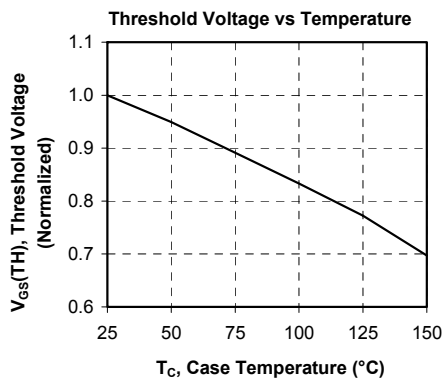
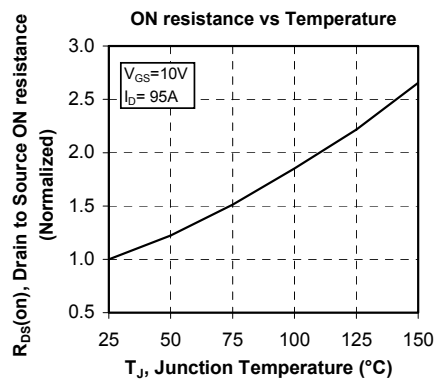
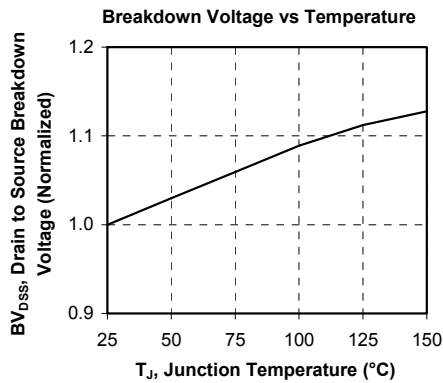
rectangular Pulse Duration (Seconds)

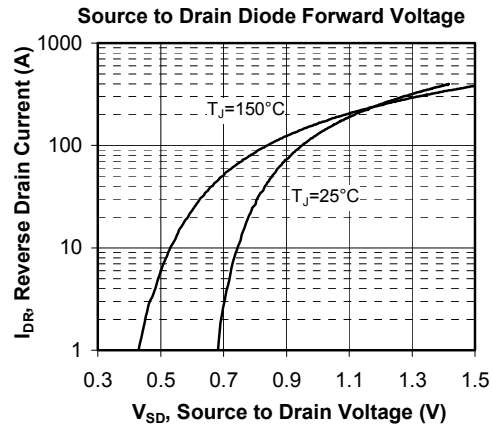
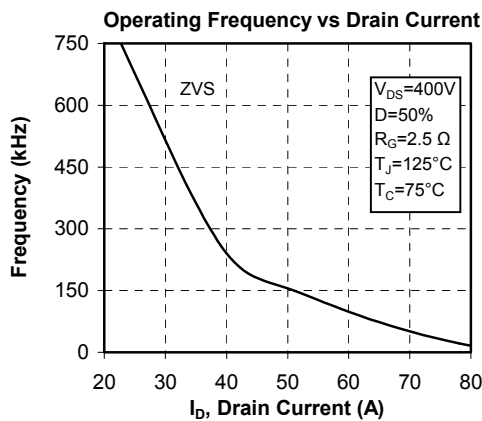
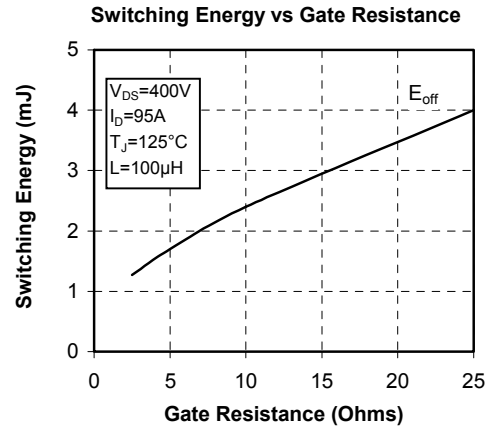
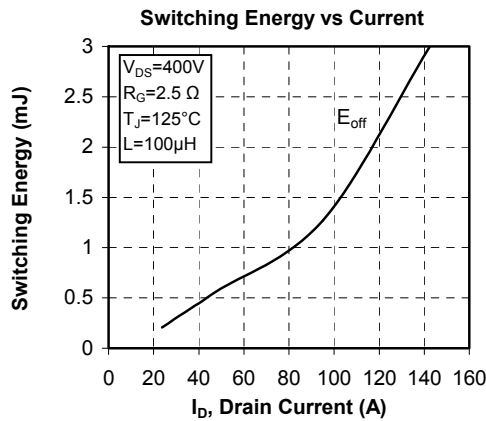
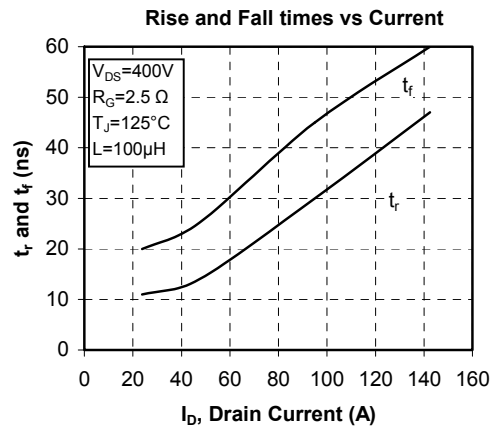
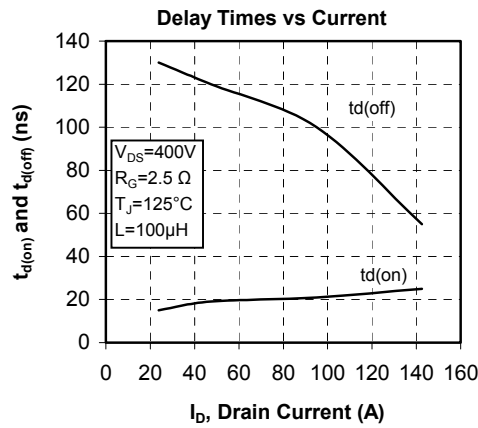
Note:

Duty Factor  $D = t_1/t_2$

Peak  $T_{jy} = P_{DM} \times Z_{\theta JA} \times T_C$







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