



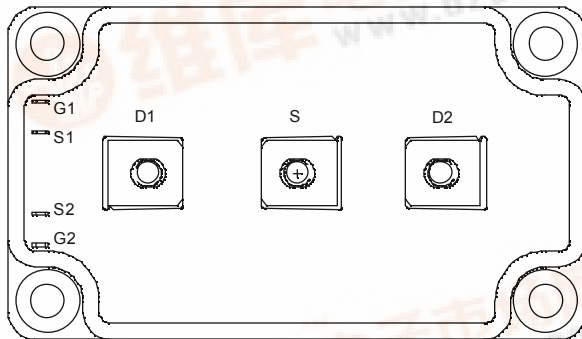
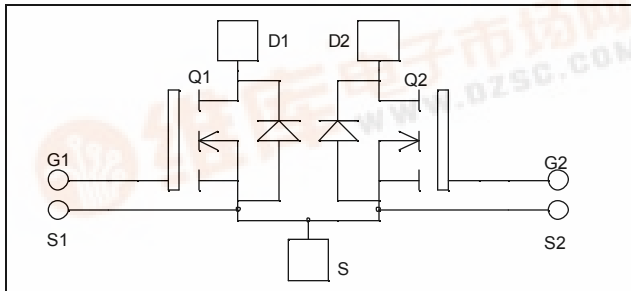
APT0502DUM90G

Dual Common Source MOSFET Power Module

$$V_{DSS} = 1000V$$

$$R_{DS(on)} = 90m\Omega \text{ typ @ } T_j = 25^\circ C$$

$$I_D = 78A @ T_c = 25^\circ C$$



Application

- AC Switches
- Switched Mode Power Supplies
- Uninterruptible Power Supplies

Features

- Power MOS 7[®] MOSFETs
 - Low $R_{DS(on)}$
 - Low input and Miller capacitance
 - Low gate charge
 - Avalanche energy rated
 - Very rugged
- Kelvin source for easy drive
- Very low stray inductance
 - Symmetrical design
 - M5 power connectors
- 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

Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{DSS}	Drain - Source Breakdown Voltage	1000	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$	A
		$T_c = 80^\circ C$	
I_{DM}	Pulsed Drain current	312	
V_{GS}	Gate - Source Voltage	± 30	V
$R_{DS(on)}$	Drain - Source ON Resistance	105	m Ω
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	W
I_{AR}	Avalanche current (repetitive and non repetitive)	25	A
E_{AR}	Repetitive Avalanche Energy	50	mJ
E_{AS}	Single Pulse Avalanche Energy	3000	

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	$V_{GS} = 0V, V_{DS} = 1000V$			400	μA
		$V_{GS} = 0V, V_{DS} = 800V$			2000	
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10V, I_D = 39A$		90	105	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 10mA$	3		5	V
I_{GSS}	Gate – Source Leakage Current	$V_{GS} = \pm 30V, V_{DS} = 0V$			± 250	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0V$		20.7		nF
C_{oss}	Output Capacitance	$V_{DS} = 25V$		3.5		
C_{rss}	Reverse Transfer Capacitance	$f = 1MHz$		0.64		
Q_g	Total gate Charge	$V_{GS} = 10V$		744		nC
Q_{gs}	Gate – Source Charge	$V_{Bus} = 500V$		96		
Q_{gd}	Gate – Drain Charge	$I_D = 78A$		488		
$T_{d(on)}$	Turn-on Delay Time	Inductive switching @ 125°C $V_{GS} = 15V$ $V_{Bus} = 670V$ $I_D = 78A$ $R_G = 1.2\Omega$		18		ns
T_r	Rise Time			12		
$T_{d(off)}$	Turn-off Delay Time			155		
T_f	Fall Time			40		
E_{on}	Turn-on Switching Energy	Inductive switching @ 25°C $V_{GS} = 15V, V_{Bus} = 670V$ $I_D = 78A, R_G = 1.2\Omega$		3.6		mJ
E_{off}	Turn-off Switching Energy			2.5		
E_{on}	Turn-on Switching Energy	Inductive switching @ 125°C $V_{GS} = 15V, V_{Bus} = 670V$ $I_D = 78A, R_G = 1.2\Omega$		5.7		mJ
E_{off}	Turn-off Switching Energy			3.1		

Source - Drain diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I_S	Continuous Source current (Body diode)	$T_c = 25^\circ\text{C}$			78	A
		$T_c = 80^\circ\text{C}$			59	
V_{SD}	Diode Forward Voltage	$V_{GS} = 0V, I_S = -78A$			1.3	V
dv/dt	Peak Diode Recovery ❶				10	V/ns
t_{rr}	Reverse Recovery Time	$I_S = -78A, V_R = 670V$		1170		ns
Q_{rr}	Reverse Recovery Charge	$di/dt = 400A/\mu s$		65.1		μC

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

$$I_S \leq -78A \quad di/dt \leq 700A/\mu s \quad V_R \leq V_{DSS} \quad T_j \leq 150^\circ\text{C}$$

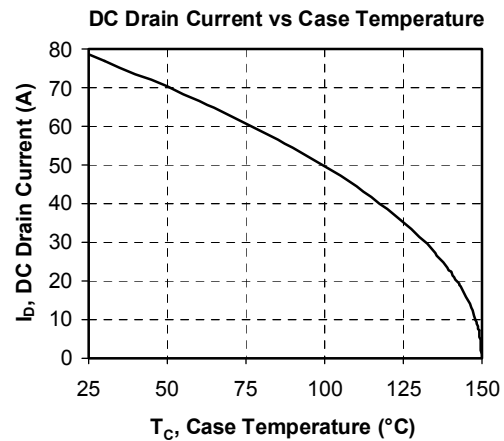
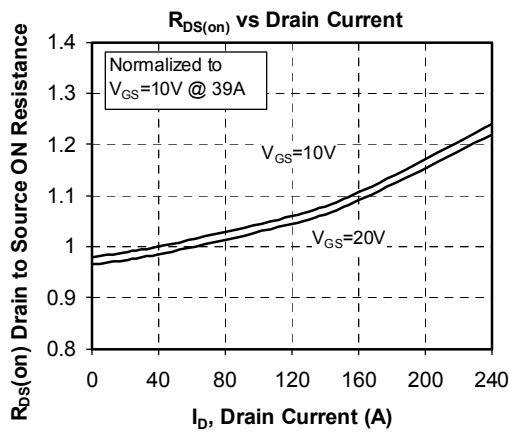
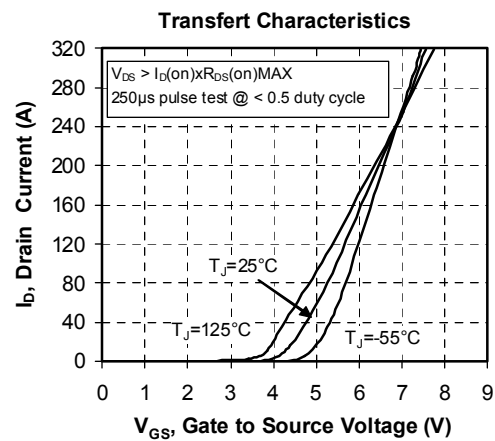
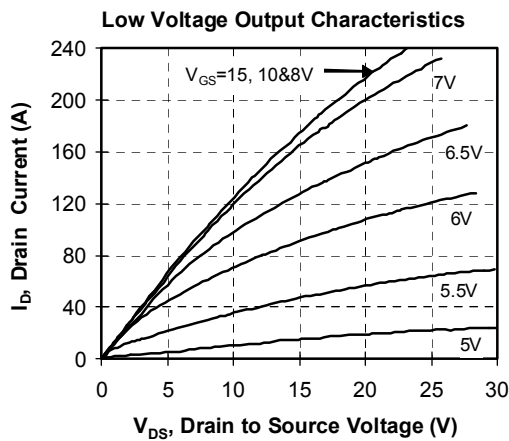
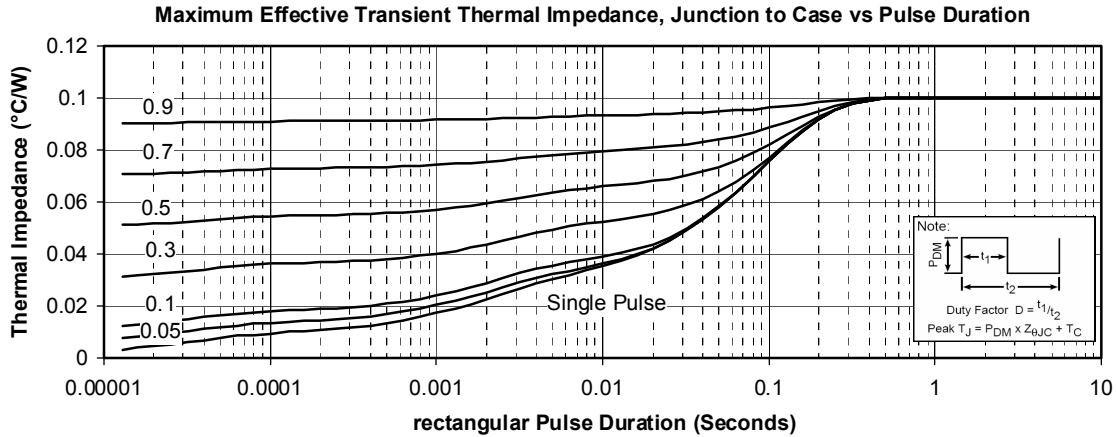


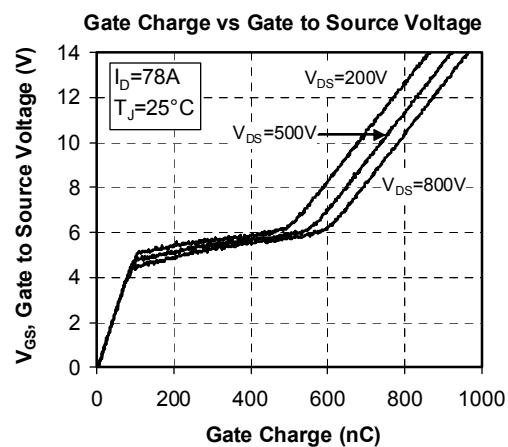
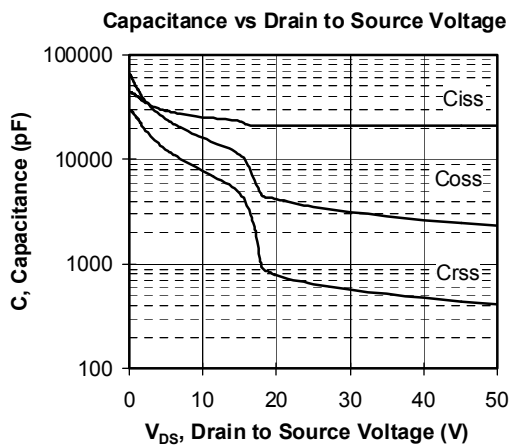
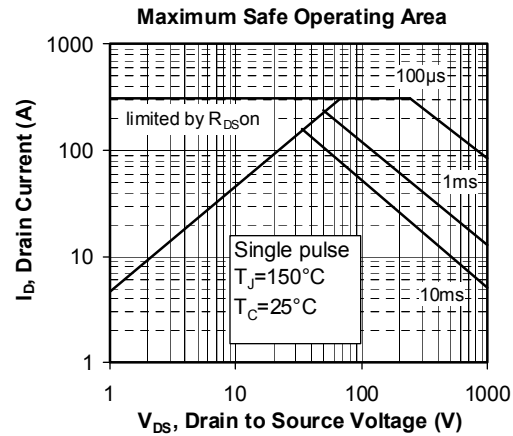
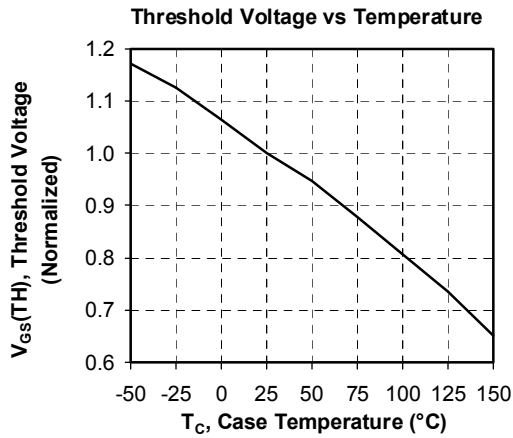
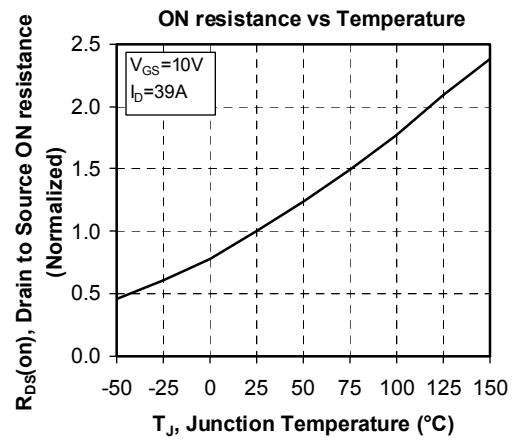
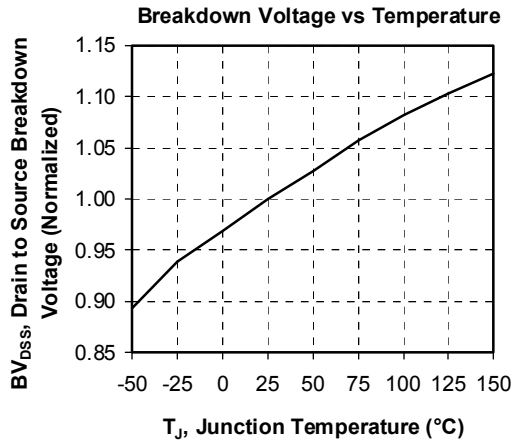
Symbol	Characteristic			Min	Typ	Max	Unit
R _{thJC}	Junction to Case Thermal Resistance					0.1	°C/W
V _{ISOL}	RMS Isolation Voltage, any terminal to case t =1 min, I isol<1mA, 50/60Hz			2500			V
T _J	Operating junction temperature range			-40		150	°C
T _{STG}	Storage Temperature Range			-40		125	
T _C	Operating Case Temperature			-40		100	
Torque	Mounting torque	To heatsink	M6	3		5	N.m
		For terminals	M5	2		3.5	
Wt	Package Weight					280	g

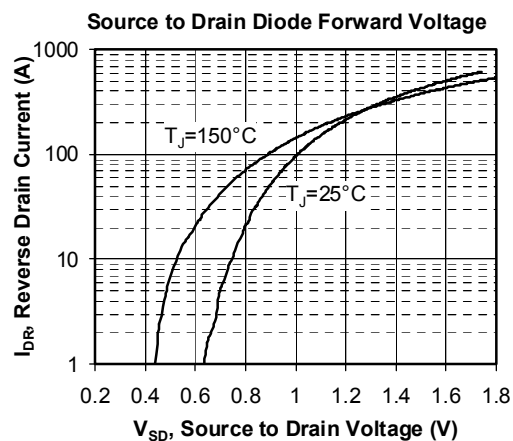
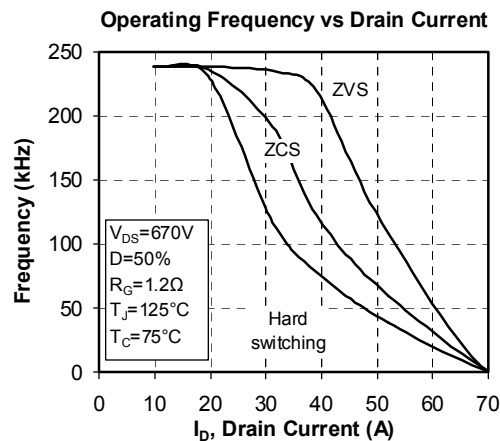
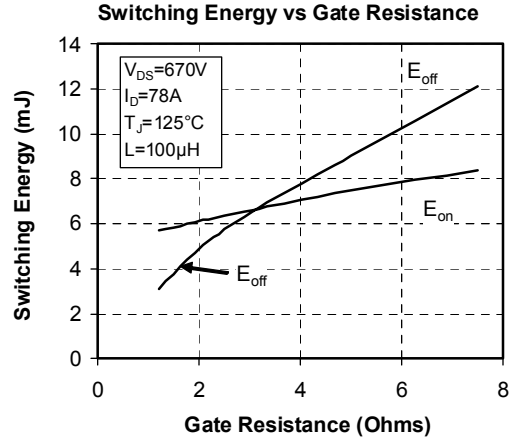
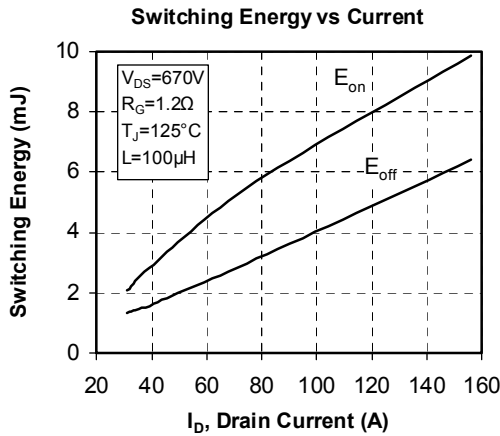
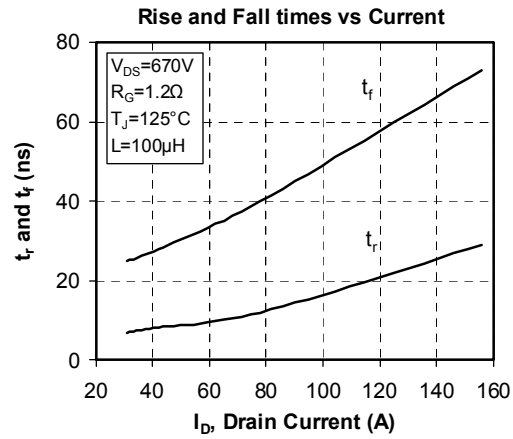
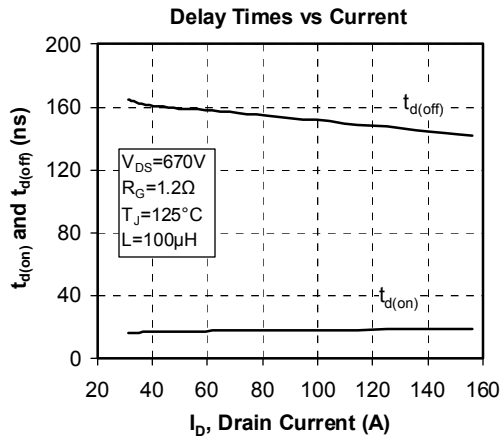
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Typical Performance Curve







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Microsemi's products are covered by one or more of U.S. patents 4,895,810 5,045,903 5,089,434 5,182,234 5,019,522 5,262,336 6,503,786 5,256,583 4,748,103 5,283,202 5,231,474 5,434,095 5,528,058 and foreign patents. U.S. and Foreign patents pending. All Rights Reserved.