



APTC80TDU15PG

Triple dual Common Source Super Junction MOSFET Power Module

$$V_{DSS} = 800V$$

$$R_{DS(on)} = 150m\Omega \text{ max @ } T_j = 25^\circ C$$

$$I_D = 28A \text{ @ } T_c = 25^\circ C$$

Application

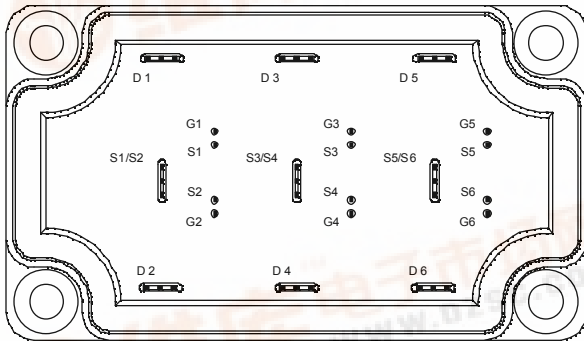
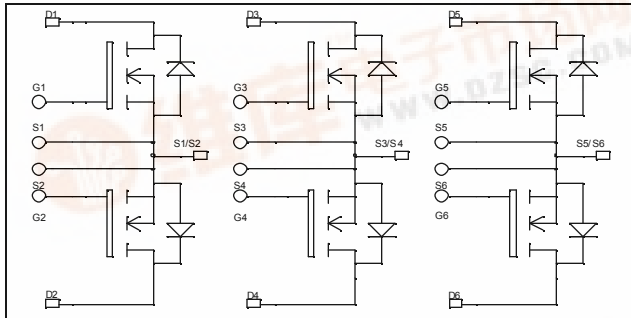
- AC Switches
- Switched Mode Power Supplies
- Uninterruptible Power Supplies

Features

- **COOLMOS**
Power Semiconductors
 - Ultra low $R_{DS(on)}$
 - Low Miller capacitance
 - Ultra low gate charge
 - Avalanche energy rated
 - Very rugged
- Kelvin source for easy drive
- Very low stray inductance
 - Symmetrical design
 - Lead frames for power connections
- High level of integration

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
- Very low (12mm) profile
- Each leg can be easily paralleled to achieve a dual common source configuration of three times the current capability
- RoHS Compliant



Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{DSS}	Drain - Source Breakdown Voltage	800	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$ 28	A
		$T_c = 80^\circ C$ 21	
I_{DM}	Pulsed Drain current	110	
V_{GS}	Gate - Source Voltage	± 30	V
$R_{DS(on)}$	Drain - Source ON Resistance	150	m Ω
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$ 277	W
I_{AR}	Avalanche current (repetitive and non repetitive)	17	A
E_{AR}	Repetitive Avalanche Energy	0.5	mJ
E_{AS}	Single Pulse Avalanche Energy	670	

CAUTION: These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed. See application note APT0502 on 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	$V_{GS} = 0V, V_{DS} = 800V$			50	μA
		$V_{GS} = 0V, V_{DS} = 800V$			375	
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10V, I_D = 14A$			150	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 2mA$	2.1	3	3.9	V
I_{GSS}	Gate – Source Leakage Current	$V_{GS} = \pm 20V, V_{DS} = 0V$			± 150	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0V$		4507		pF
C_{oss}	Output Capacitance	$V_{DS} = 25V$		2092		
C_{rss}	Reverse Transfer Capacitance	$f = 1MHz$		108		
Q_g	Total gate Charge	$V_{GS} = 10V$		180		nC
Q_{gs}	Gate – Source Charge	$V_{Bus} = 400V$		22		
Q_{gd}	Gate – Drain Charge	$I_D = 28A$		90		
$T_{d(on)}$	Turn-on Delay Time	Inductive switching @ 125°C $V_{GS} = 15V$ $V_{Bus} = 533V$ $I_D = 28A$ $R_G = 2.5\Omega$		10		ns
T_r	Rise Time			13		
$T_{d(off)}$	Turn-off Delay Time			83		
T_f	Fall Time			35		
E_{on}	Turn-on Switching Energy	Inductive switching @ 25°C $V_{GS} = 15V, V_{Bus} = 533V$ $I_D = 28A, R_G = 2.5\Omega$		486		μJ
E_{off}	Turn-off Switching Energy			278		
E_{on}	Turn-on Switching Energy	Inductive switching @ 125°C $V_{GS} = 15V, V_{Bus} = 533V$ $I_D = 28A, R_G = 2.5\Omega$		850		μJ
E_{off}	Turn-off Switching Energy			342		

Source - Drain diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I_S	Continuous Source current (Body diode)	$T_c = 25^\circ\text{C}$		28		A
		$T_c = 80^\circ\text{C}$		21		
V_{SD}	Diode Forward Voltage	$V_{GS} = 0V, I_S = -28A$			1.2	V
dv/dt	Peak Diode Recovery ❶				6	V/ns
t_{rr}	Reverse Recovery Time	$I_S = -28A$ $V_R = 400V$	$T_j = 25^\circ\text{C}$	550		ns
Q_{rr}	Reverse Recovery Charge	$di_s/dt = 200A/\mu s$	$T_j = 25^\circ\text{C}$	30		μC

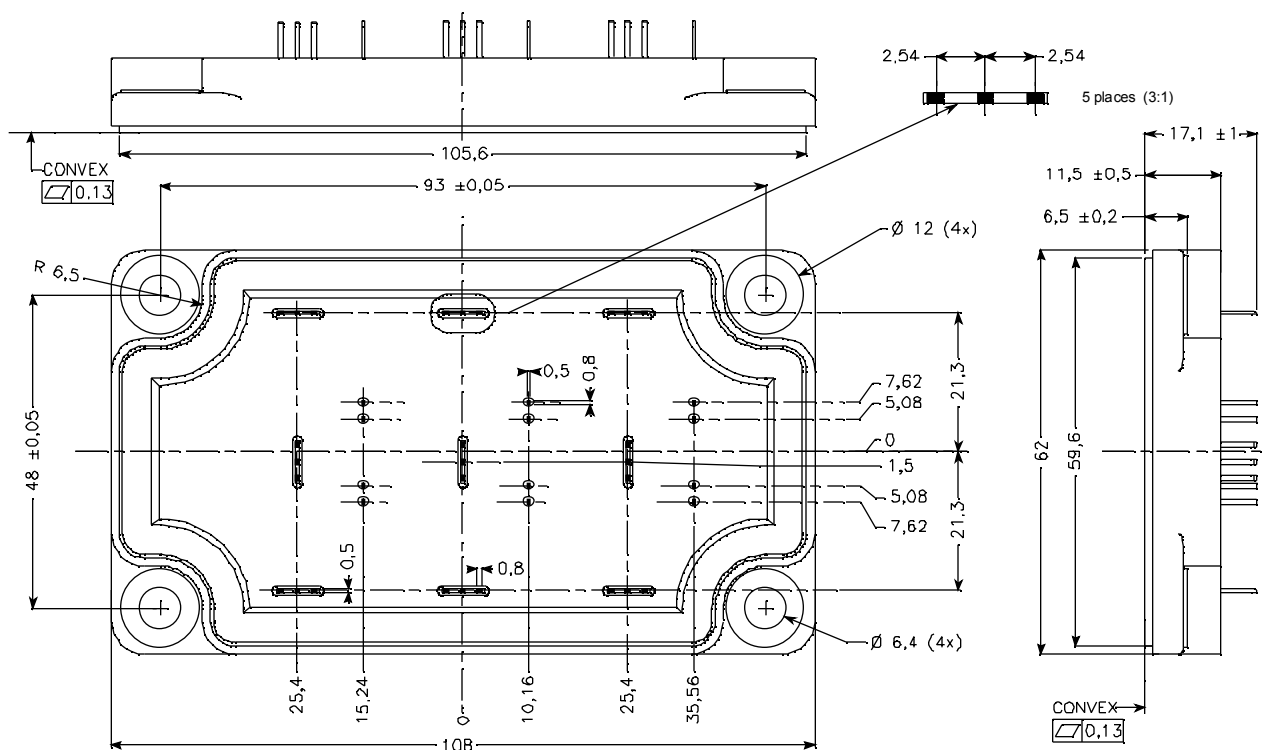
❶ dv/dt numbers reflect the limitations of the circuit rather than the device itself.

$I_S \leq -28A$ $di/dt \leq 200A/\mu s$ $V_R \leq V_{DSS}$ $T_j \leq 150^\circ\text{C}$

Thermal and package characteristics

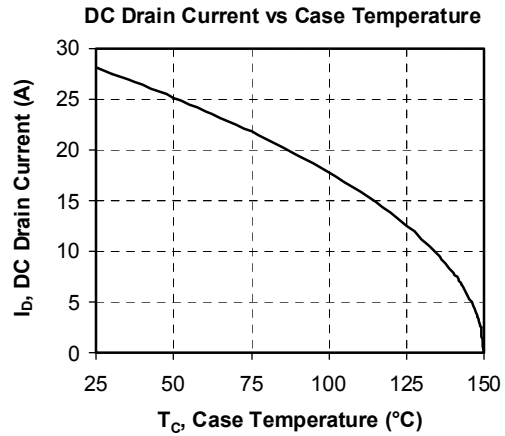
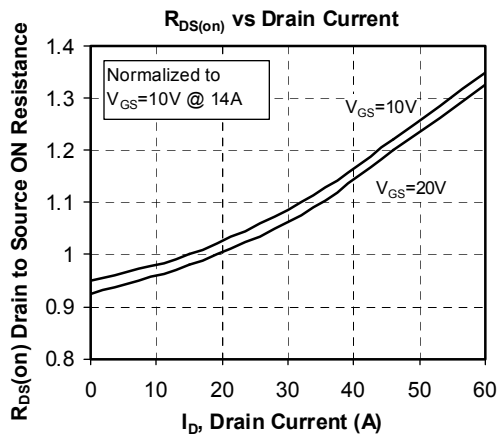
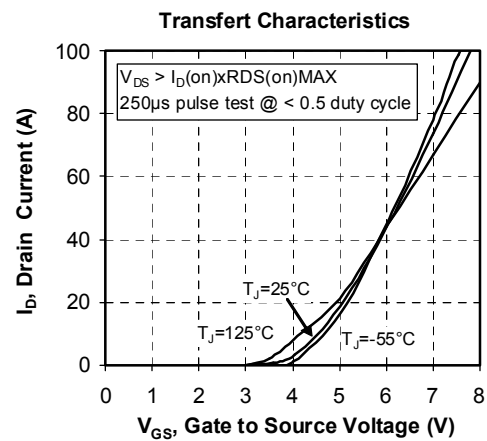
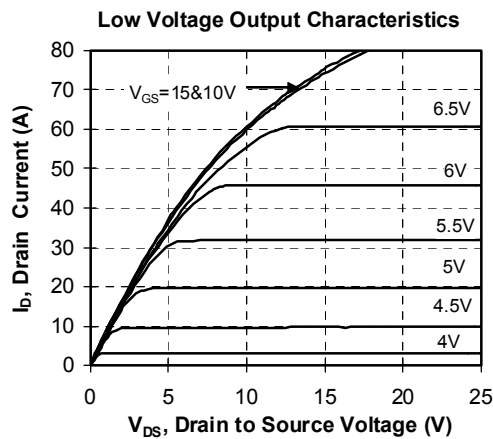
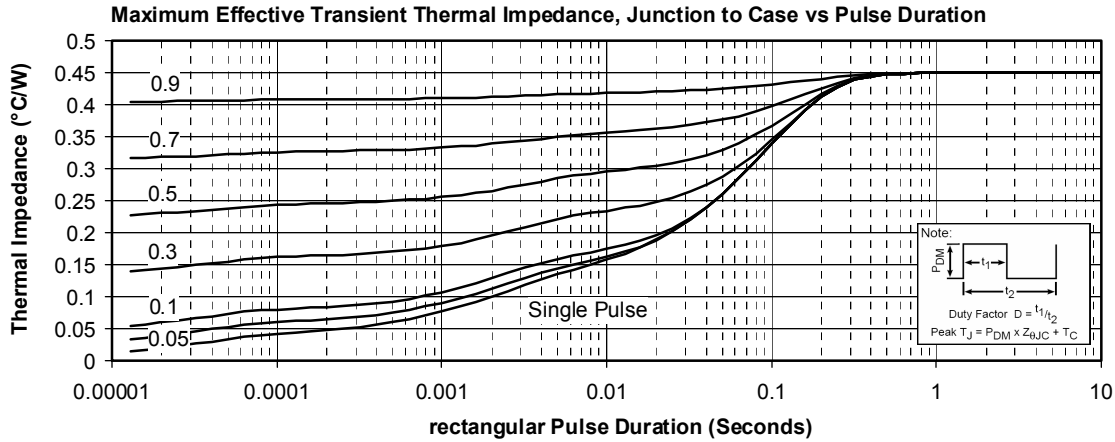
Symbol	Characteristic			Min	Typ	Max	Unit
R _{thJC}	Junction to Case Thermal Resistance					0.45	°C/W
V _{ISOL}	RMS Isolation Voltage, any terminal to case t =1 min, I isol<1mA, 50/60Hz			2500			V
T _J	Operating junction temperature range			-40		150	°C
T _{STG}	Storage Temperature Range			-40		125	
T _C	Operating Case Temperature			-40		100	
Torque	Mounting torque	To heatsink	M6	3		5	N.m
Wt	Package Weight					250	g

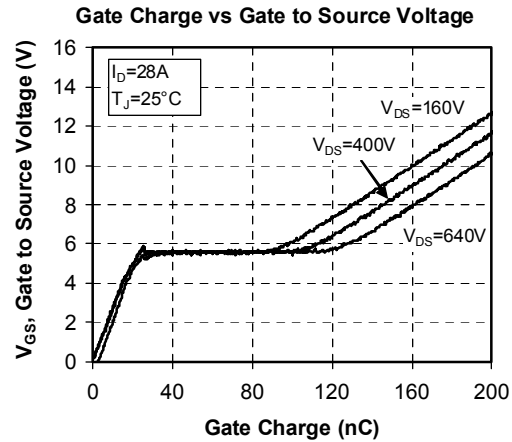
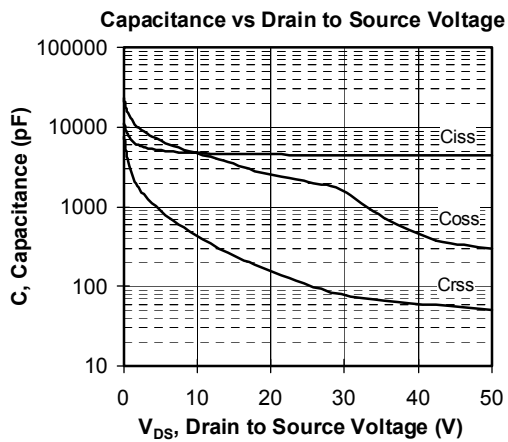
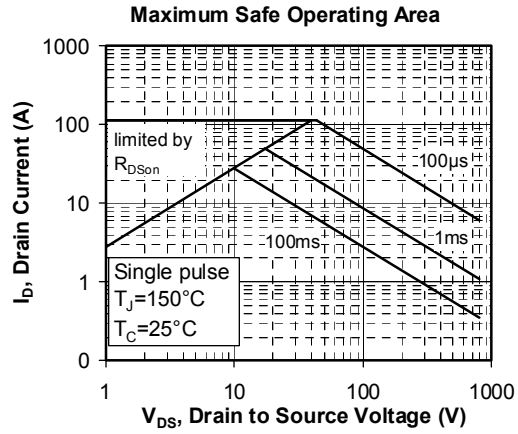
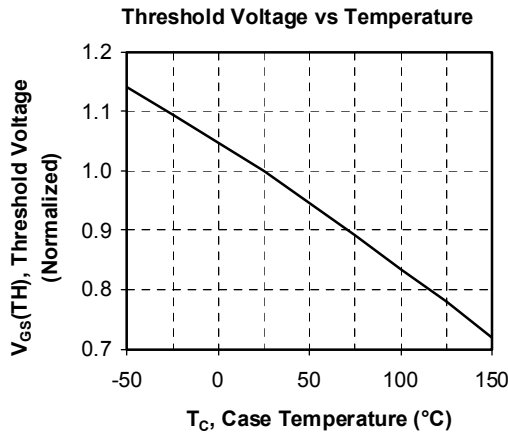
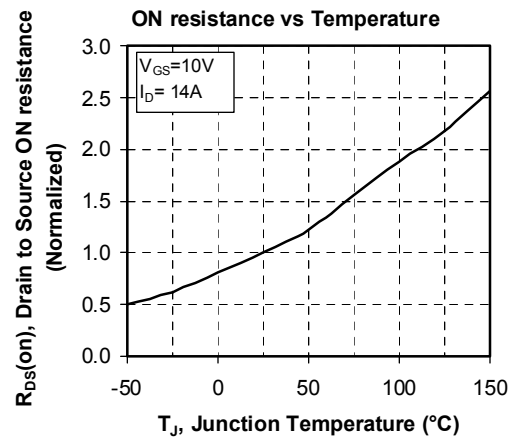
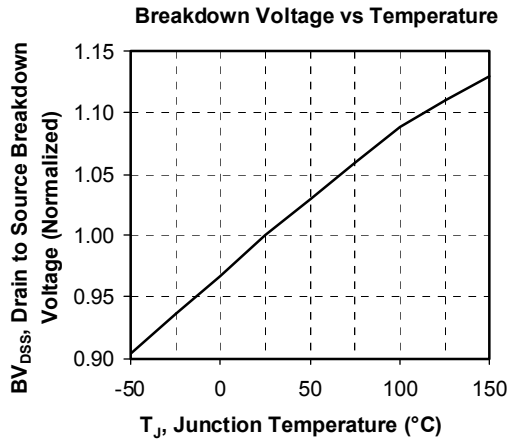
SP6-P Package outline (dimensions in mm)

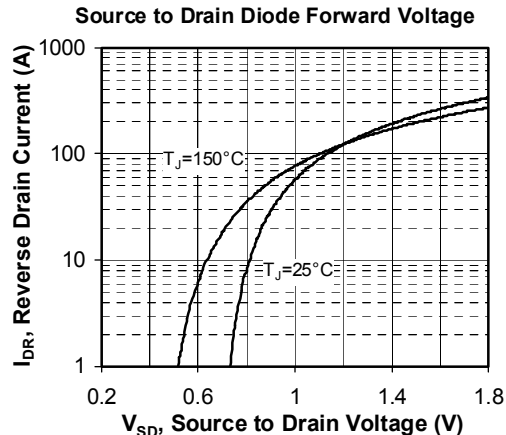
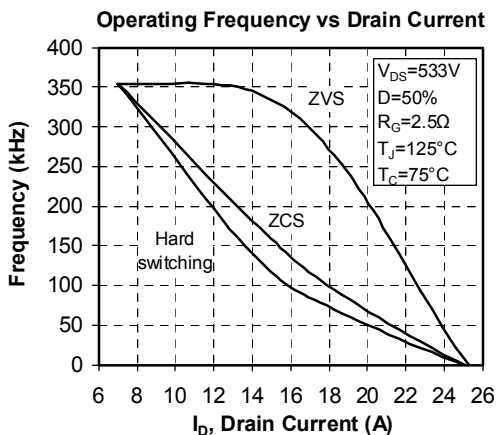
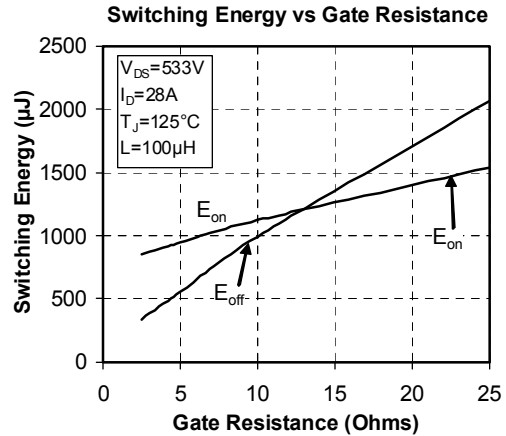
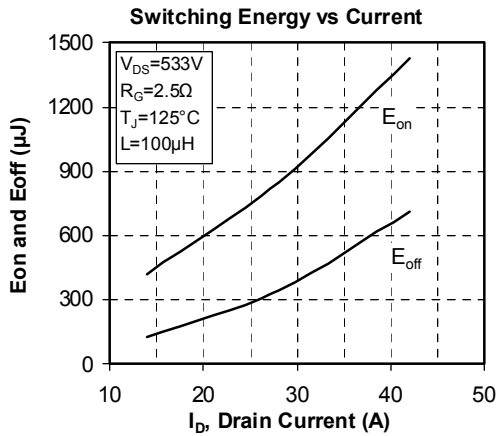
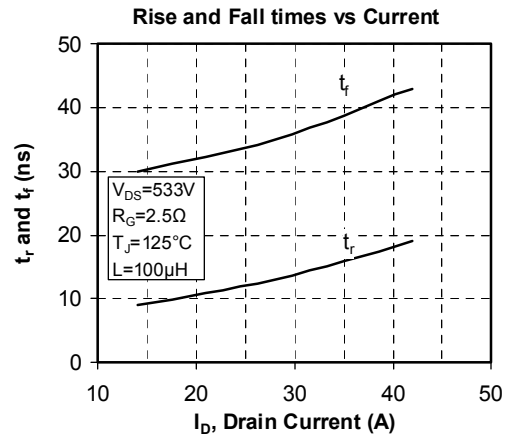
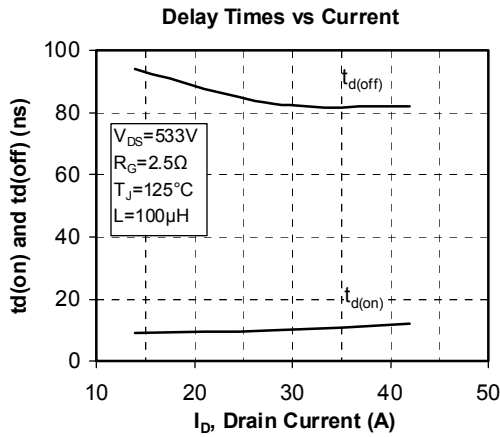


See application note 1902 - Mounting Instructions for SP6-P (12mm) Power Modules on www.microsemi.com

Typical Performance Curve







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