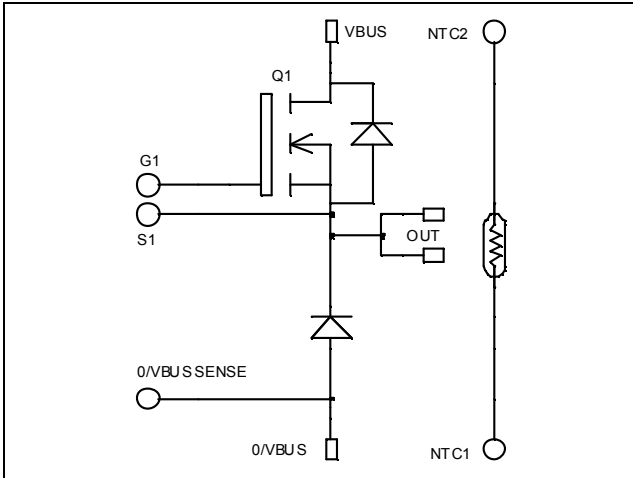


***Buck chopper
MOSFET Power Module***

**$V_{DSS} = 1000V$
 $R_{DSon} = 180m\Omega \text{ max @ } T_j = 25^\circ C$
 $I_D = 43A \text{ @ } T_c = 25^\circ C$**

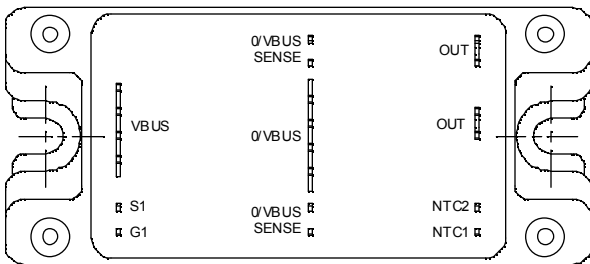


Application

- AC and DC motor control
- Switched Mode Power Supplies

Features

- Power MOS 7[®] MOSFETs
 - Low R_{DSon}
 - Low input and Miller capacitance
 - Low gate charge
 - Avalanche energy rated
 - Very rugged
- Kelvin source for easy drive
- Very low stray inductance
 - Symmetrical design
 - Lead frames for power connections
- Internal thermistor for temperature monitoring
- 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
- Low profile

Absolute maximum ratings

<i>Symbol</i>	<i>Parameter</i>	<i>Max ratings</i>	<i>Unit</i>
V_{DSS}	Drain - Source Breakdown Voltage	1000	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$	43
		$T_c = 80^\circ C$	33
I_{DM}	Pulsed Drain current	172	A
V_{GS}	Gate - Source Voltage	± 30	
R_{DSon}	Drain - Source ON Resistance	180	$m\Omega$
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	780
I_{AR}	Avalanche current (repetitive and non repetitive)	25	A
E_{AR}	Repetitive Avalanche Energy	50	mJ
E_{AS}	Single Pulse Avalanche Energy	3000	

CAUTION: These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.

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

Electrical Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
BV_{DSS}	Drain - Source Breakdown Voltage	$V_{GS} = 0V, I_D = 500\mu A$	1000			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS} = 0V, V_{DS} = 1000V, T_j = 25^\circ\text{C}$			500	μA
		$V_{GS} = 0V, V_{DS} = 800V, T_j = 125^\circ\text{C}$			2000	
$R_{DS(on)}$	Drain - Source on Resistance	$V_{GS} = 10V, I_D = 21.5A$			180	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 5mA$	3		5	V
I_{GSS}	Gate - Source Leakage Current	$V_{GS} = \pm 30V, V_{DS} = 0V$			± 150	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0V$		10.4		nF
C_{oss}	Output Capacitance	$V_{DS} = 25V$		1.76		
C_{rss}	Reverse Transfer Capacitance	$f = 1MHz$		0.32		
Q_g	Total gate Charge	$V_{GS} = 10V$		372		nC
Q_{gs}	Gate - Source Charge	$V_{Bus} = 500V$		48		
Q_{gd}	Gate - Drain Charge	$I_D = 43A$		244		
$T_{d(on)}$	Turn-on Delay Time	Inductive switching @ 125°C $V_{GS} = 15V$ $V_{Bus} = 670V$ $I_D = 43A$ $R_G = 2.5\Omega$		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 ❶	Inductive switching @ 25°C $V_{GS} = 15V, V_{Bus} = 670V$ $I_D = 43A, R_G = 2.5\Omega$		1800		μJ
E_{off}	Turn-off Switching Energy ❷			1246		
E_{on}	Turn-on Switching Energy ❶	Inductive switching @ 125°C $V_{GS} = 15V, V_{Bus} = 670V$ $I_D = 43A, R_G = 2.5\Omega$		2846		μJ
E_{off}	Turn-off Switching Energy ❷			1558		

Diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$I_{F(AV)}$	Maximum Average Forward Current	50% duty cycle, $T_c = 100^\circ\text{C}$		60		A
V_F	Diode Forward Voltage	$I_F = 60A$		1.9	2.5	V
		$I_F = 120A$		2.2		
		$I_F = 60A, T_j = 125^\circ\text{C}$		1.7		
t_{rr}	Reverse Recovery Time	$I_F = 60A, V_R = 667V, di/dt = 200A/\mu s, T_j = 25^\circ\text{C}$		280		ns
		$T_j = 125^\circ\text{C}$		350		
Q_{rr}	Reverse Recovery Charge	$I_F = 60A, V_R = 667V, di/dt = 200A/\mu s, T_j = 25^\circ\text{C}$		760		nC
		$T_j = 125^\circ\text{C}$		3600		

❶ E_{on} includes diode reverse recovery.

❷ In accordance with JEDEC standard JESD24-1.

Thermal and package characteristics

Symbol	Characteristic	Min	Typ	Max	Unit	
R _{thJC}	Junction to Case	Transistor		0.16	°C/W	
		Diode		0.9		
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	M5	4.7	N.m
Wt	Package Weight				160	g

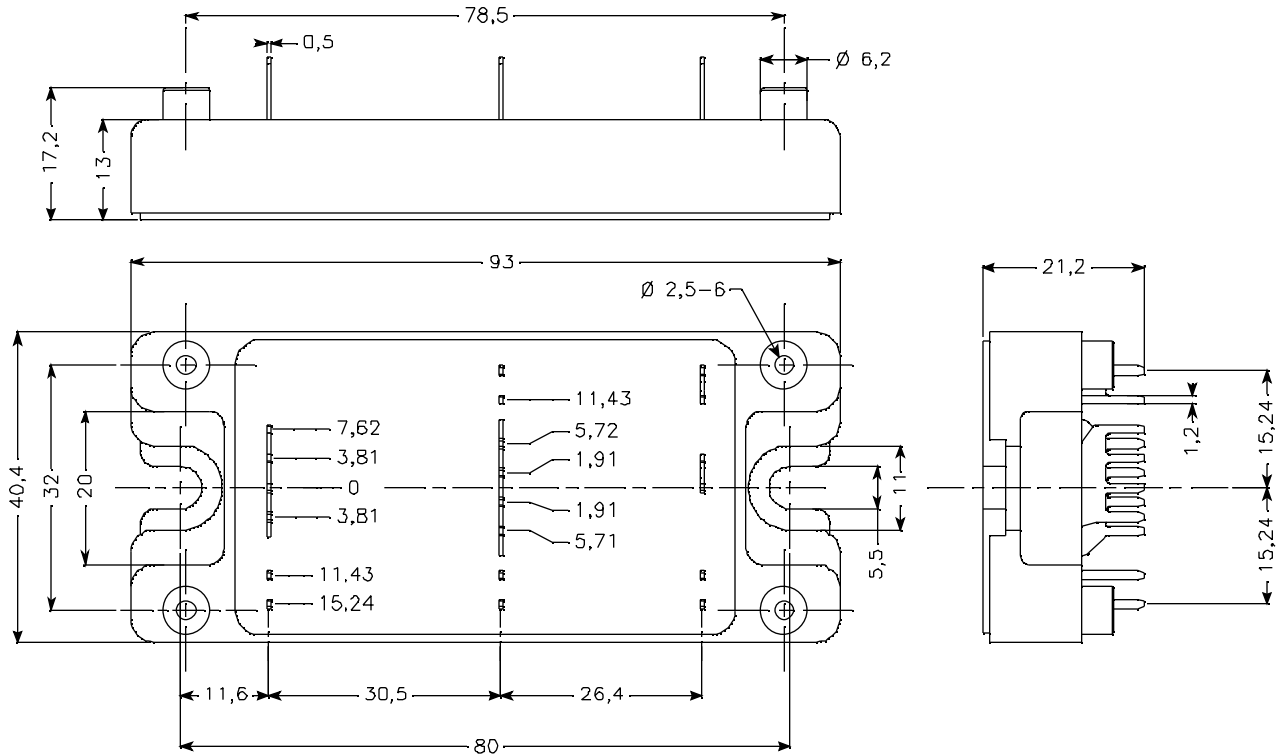
Temperature sensor NTC

Symbol	Characteristic	Min	Typ	Max	Unit
R ₂₅	Resistance @ 25°C		68		kΩ
B _{25/85}	T ₂₅ = 298.16 K		4080		K

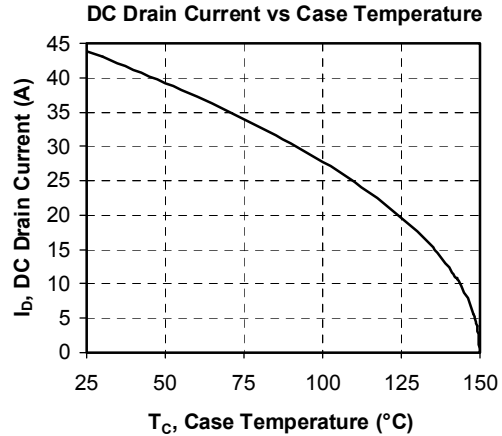
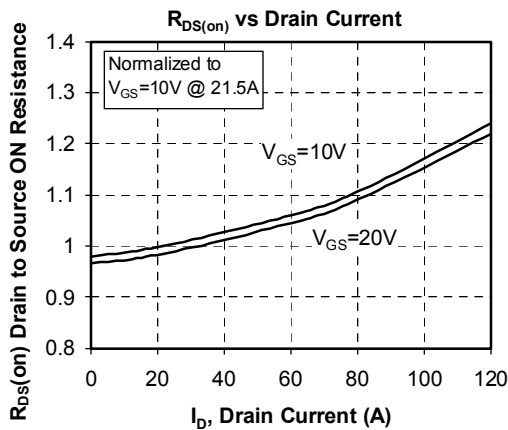
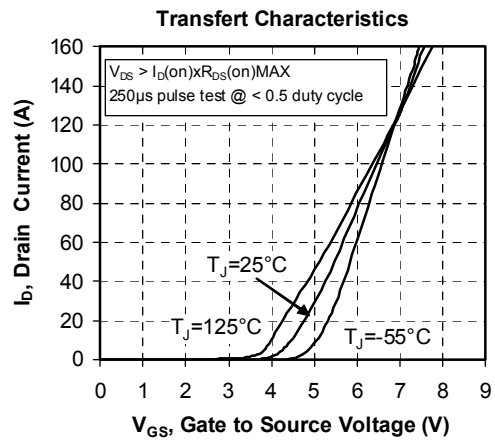
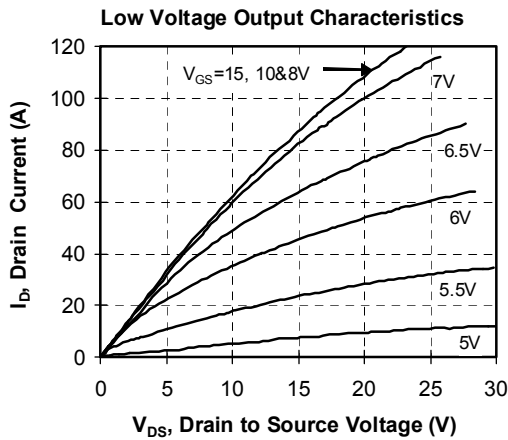
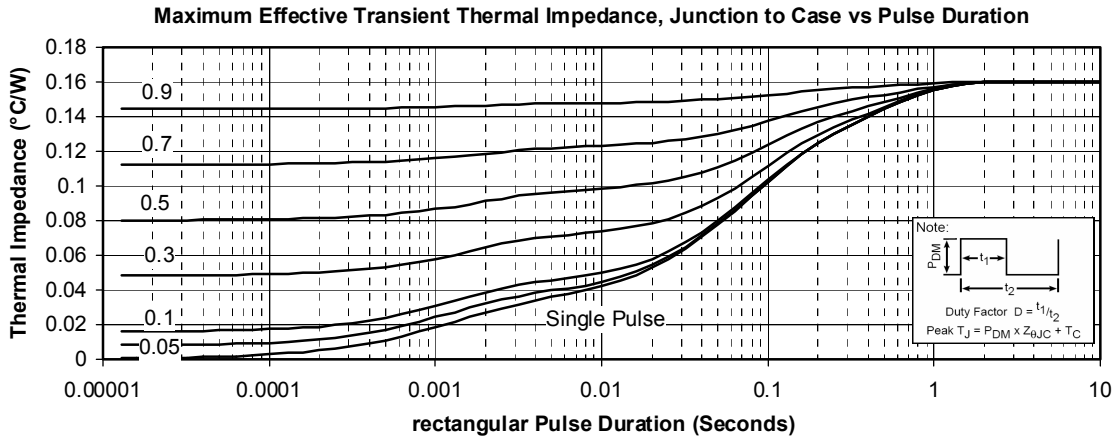
$$R_T = \frac{R_{25}}{\exp \left[B_{25/85} \left(\frac{1}{T_{25}} - \frac{1}{T} \right) \right]}$$

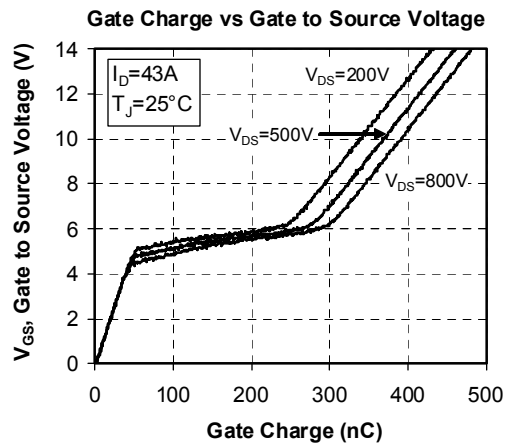
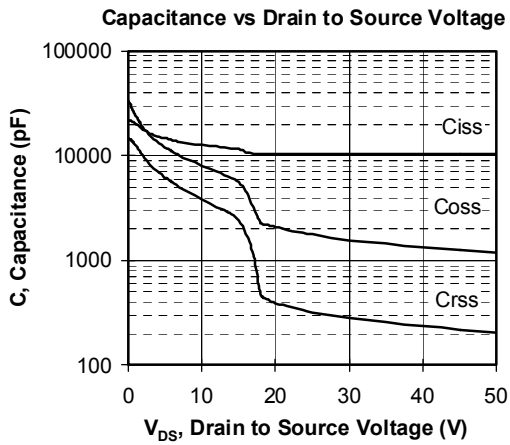
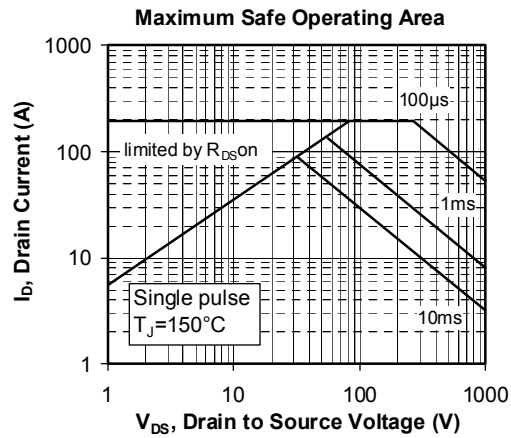
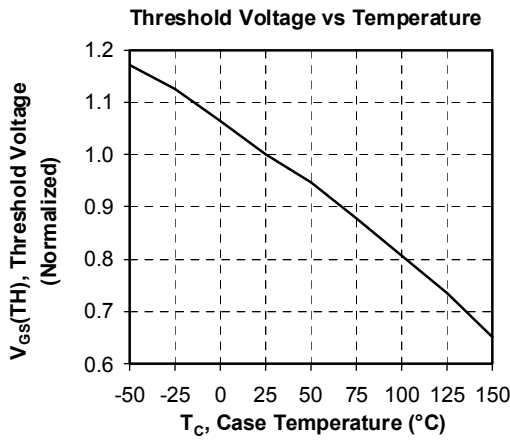
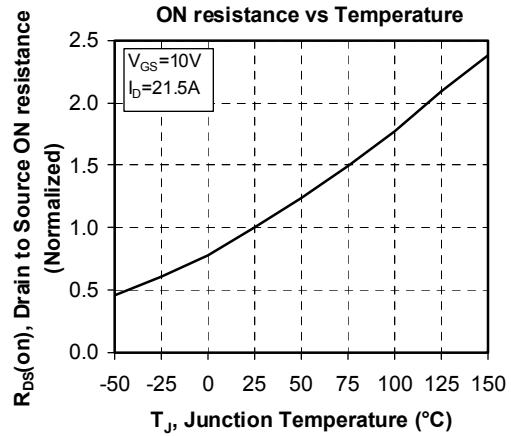
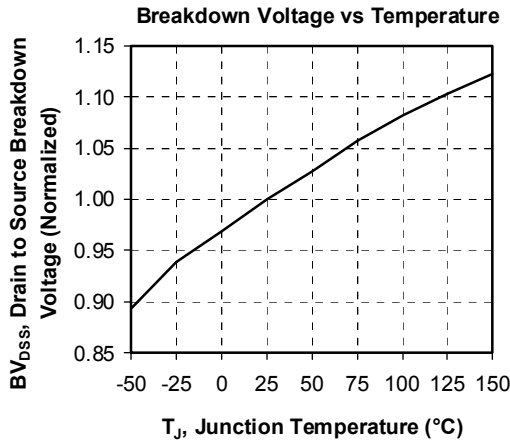
T: Thermistor temperature
R_T: Thermistor value at T

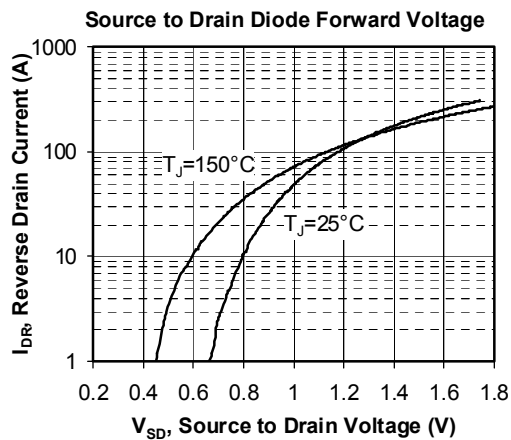
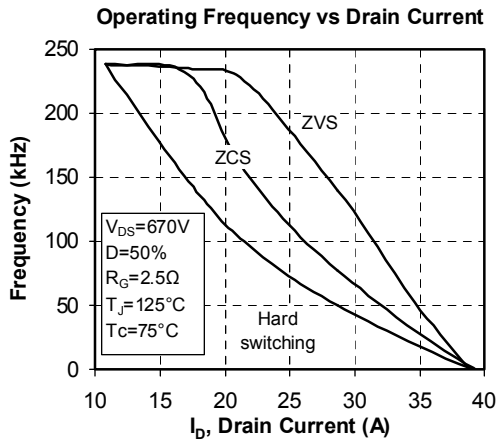
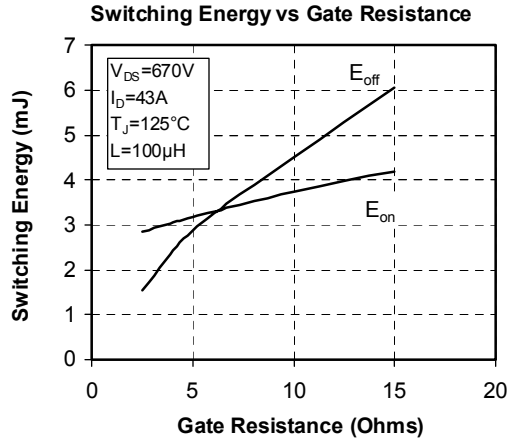
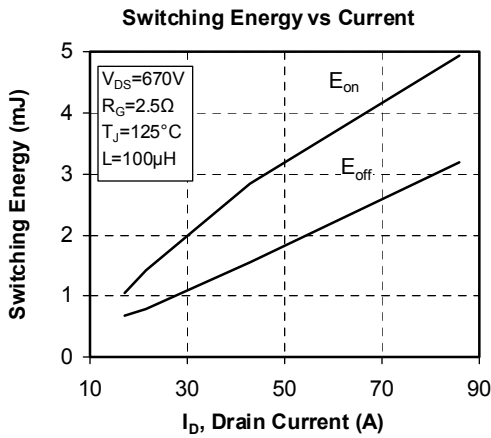
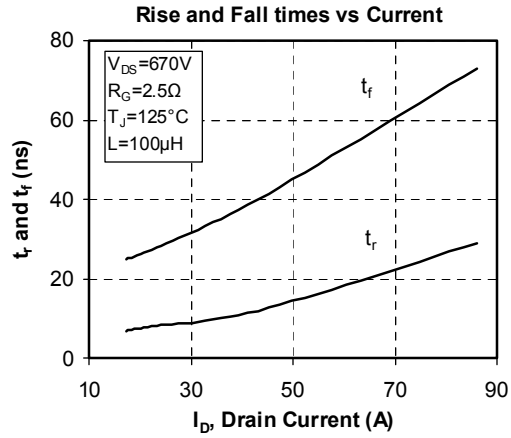
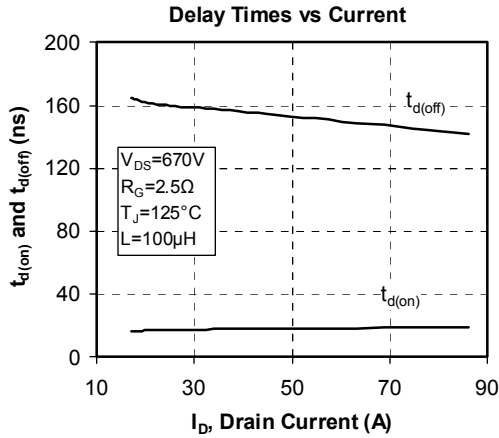
Package outline



Typical Performance Curve







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APT'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.