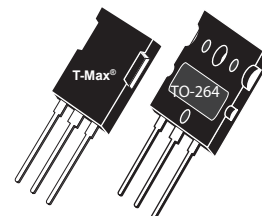
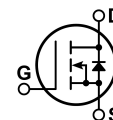


N-Channel FREDFET

Power MOS 8™ is a high speed, high voltage N-channel switch-mode power MOSFET. This 'FREDFET' version has a drain-source (body) diode that has been optimized for high reliability in ZVS phase shifted bridge and other circuits through reduced t_{rr} , soft recovery, and high recovery dv/dt capability. Low gate charge, high gain, and a greatly reduced ratio of C_{rss}/C_{iss} result in excellent noise immunity and low switching loss. The intrinsic gate resistance and capacitance of the poly-silicon gate structure help control di/dt during switching, resulting in low EMI and reliable paralleling, even when switching at very high frequency.


APT44F80B2
APT44F80L

Single die FREDFET



FEATURES

- Fast switching with low EMI
- Low t_{rr} for high reliability
- Ultra low C_{rss} for improved noise immunity
- Low gate charge
- Avalanche energy rated
- RoHS compliant 

TYPICAL APPLICATIONS

- ZVS phase shifted and other full bridge
- Half bridge
- PFC and other boost converter
- Buck converter
- Single and two switch forward
- Flyback

Absolute Maximum Ratings

Symbol	Parameter	Ratings	Unit
I_D	Continuous Drain Current @ $T_c = 25^\circ C$	47	A
	Continuous Drain Current @ $T_c = 100^\circ C$	29	
I_{DM}	Pulsed Drain Current ^①	173	
V_{GS}	Gate - Source Voltage	± 30	V
E_{AS}	Single Pulse Avalanche Energy ^②	1980	mJ
I_{AR}	Avalanche Current, Repetitive or Non-Repetitive	24	A

Thermal and Mechanical Characteristics

Symbol	Characteristic	Min	Typ	Max	Unit
P_D	Total Power Dissipation @ $T_c = 25^\circ C$	-	-	1135	W
$R_{\theta JC}$	Junction to Case Thermal Resistance	-	-	.11	$^\circ C/W$
$R_{\theta CS}$	Case to Sink Thermal Resistance, Flat, Greased Surface	-	.11	-	
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55	-	150	$^\circ C$
T_L	Soldering Temperature for 10 Seconds (1.6mm from case)	-	-	300	
W_T	Package Weight	-	0.22	-	oz
		-	6.2	-	g
Torque	Mounting Torque (TO-264 Package), 4-40 or M3 screw	-	-	10	in·lbf
		-	-	1.1	N·m

Static Characteristics

 $T_J = 25^\circ\text{C}$ unless otherwise specified

APT44F80B2_L

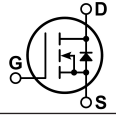
Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
$V_{BR(DSS)}$	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	800			V
$\Delta V_{BR(DSS)}/\Delta T_J$	Breakdown Voltage Temperature Coefficient	Reference to 25°C , $I_D = 250\mu A$		0.87		$V/^\circ\text{C}$
$R_{DS(on)}$	Drain-Source On Resistance ^③	$V_{GS} = 10V, I_D = 24A$		0.17	0.21	Ω
$V_{GS(th)}$	Gate-Source Threshold Voltage	$V_{GS} = V_{DS}, I_D = 2.5mA$	2.5	4	5	V
$\Delta V_{GS(th)}/\Delta T_J$	Threshold Voltage Temperature Coefficient			-10		$mV/^\circ\text{C}$
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 800V$ $V_{GS} = 0V$	$T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$		250 1000	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS} = \pm 30V$			± 100	nA

Dynamic Characteristics

 $T_J = 25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
g_{fs}	Forward Transconductance	$V_{DS} = 50V, I_D = 24A$		43		S
C_{iss}	Input Capacitance	$V_{GS} = 0V, V_{DS} = 25V$ $f = 1MHz$		9330		pF
C_{rss}	Reverse Transfer Capacitance			160		
C_{oss}	Output Capacitance			930		
$C_{o(cr)}^{④}$	Effective Output Capacitance, Charge Related	$V_{GS} = 0V, V_{DS} = 0V$ to 533V		440		
$C_{o(er)}^{⑤}$	Effective Output Capacitance, Energy Related			220		
Q_g	Total Gate Charge	$V_{GS} = 0$ to 10V, $I_D = 24A$, $V_{DS} = 400V$		305		nC
Q_{gs}	Gate-Source Charge			51		
Q_{gd}	Gate-Drain Charge			155		
$t_{d(on)}$	Turn-On Delay Time	Resistive Switching $V_{DD} = 400V, I_D = 24A$ $R_G = 4.7\Omega^{⑥}, V_{GG} = 15V$		55		ns
t_r	Current Rise Time			75		
$t_{d(off)}$	Turn-Off Delay Time			230		
t_f	Current Fall Time			70		

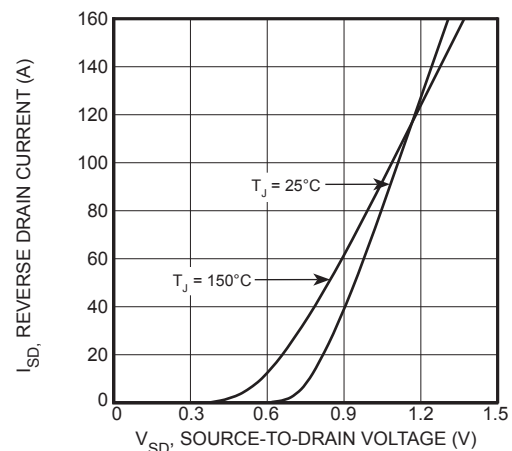
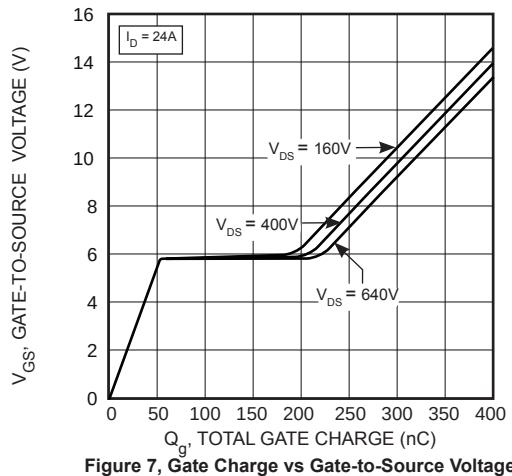
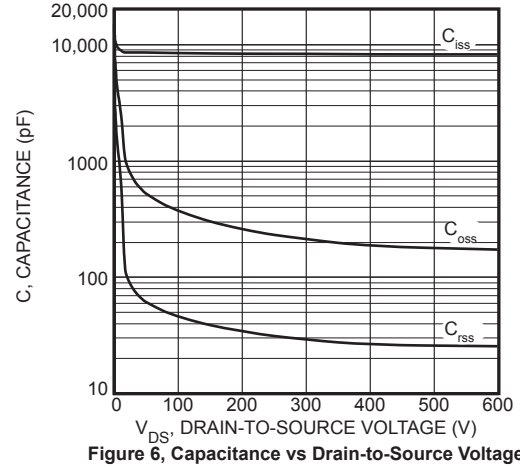
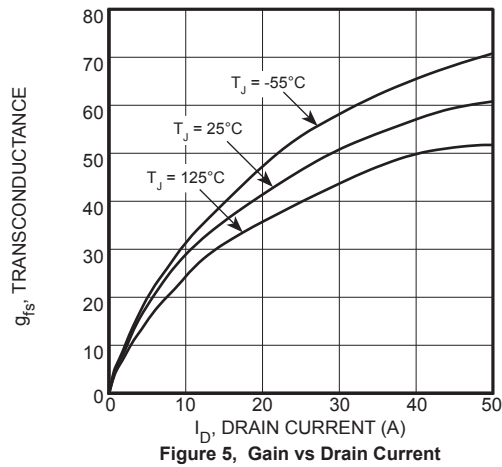
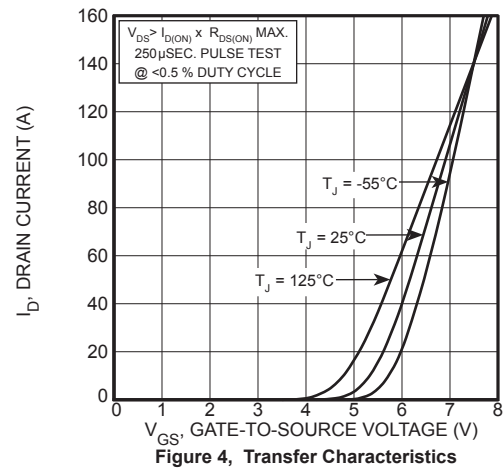
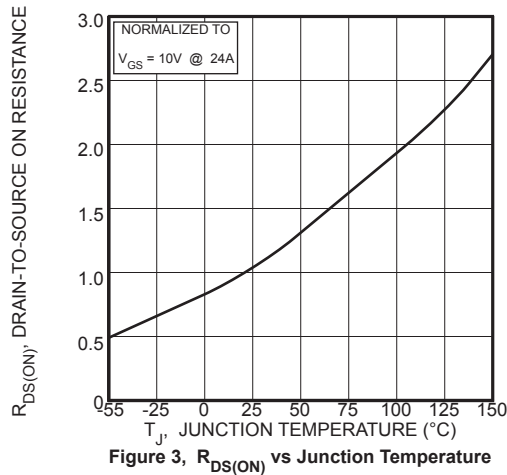
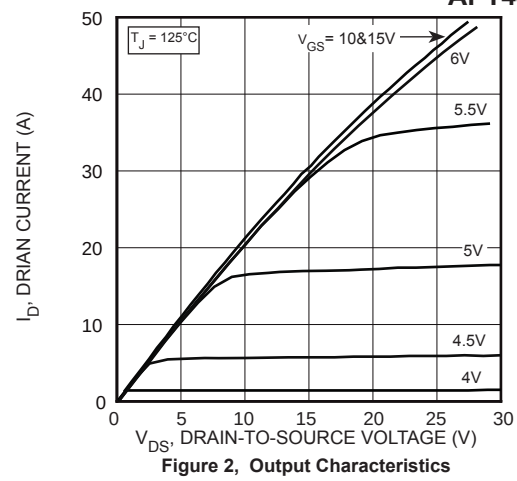
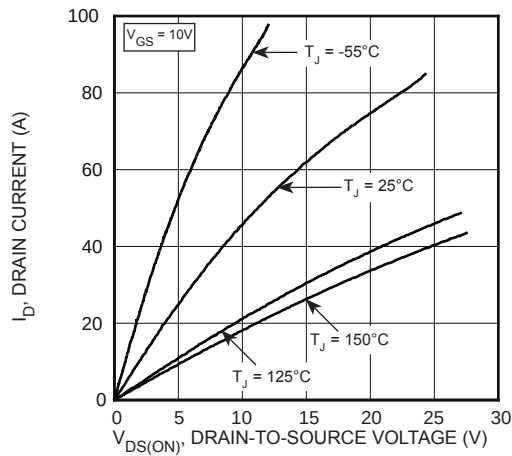
Source-Drain Diode Characteristics

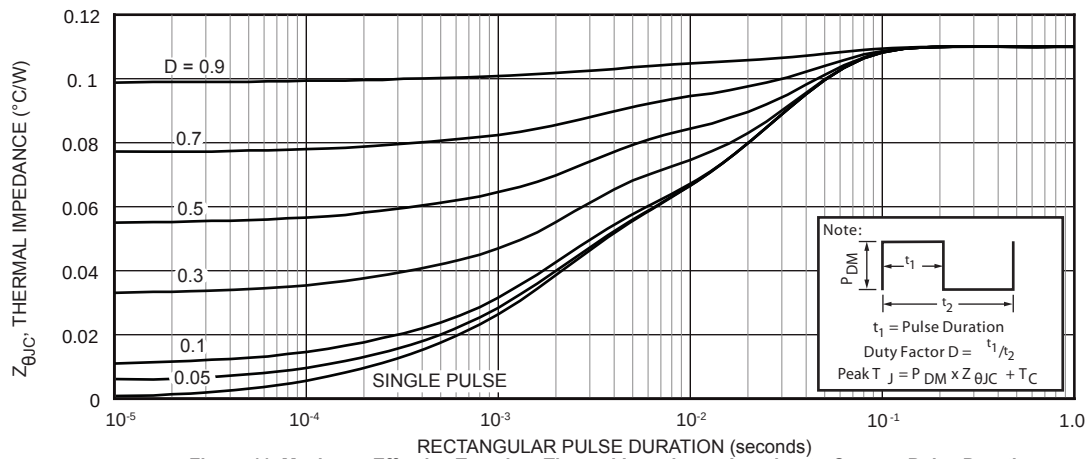
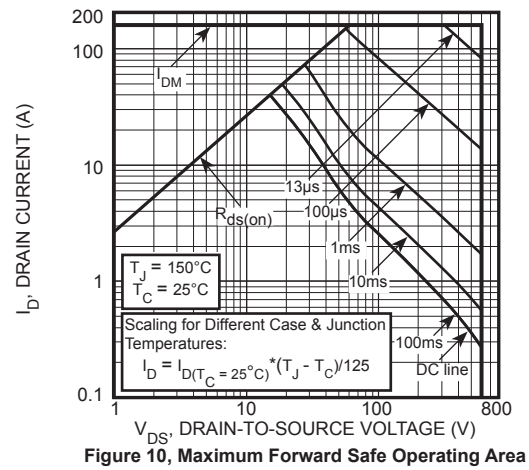
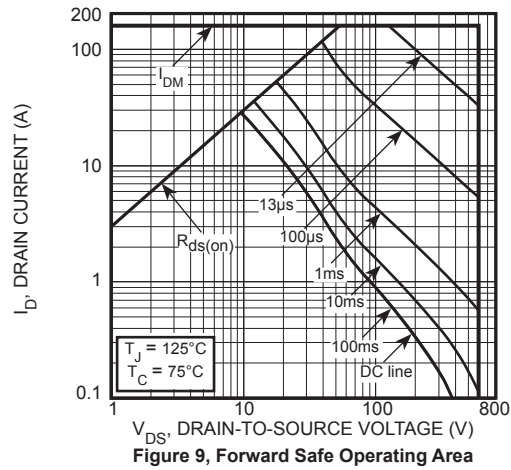
Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
I_S	Continuous Source Current (Body Diode)	MOSFET symbol showing the integral reverse p-n junction diode (body diode) 			47	A
I_{SM}	Pulsed Source Current (Body Diode) ^①				173	
V_{SD}	Diode Forward Voltage	$I_{SD} = 24A, T_J = 25^\circ\text{C}, V_{GS} = 0V$			1.2	V
t_{rr}	Reverse Recovery Time	$I_{SD} = 24A^{③}$ $di_{SD}/dt = 100A/\mu s$ $V_{DD} = 100V$	$T_J = 25^\circ\text{C}$	320	370	nS
			$T_J = 125^\circ\text{C}$	590	710	
Q_{rr}	Reverse Recovery Charge		$T_J = 25^\circ\text{C}$	1.91		μC
			$T_J = 125^\circ\text{C}$	5.18		
I_{rrm}	Reverse Recovery Current		$T_J = 25^\circ\text{C}$	12.1		A
			$T_J = 125^\circ\text{C}$	18.1		
dv/dt	Peak Recovery dv/dt	$I_{SD} \leq 24A, di/dt \leq 1000A/\mu s, V_{DD} = 400V$, $T_J = 125^\circ\text{C}$			25	V/ns

① Repetitive Rating: Pulse width and case temperature limited by maximum junction temperature.

② Starting at $T_J = 25^\circ\text{C}$, $L = 6.9mH$, $R_G = 25\Omega$, $I_{AS} = 24A$.③ Pulse test: Pulse Width < 380 μs , duty cycle < 2%.④ $C_{o(cr)}$ is defined as a fixed capacitance with the same stored charge as C_{OSS} with $V_{DS} = 67\%$ of $V_{(BR)DSS}$.⑤ $C_{o(er)}$ is defined as a fixed capacitance with the same stored energy as C_{OSS} with $V_{DS} = 67\%$ of $V_{(BR)DSS}$. To calculate $C_{o(er)}$ for any value of V_{DS} less than $V_{(BR)DSS}$, use this equation: $C_{o(er)} = -8.32E-8/V_{DS}^2 + 3.49E-8/V_{DS} + 1.30E-10$.⑥ R_G is external gate resistance, not including internal gate resistance or gate driver impedance. (MIC4452)

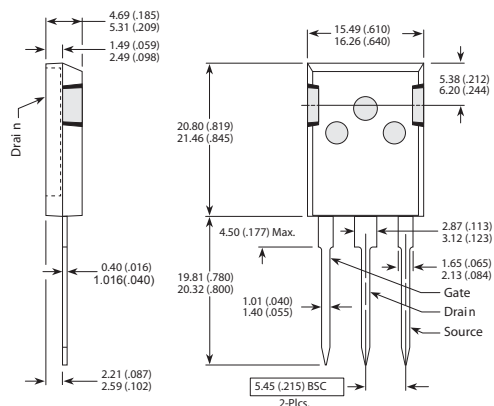
Microsemi reserves the right to change, without notice, the specifications and information contained herein.





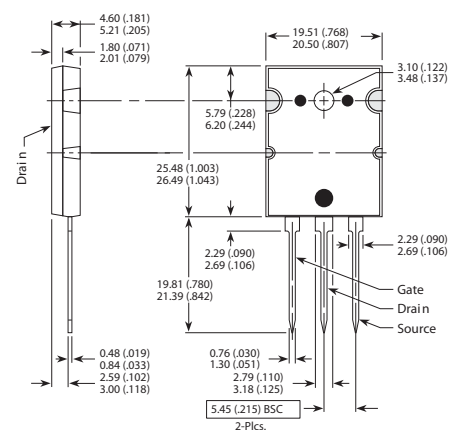
T-MAX™ (B2) Package Outline

Ⓔ 100% Sn Plated



Dimensions in Millimeters (Inches)

TO-264 (L) Package Outline



Dimensions in Millimeters (Inches)