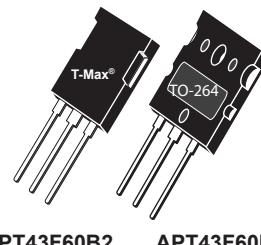


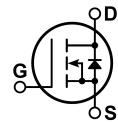
## N-Channel FREDFET

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.



APT43F60B2      APT43F60L

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 @ $T_C = 25^\circ\text{C}$	45	A
	Continuous Drain Current @ $T_C = 100^\circ\text{C}$	28	
$I_{DM}$	Pulsed Drain Current <sup>①</sup>	160	
$V_{GS}$	Gate-Source Voltage	$\pm 30$	V
$E_{AS}$	Single Pulse Avalanche Energy <sup>②</sup>	1200	mJ
$I_{AR}$	Avalanche Current, Repetitive or Non-Repetitive	21	A

### Thermal and Mechanical Characteristics

Symbol	Characteristic	Min	Typ	Max	Unit
$P_D$	Total Power Dissipation @ $T_C = 25^\circ\text{C}$			780	W
$R_{\theta JC}$	Junction to Case Thermal Resistance			0.16	°C/W
$R_{\theta CS}$	Case to Sink Thermal Resistance, Flat, Greased Surface		0.11		
$T_J, T_{STG}$	Operating and Storage Junction Temperature Range	-55		150	°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<sub>J</sub> = 25°C unless otherwise specified**
**APT43F60B2\_L**

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V <sub>BR(DSS)</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA	600			V
ΔV <sub>BR(DSS)</sub> /ΔT <sub>J</sub>	Breakdown Voltage Temperature Coefficient	Reference to 25°C, I <sub>D</sub> = 250μA		0.57		V/°C
R <sub>DS(on)</sub>	Drain-Source On Resistance <sup>③</sup>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 21A		0.12	0.15	Ω
V <sub>GS(th)</sub>	Gate-Source Threshold Voltage	V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> = 2.5mA	2.5	4	5	V
ΔV <sub>GS(th)/ΔT_J</sub>	Threshold Voltage Temperature Coefficient			-10		mV/°C
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> = 600V V <sub>GS</sub> = 0V	T <sub>J</sub> = 25°C T <sub>J</sub> = 125°C		250 1000	μA
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> = ±30V			±100	nA

**Dynamic Characteristics**
**T<sub>J</sub> = 25°C unless otherwise specified**

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> = 50V, I <sub>D</sub> = 21A		42		S
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 25V f = 1MHz		8590		pF
C <sub>rss</sub>	Reverse Transfer Capacitance			90		
C <sub>oss</sub>	Output Capacitance			800		
C <sub>o(cr)</sub> <sup>④</sup>	Effective Output Capacitance, Charge Related	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 0V to 400V		420		pF
C <sub>o(er)</sub> <sup>⑤</sup>	Effective Output Capacitance, Energy Related			220		
Q <sub>g</sub>	Total Gate Charge	V <sub>GS</sub> = 0 to 10V, I <sub>D</sub> = 21A, V <sub>DS</sub> = 300V		215		nC
Q <sub>gs</sub>	Gate-Source Charge			45		
Q <sub>gd</sub>	Gate-Drain Charge			90		
t <sub>d(on)</sub>	Turn-On Delay Time	Resistive Switching V <sub>DD</sub> = 400V, I <sub>D</sub> = 21A R <sub>G</sub> = 4.7Ω <sup>⑥</sup> , V <sub>GG</sub> = 15V		48		ns
t <sub>r</sub>	Current Rise Time			55		
t <sub>d(off)</sub>	Turn-Off Delay Time			145		
t <sub>f</sub>	Current Fall Time			44		

**Source-Drain Diode Characteristics**

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
I <sub>S</sub>	Continuous Source Current (Body Diode)	MOSFET symbol showing the integral reverse p-n junction diode (body diode)			45	A
I <sub>SM</sub>	Pulsed Source Current (Body Diode) <sup>①</sup>				160	
V <sub>SD</sub>	Diode Forward Voltage	I <sub>SD</sub> = 21A, T <sub>J</sub> = 25°C, V <sub>GS</sub> = 0V			1.2	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>SD</sub> = 21A <sup>③</sup> di <sub>SD</sub> /dt = 100A/μs V <sub>DD</sub> = 100V	T <sub>J</sub> = 25°C		270	ns
Q <sub>rr</sub>	Reverse Recovery Charge		T <sub>J</sub> = 125°C		500	
I <sub>rrm</sub>	Reverse Recovery Current	I <sub>SD</sub> ≤ 21A, di/dt ≤ 1000A/μs, V <sub>DD</sub> = 400V, T <sub>J</sub> = 125°C	T <sub>J</sub> = 25°C	1.14		μC
dv/dt	Peak Recovery dv/dt		T <sub>J</sub> = 125°C	2.91		
			T <sub>J</sub> = 25°C	9.6		A
			T <sub>J</sub> = 125°C	13.8		

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

② Starting at T<sub>J</sub> = 25°C, L = 5.44mH, R<sub>G</sub> = 25Ω, I<sub>AS</sub> = 21A.

③ Pulse test: Pulse Width < 380μs, duty cycle < 2%.

④ C<sub>o(cr)</sub> is defined as a fixed capacitance with the same stored charge as C<sub>oss</sub> with V<sub>DS</sub> = 67% of V<sub>(BR)DSS</sub>.

⑤ C<sub>o(er)</sub> is defined as a fixed capacitance with the same stored energy as C<sub>oss</sub> with V<sub>DS</sub> = 67% of V<sub>(BR)DSS</sub>. To calculate C<sub>o(er)</sub> for any value of V<sub>DS</sub> less than V<sub>(BR)DSS</sub>, use this equation: C<sub>o(er)</sub> = -8.32E-8/V<sub>DS</sub><sup>2</sup> + 3.49E-8/V<sub>DS</sub> + 1.30E-10.

⑥ R<sub>G</sub> 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.

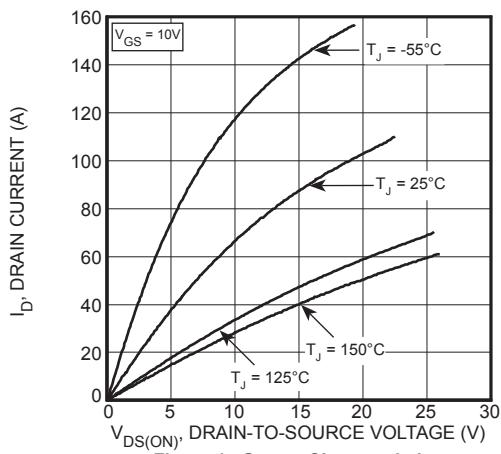


Figure 1, Output Characteristics

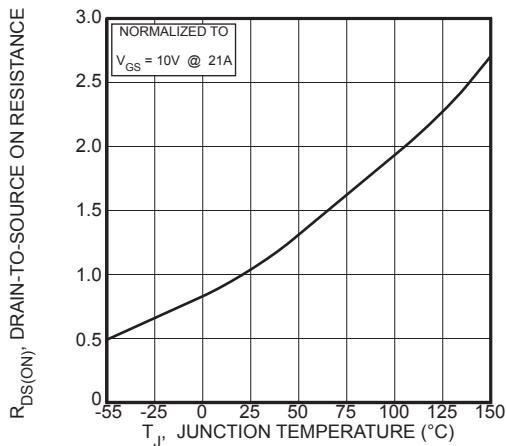
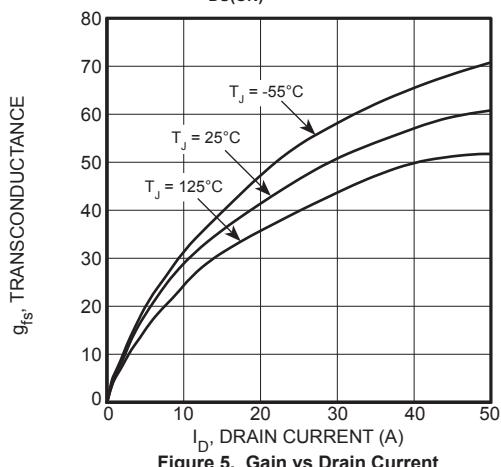
Figure 3,  $R_{DS(ON)}$  vs Junction Temperature

Figure 5, Gain vs Drain Current

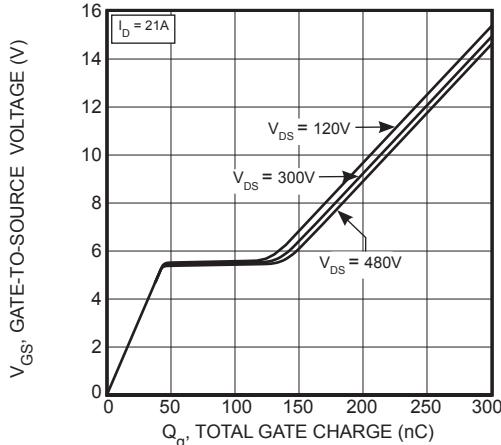


Figure 7, Gate Charge vs Gate-to-Source Voltage

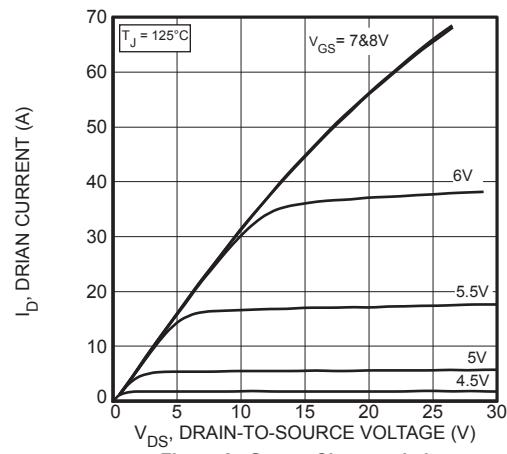


Figure 2, Output Characteristics

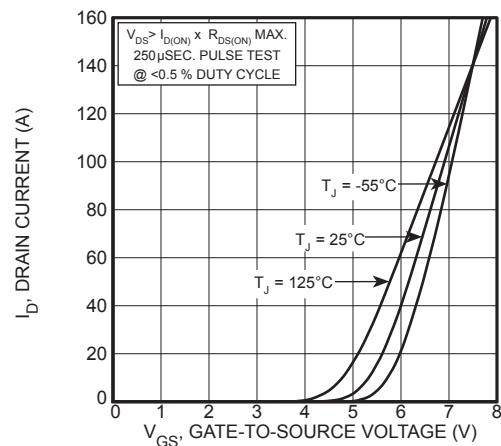


Figure 4, Transfer Characteristics

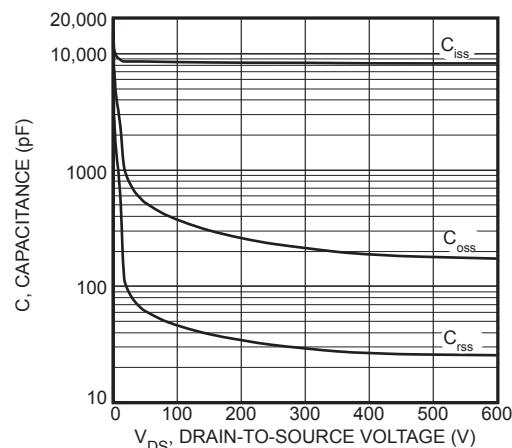


Figure 6, Capacitance vs Drain-to-Source Voltage

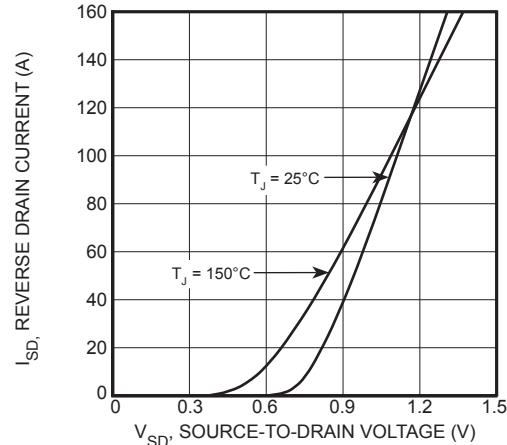


Figure 8, Reverse Drain Current vs Source-to-Drain Voltage

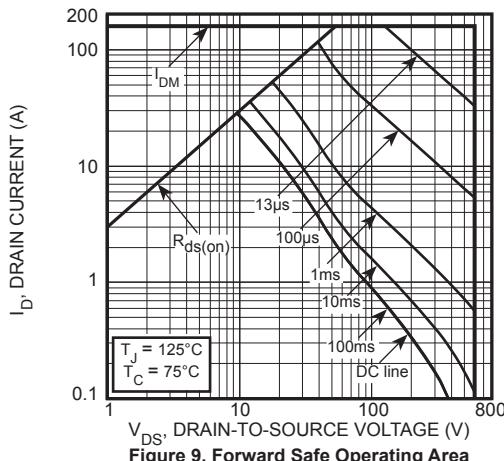


Figure 9, Forward Safe Operating Area

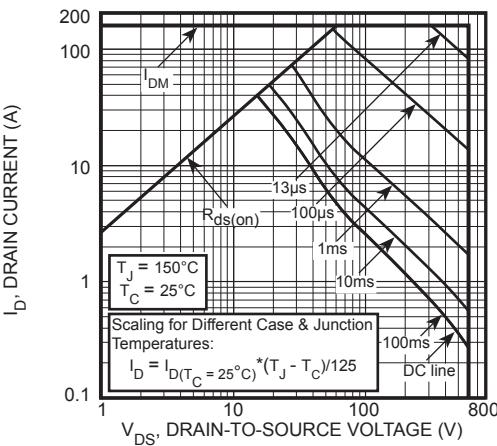


Figure 10, Maximum Forward Safe Operating Area

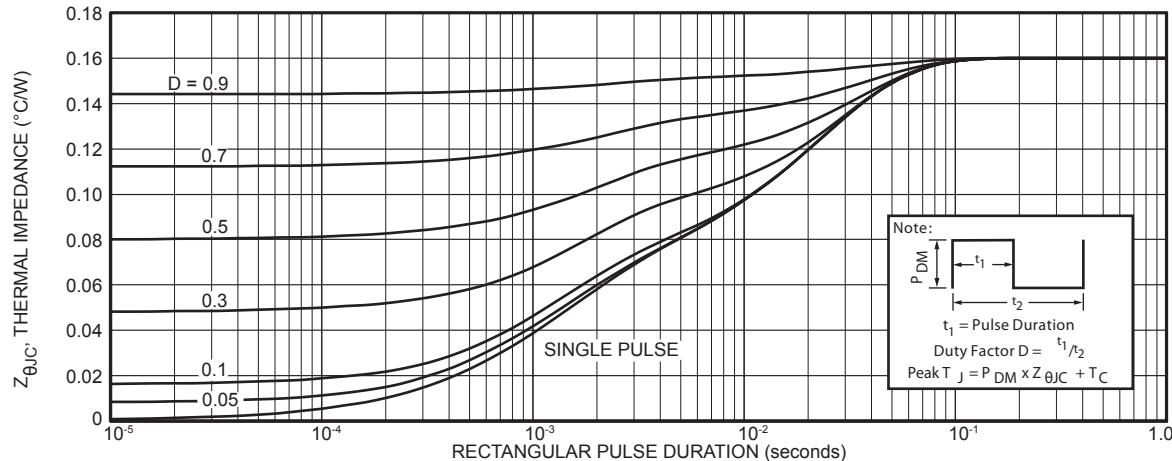
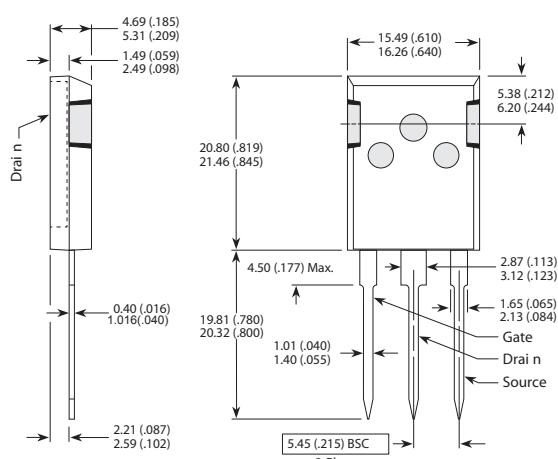
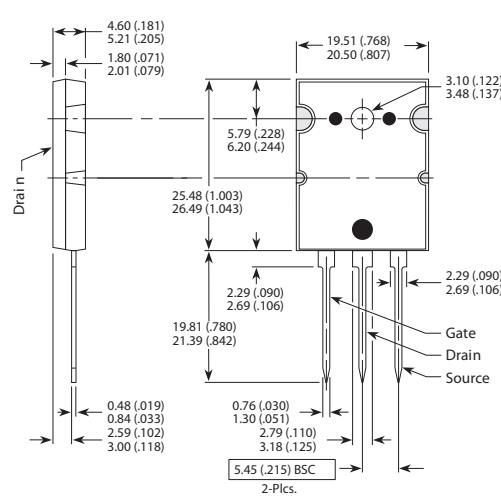


Figure 11. Maximum Effective Transient Thermal Impedance Junction-to-Case vs Pulse Duration

**T-MAX® (B2) Package Outline**

These dimensions are equal to the TO-247 without the mounting hole.  
Dimensions in Millimeters and (Inches)

**TO-264 (L) Package Outline**

Dimensions in Millimeters and (Inches)

ООО "ЛайфЭлектроникс"

"LifeElectronics" LLC

ИНН 7805602321 КПП 780501001 Р/С 40702810122510004610 ФАКБ "АБСОЛЮТ БАНК" (ЗАО) в г.Санкт-Петербурге К/С 30101810900000000703 БИК 044030703

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С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибуторских договоров

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- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
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- Тестирование поставляемой продукции.
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- Входной контроль качества.
- Наличие сертификата ISO.

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- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



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