

**Static Characteristics**
**T<sub>J</sub> = 25°C unless otherwise specified**
**APT84M50B2\_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	500			V
ΔV <sub>BR(DSS)}/ΔT<sub>J</sub></sub>	Breakdown Voltage Temperature Coefficient	Reference to 25°C, I <sub>D</sub> = 250μA		0.60		V/°C
R <sub>DS(on)</sub>	Drain-Source On Resistance <sup>③</sup>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 42A		0.055	0.065	Ω
V <sub>GS(th)</sub>	Gate-Source Threshold Voltage	V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> = 2.5mA	3	4	5	V
ΔV <sub>GS(th)}/ΔT<sub>J</sub></sub>	Threshold Voltage Temperature Coefficient			-10		mV/°C
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> = 500V V <sub>GS</sub> = 0V			100	μA
		T <sub>J</sub> = 25°C T <sub>J</sub> = 125°C			500	
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> = 42A		65		S
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 25V f = 1MHz		13500		pF
C <sub>rss</sub>	Reverse Transfer Capacitance			185		
C <sub>oss</sub>	Output Capacitance			1455		
C <sub>o(cr)</sub> <sup>④</sup>	Effective Output Capacitance, Charge Related	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 0V to 333V		845		pF
C <sub>o(er)</sub> <sup>⑤</sup>	Effective Output Capacitance, Energy Related			425		
Q <sub>g</sub>	Total Gate Charge	V <sub>GS</sub> = 0 to 10V, I <sub>D</sub> = 42A, V <sub>DS</sub> = 250V		340		nC
Q <sub>gs</sub>	Gate-Source Charge			75		
Q <sub>gd</sub>	Gate-Drain Charge			155		
t <sub>d(on)</sub>	Turn-On Delay Time	<b>Resistive Switching</b> V <sub>DD</sub> = 333V, I <sub>D</sub> = 42A R <sub>G</sub> = 2.2Ω <sup>⑥</sup> , V <sub>GG</sub> = 15V		60		ns
t <sub>r</sub>	Current Rise Time			70		
t <sub>d(off)</sub>	Turn-Off Delay Time			155		
t <sub>f</sub>	Current Fall Time			50		

**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)			84	A
I <sub>SM</sub>	Pulsed Source Current (Body Diode) <sup>①</sup>				270	
V <sub>SD</sub>	Diode Forward Voltage	I <sub>SD</sub> = 42A, T <sub>J</sub> = 25°C, V <sub>GS</sub> = 0V			1.0	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>SD</sub> = 42A <sup>②</sup>		720		ns
Q <sub>rr</sub>	Reverse Recovery Charge	di <sub>SD</sub> /dt = 100A/μs, T <sub>J</sub> = 25°C		20		μC
dv/dt	Peak Recovery dv/dt	I <sub>SD</sub> ≤ 42A, di/dt ≤ 1000A/μs, V <sub>DD</sub> = 100V, T <sub>J</sub> = 125°C			8	V/ns

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

② Starting at T<sub>J</sub> = 25°C, L = 2.08mH, R<sub>G</sub> = 25Ω, I<sub>AS</sub> = 42A.

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> = -3.14E-7/V<sub>DS</sub><sup>2</sup> + 7.31E-8/V<sub>DS</sub> + 2.09E-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.

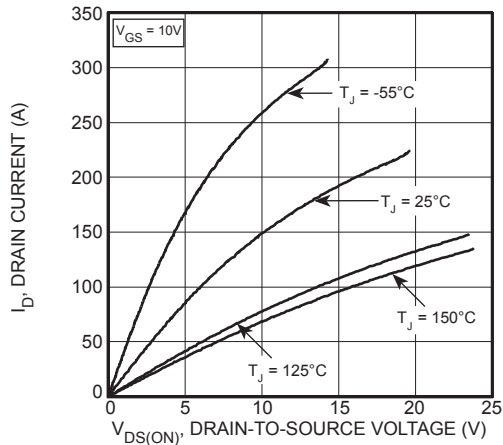


Figure 1, Output Characteristics

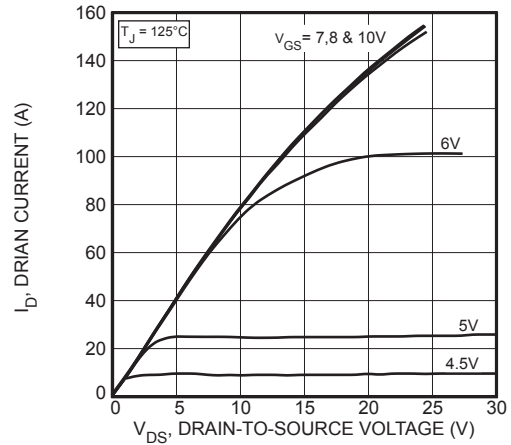


Figure 2, Output Characteristics

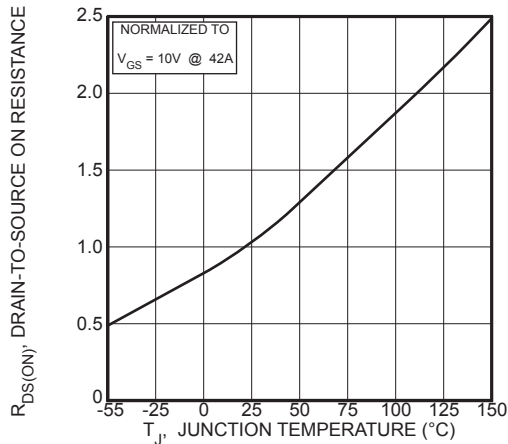


Figure 3,  $R_{DS(ON)}$  vs Junction Temperature

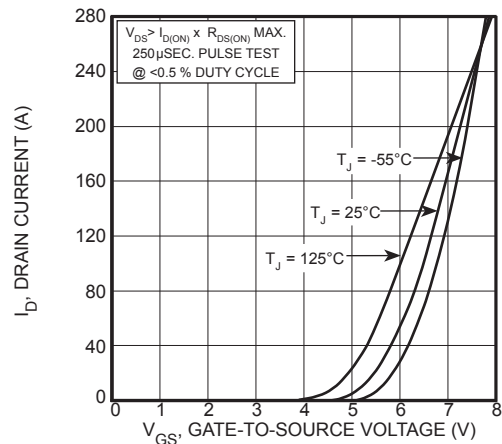


Figure 4, Transfer Characteristics

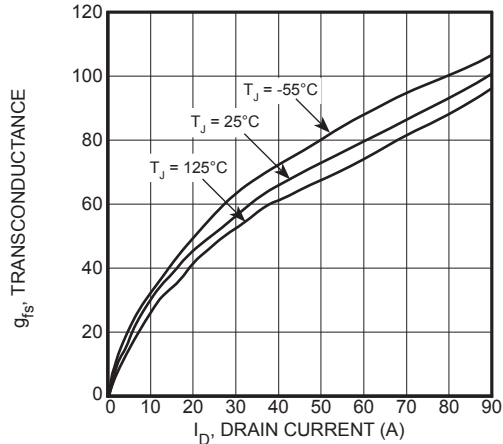


Figure 5, Gain vs Drain Current

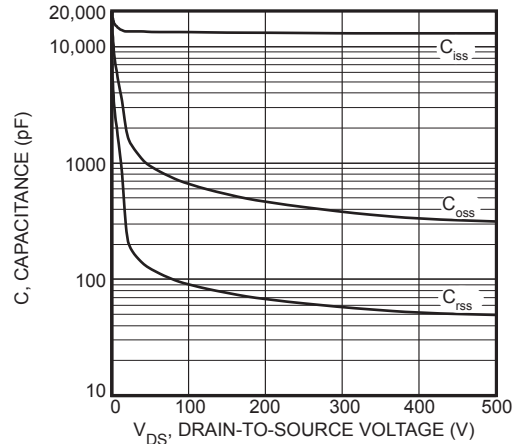


Figure 6, Capacitance vs Drain-to-Source Voltage

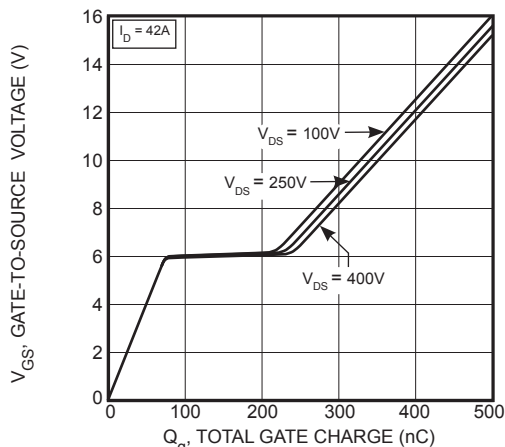


Figure 7, Gate Charge vs Gate-to-Source Voltage

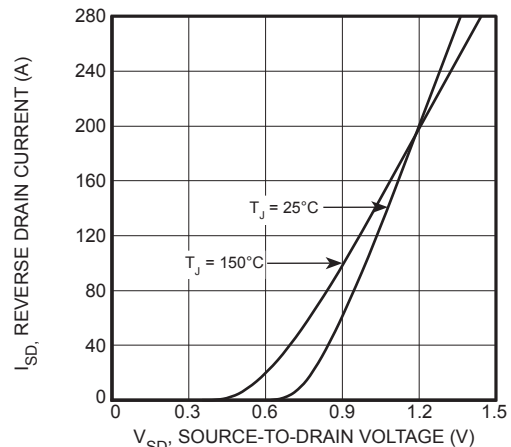
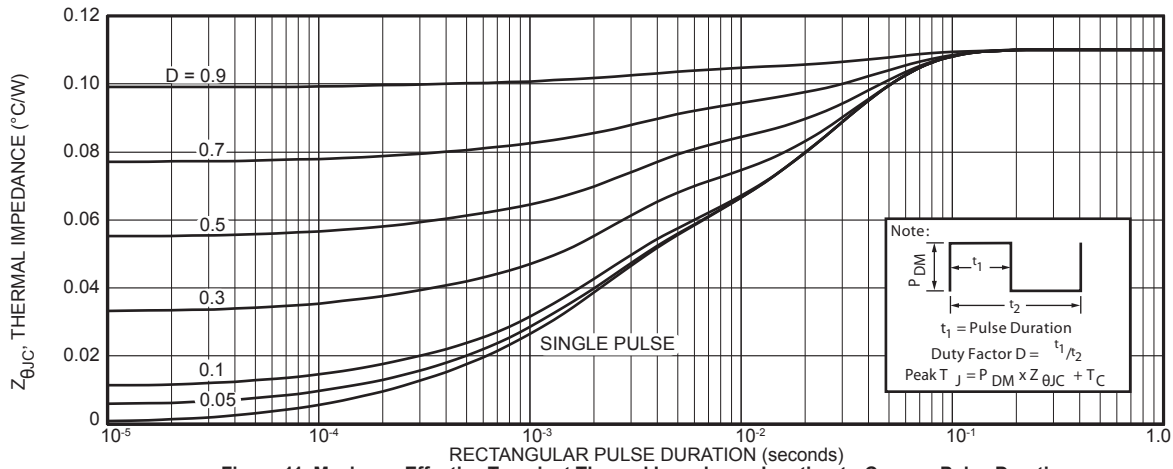
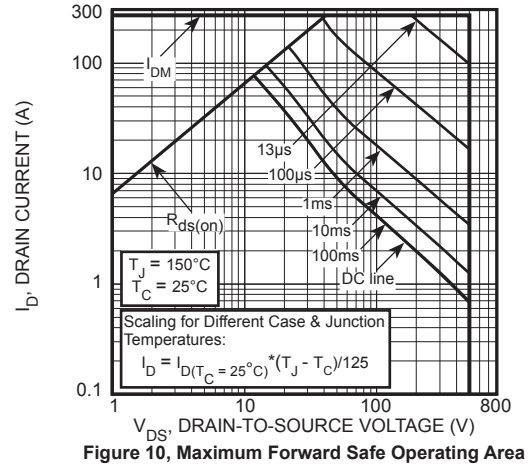
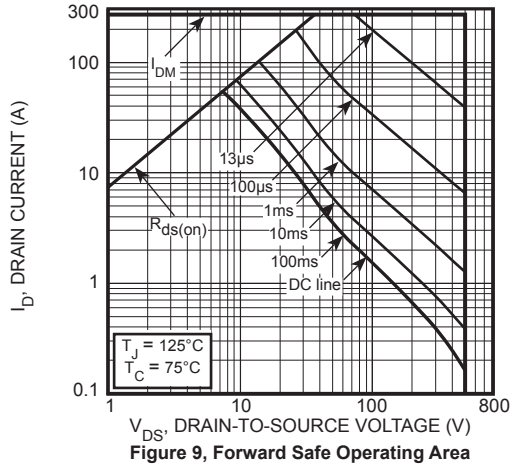


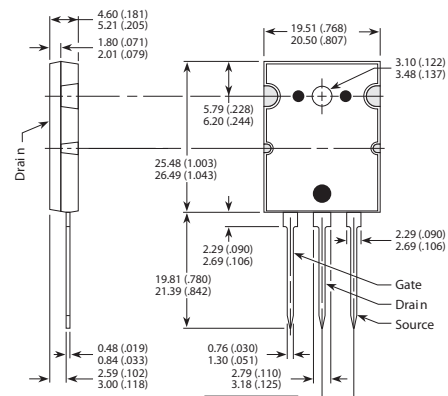
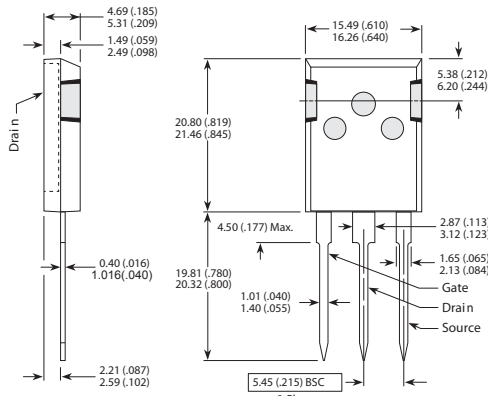
Figure 8, Reverse Drain Current vs Source-to-Drain Voltage



**T-MAX™ (B2) Package Outline**

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

Ⓒ 100% Sn Plated



These dimensions are equal to the TO-247 without the mounting hole.

Dimensions in Millimeters (Inches)

Dimensions in Millimeters (Inches)

# Mouser Electronics

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