

Static Characteristics

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

APT38F80B2_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 $25^\circ\text{C}, I_D = 250\mu A$		0.87		V/ $^\circ\text{C}$
$R_{DS(on)}$	Drain-Source On Resistance ^③	$V_{GS} = 10V, I_D = 20A$		0.19	0.24	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	$V_{DS} = 800V$ $V_{GS} = 0V$			250	μA
		$T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$			1000	
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	$V_{DS} = 50V, I_D = 20A$		38		S
C_{iss}	Input Capacitance	$V_{GS} = 0V, V_{DS} = 25V$ $f = 1MHz$		8070		pF
C_{rss}	Reverse Transfer Capacitance			140		
C_{oss}	Output Capacitance			805		
$C_{o(cr)}^{④}$	Effective Output Capacitance, Charge Related	$V_{GS} = 0V, V_{DS} = 0V$ to 533V		380		
$C_{o(er)}^{⑤}$	Effective Output Capacitance, Energy Related			190		
Q_g	Total Gate Charge	$V_{GS} = 0$ to 10V, $I_D = 20A$, $V_{DS} = 400V$		260		nC
Q_{gs}	Gate-Source Charge			44		
Q_{gd}	Gate-Drain Charge			135		
$t_{d(on)}$	Turn-On Delay Time	Resistive Switching $V_{DD} = 533V, I_D = 20A$ $R_G = 2.2\Omega^{⑥}, V_{GG} = 15V$		46		ns
t_r	Current Rise Time			65		
$t_{d(off)}$	Turn-Off Delay Time			200		
t_f	Current Fall Time			60		

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)			41	A
I_{SM}	Pulsed Source Current (Body Diode) ^①				150	
V_{SD}	Diode Forward Voltage	$I_{SD} = 20A, T_J = 25^\circ\text{C}, V_{GS} = 0V$			1.2	V
t_{rr}	Reverse Recovery Time	$I_{SD} = 20A^{③}$ $V_{DD} = 100V$ $di_{SD}/dt = 100A/\mu s$	$T_J = 25^\circ\text{C}$	250	300	ns
			$T_J = 125^\circ\text{C}$	485	600	
Q_{rr}	Reverse Recovery Charge		$T_J = 25^\circ\text{C}$	2		μC
			$T_J = 125^\circ\text{C}$	6.7		
I_{rrm}	Reverse Recovery Current		$T_J = 25^\circ\text{C}$	13		A
			$T_J = 125^\circ\text{C}$	22		
dv/dt	Peak Recovery dv/dt	$I_{SD} \leq 20A, di/dt \leq 1000A/\mu s, V_{DD} = 533V$ $T_J = 125^\circ\text{C}$			20	V/ns

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

② Starting at $T_J = 25^\circ\text{C}$, $L = 8.55mH$, $R_G = 25\Omega$, $I_{AS} = 20A$.

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: $C_{o(er)} = -2.17E-7/V_{DS}^2 + 2.63E-8/V_{DS} + 3.74E-11$.

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.

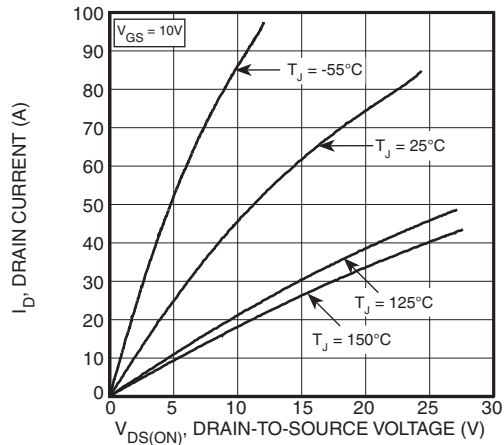


Figure 1, Output Characteristics

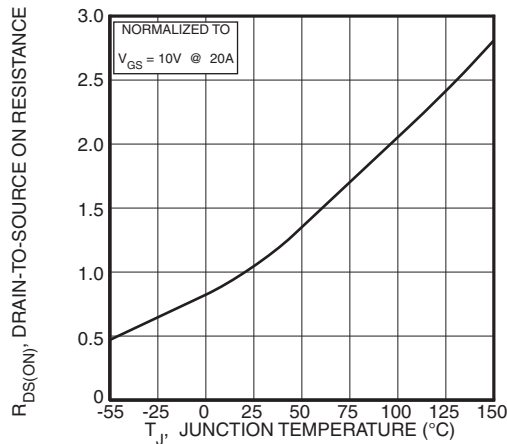
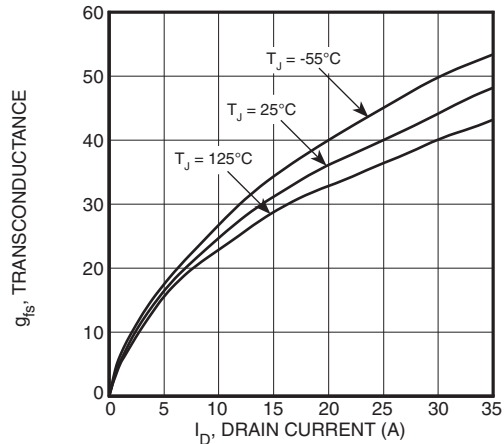
Figure 3, $R_{DS(ON)}$ vs Junction Temperature

Figure 5, Gain vs Drain Current

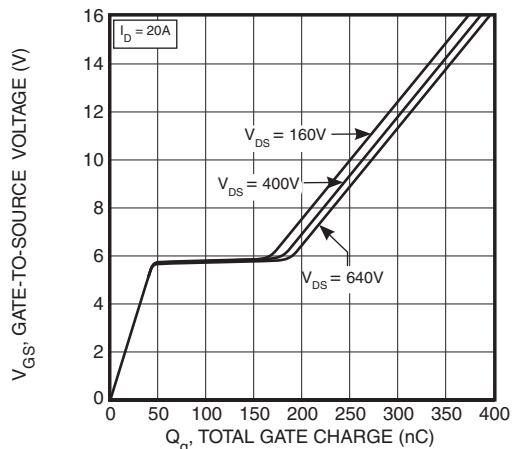


Figure 7, Gate Charge vs Gate-to-Source Voltage

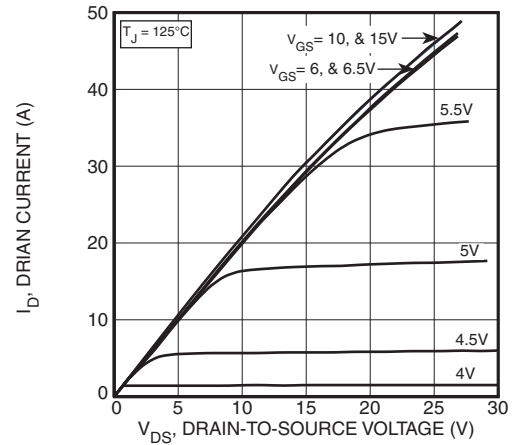


Figure 2, Output Characteristics

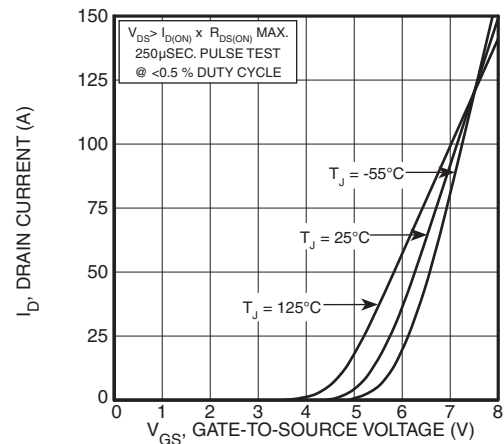


Figure 4, Transfer Characteristics

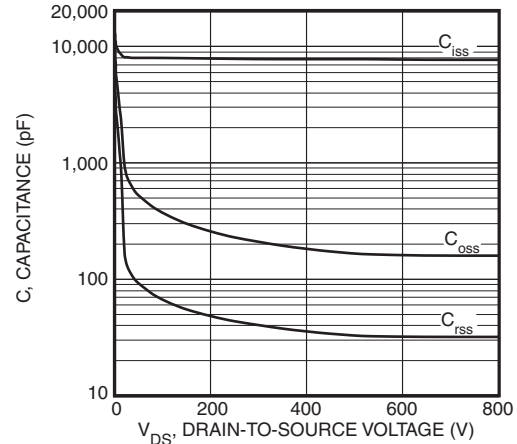


Figure 6, Capacitance vs Drain-to-Source Voltage

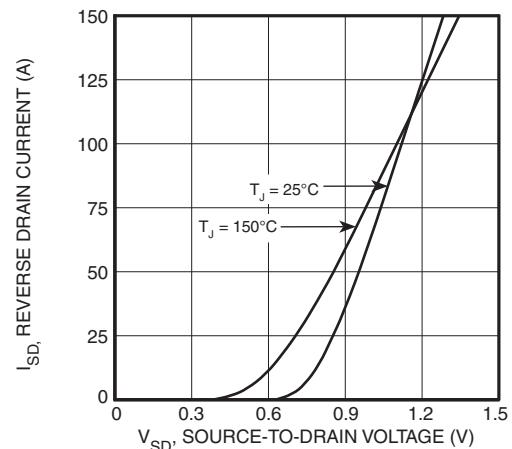


Figure 8, Reverse Drain Current vs Source-to-Drain Voltage

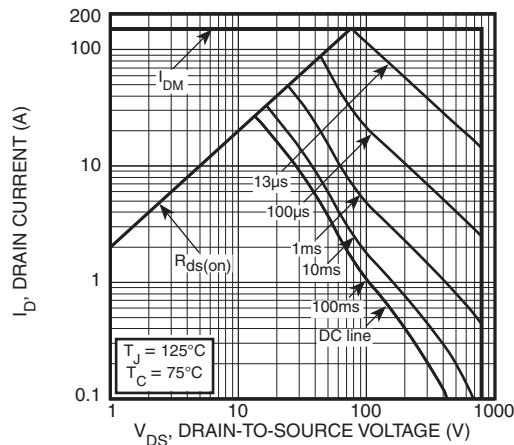


Figure 9, Forward Safe Operating Area

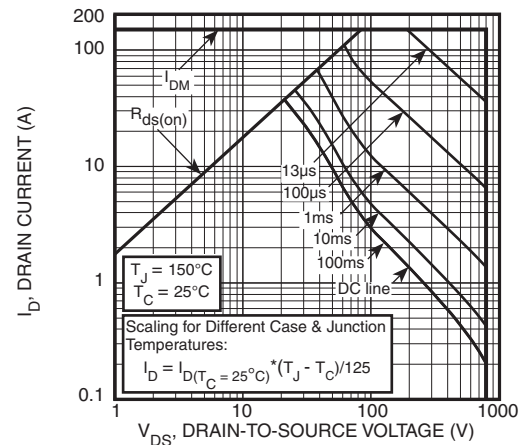


Figure 10, Maximum Forward Safe Operating Area

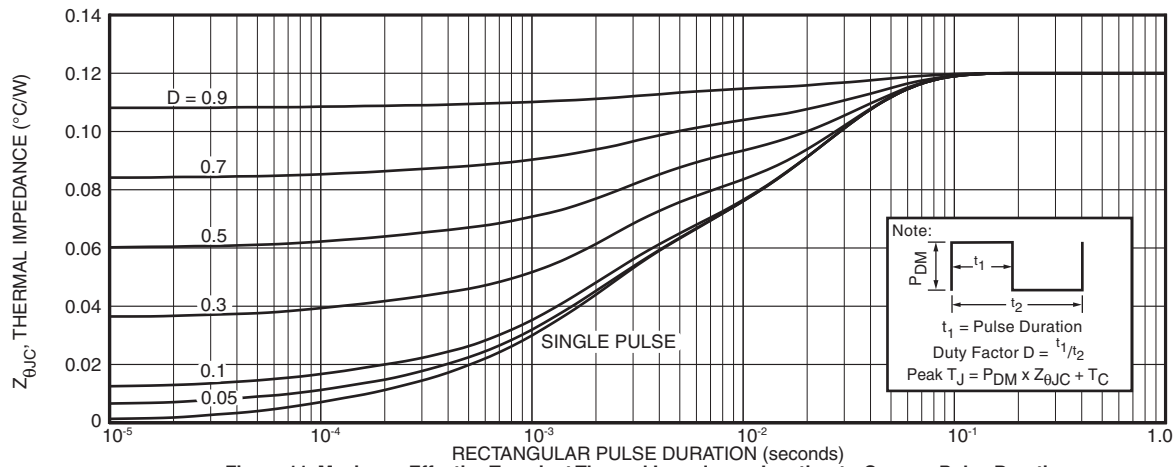
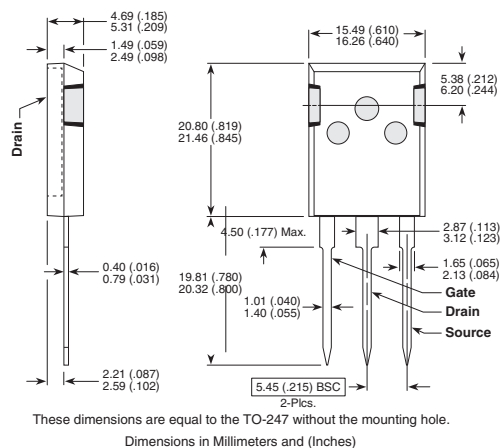


Figure 11. Maximum Effective Transient Thermal Impedance Junction-to-Case vs Pulse Duration

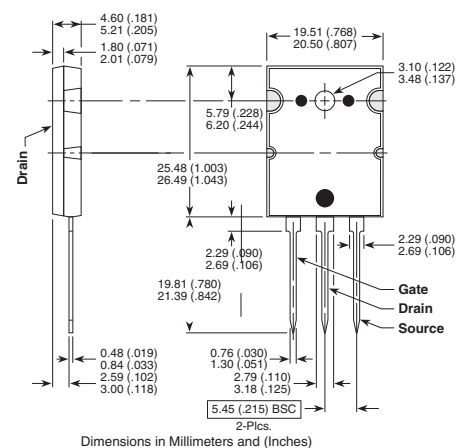
T-MAX® (B2) Package Outline

TO-264 (L) Package Outline

e3 100% Sn Plated



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



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