

NTLTS3107P

Power MOSFET

–20 V, –8.3 A, Single P–Channel,
Micro8 Leadless Package

Features

- Low $R_{DS(on)}$ for Extended Battery Life
- Surface Mount Micro8 Leadless for Improved Thermal Performance
- Low Profile (<1.0 mm) Optimal for Portable Designs
- Low Turn-On Voltage
- This is a Pb-Free Device

Applications

- Optimized for Load Management Applications
- Charge Control in Battery Powered Systems
- Cell Phones, DSC, Notebooks, Portable Games, etc.

MAXIMUM RATINGS ($T_J = 25^\circ\text{C}$ unless otherwise stated)

Parameter			Symbol	Value	Unit
Drain-to-Source Voltage			V_{DSS}	−20	V
Gate-to-Source Voltage			V_{GS}	± 8.0	V
Continuous Drain Current (Note 1)	Steady State	$T_A = 25^{\circ}\text{C}$	I_D	−8.3	A
		$T_A = 85^{\circ}\text{C}$		−6.0	
	$t \leq 10\text{ s}$	$T_A = 25^{\circ}\text{C}$		−12	
Power Dissipation (Note 1)	Steady State	$T_A = 25^{\circ}\text{C}$	P_D	1.6	W
	$t \leq 10\text{ s}$			3.3	
Continuous Drain Current (Note 2)	Steady State	$T_A = 25^{\circ}\text{C}$	I_D	−5.9	A
		$T_A = 85^{\circ}\text{C}$		−3.7	
Power Dissipation (Note 2)		$T_A = 25^{\circ}\text{C}$	P_D	0.8	W
Pulsed Drain Current (Note 1)	$t_p = 10\text{ }\mu\text{s}$		I_{DM}	−25	A
Operating Junction and Storage Temperature			T_J, T_{STG}	−55 to 150	$^{\circ}\text{C}$
Source Current (Body Diode)			I_S	−1.6	A
Lead Temperature for Soldering Purposes (1/8 in from case for 10 s)			T_L	260	$^{\circ}\text{C}$

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Max	Unit
Junction-to-Ambient – Steady State (Note 1)	$R_{\theta JA}$	80	$^\circ\text{C/W}$
Junction-to-Ambient – $t \leq 10\text{ s}$ (Note 1)	$R_{\theta JA}$	38	$^\circ\text{C/W}$
Junction-to-Ambient – Steady State (Note 2)	$R_{\theta JA}$	160	$^\circ\text{C/W}$

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

1. Surface-mounted on FR4 board using 1 sq. in. pad size (Cu. area = 1.127 sq. in. [1 oz] including traces).
2. Surface-mounted on FR4 board using minimum recommended pad size (Cu. area = TBD sq. in.).

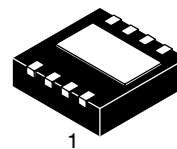
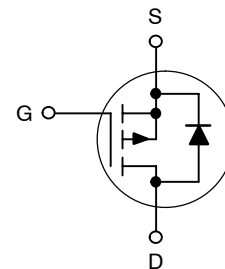


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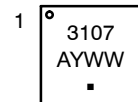
$V_{(BR)DS}$	$R_{DS(on)}$ TYP	I_D MAX
–20 V	12.2 m Ω @ –4.5 V	–8.3 A
	15.6 m Ω @ –2.5 V	
	26.2 m Ω @ –1.8 V	

P–Channel MOSFET



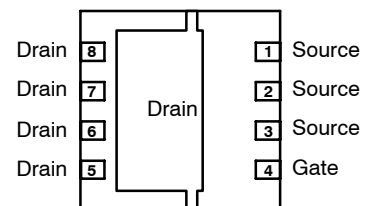
**Micro8 Leadless
CASE 846C**

MARKING DIAGRAM



A = Assembly Location
Y = Year
WW = Work Week
▪ = Pb-Free Package

PIN ASSIGNMENT



(Bottom View)

ORDERING INFORMATION

Device	Package	Shipping†
NTLTS3107PR2G	Micro8 (Pb-Free)	2500/Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

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ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise specified)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Drain-to-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = -250 μA	-20			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	V _{(BR)DSS} /T _J			11		mV/°C
Zero Gate Voltage Drain Current	I _{DSS}	V _{GS} = 0 V, V _{DS} = -16 V			-10	μA
Gate-to-Source Leakage Current	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±8.0 V			±100	nA

ON CHARACTERISTICS (Note 3)

Gate Threshold Voltage	V _{GS(TH)}	V _{GS} = V _{DS} , I _D = -250 μA	-0.45		-1.2	V
Negative Threshold Temperature Coefficient	V _{GS(TH)} /T _J			3.4		mV/°C
Drain-to-Source On Resistance	R _{DS(on)}	V _{GS} = -4.5 V, I _D = -8.0 A		12.2	16	mΩ
		V _{GS} = -2.5 V, I _D = -7.0 A		15.6	21	
		V _{GS} = -1.8 V, I _D = -5.8 A		26.2		
Forward Transconductance	g _{FS}	V _{DS} = -5 V, I _D = -8.0 A		25		S

CHARGES AND CAPACITANCES

Input Capacitance	C _{ISS}	V _{GS} = 0 V, f = 1 MHz, V _{DS} = -16 V		4645	6500	pF
Output Capacitance	C _{OSS}			465	650	
Reverse Transfer Capacitance	C _{RSS}			285	400	
Total Gate Charge	Q _{G(TOT)}	V _{GS} = -4.5 V, V _{DS} = -16 V, I _D = -8.0 A		40	60	nC
Threshold Gate Charge	Q _{G(TH)}			3.0		
Gate-to-Source Gate Charge	Q _{GS}			7.0		
Gate-to-Drain "Miller" Charge	Q _{GD}			11		

SWITCHING CHARACTERISTICS (Note 4)

Turn-On Delay Time	t _{d(on)}	V _{GS} = -4.5 V, V _{DS} = -10 V, I _D = -8.0 A, R _G = 3.0 Ω		30		ns
Rise Time	t _r			20		
Turn-Off Delay Time	t _{d(off)}			250		
Fall Time	t _f			80		

DRAIN-SOURCE DIODE CHARACTERISTICS (Note 3)

Forward Diode Voltage	V _{SD}	V _{GS} = 0 V, I _S = -1.6 A	T _J = 25°C		-0.7	-1.2	V
			T _J = 125°C		0.5		
Reverse Recovery Time	t _{RR}	V _{GS} = 0 V, dI _S /dt = 100 A/μs, I _S = -1.6 A		75	100	ns	
Charge Time	t _a			28			
Discharge Time	t _b			47			
Reverse Recovery Charge	Q _{RR}			81.5		nC	

3. Pulse Test: pulse width ≤ 300 μs, duty cycle ≤ 2%.

4. Switching characteristics are independent of operating junction temperatures.

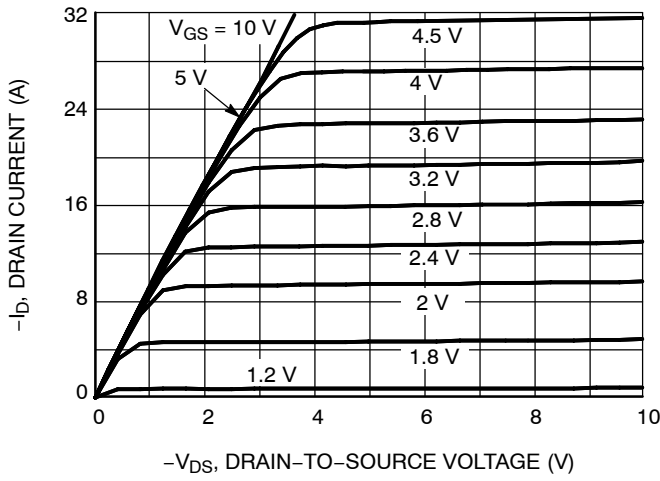


Figure 1. On-Region Characteristics

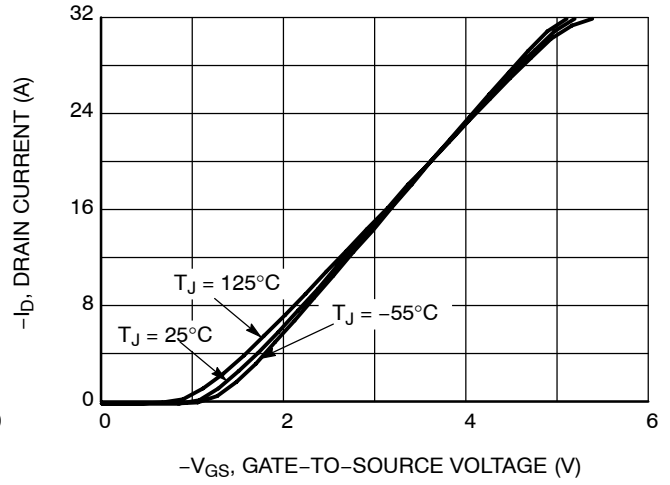


Figure 2. Transfer Characteristics

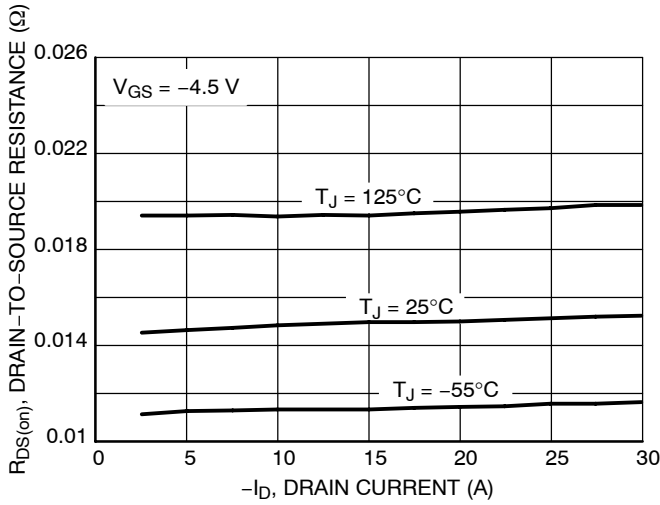


Figure 3. On-Resistance versus Drain Current and Temperature

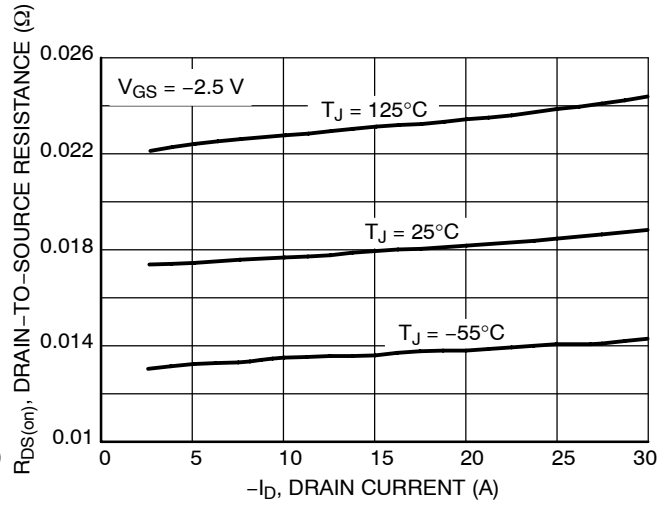


Figure 4. On-Resistance versus Drain Current and Temperature

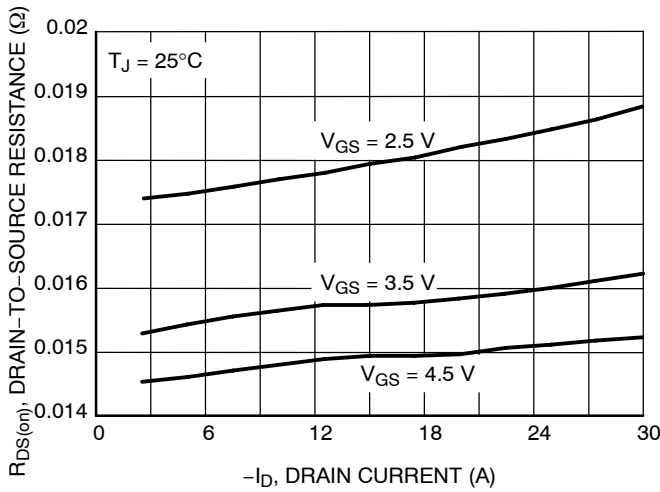


Figure 5. On-Resistance versus Drain Current and Gate Voltage

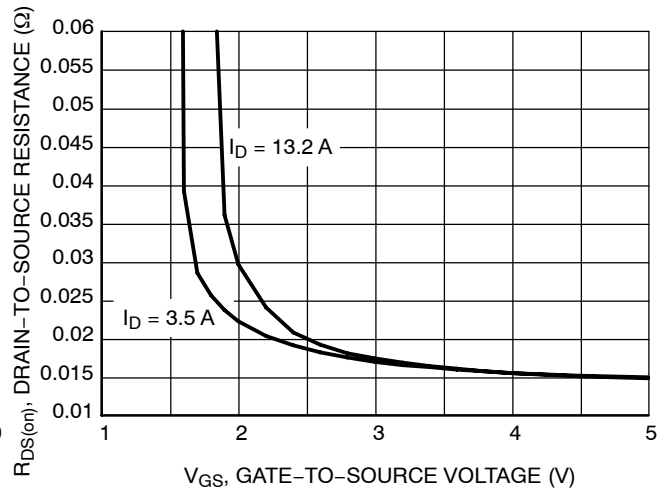


Figure 6. On-Resistance versus Gate Voltage

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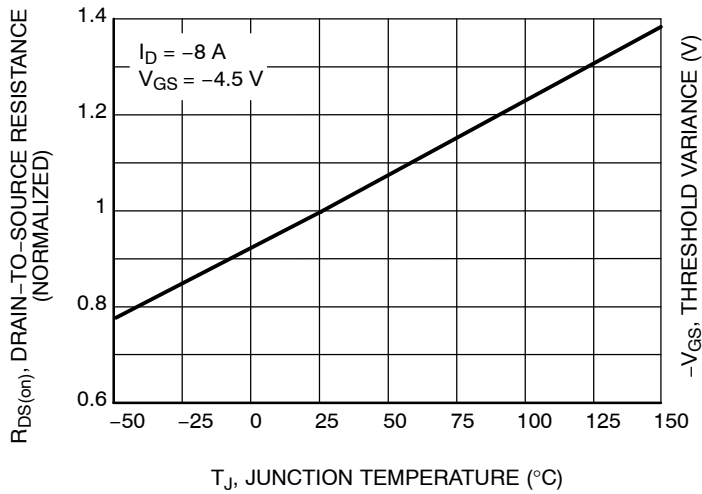


Figure 7. On-Resistance Variation with Temperature

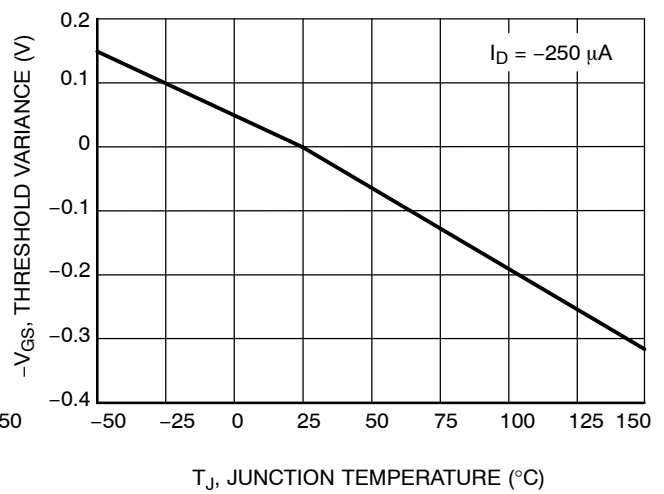


Figure 8. Threshold Voltage

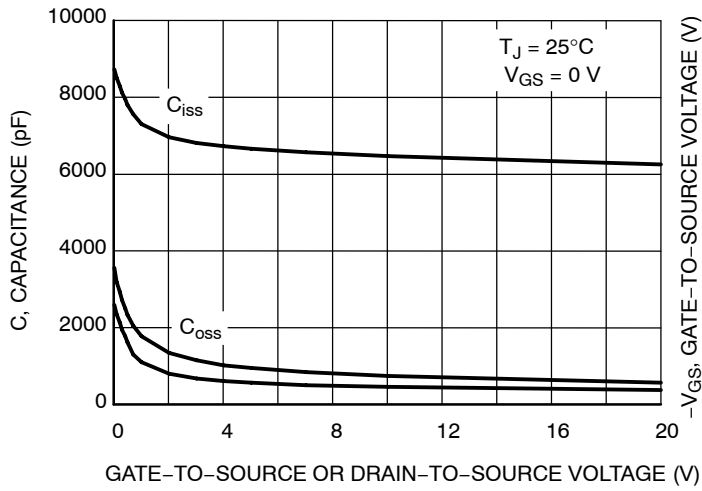


Figure 9. Capacitance Variation

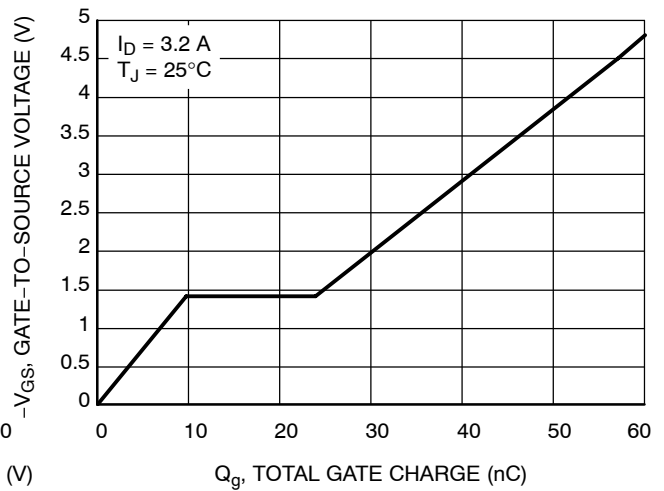


Figure 10. Gate-to-Source and Drain-to-Source Voltage versus Total Charge

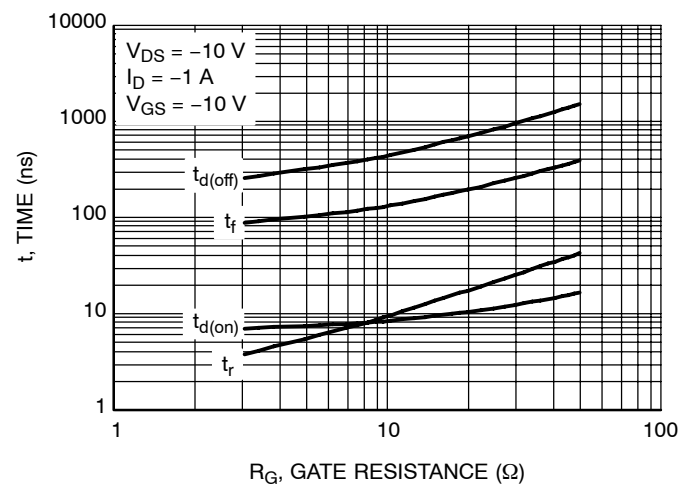


Figure 11. Resistive Switching Time Variation versus Gate Resistance

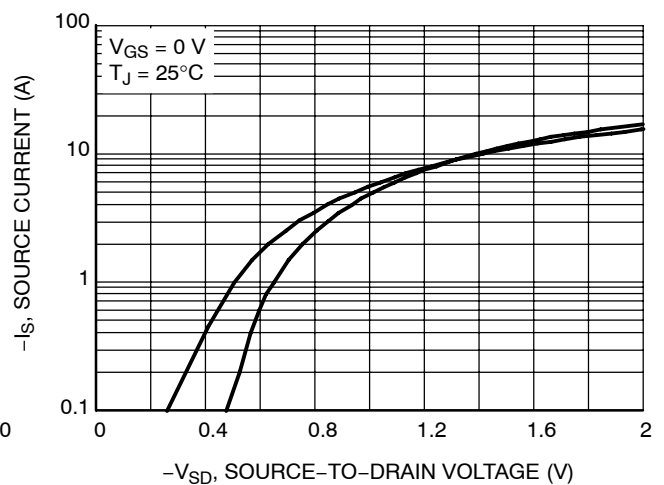
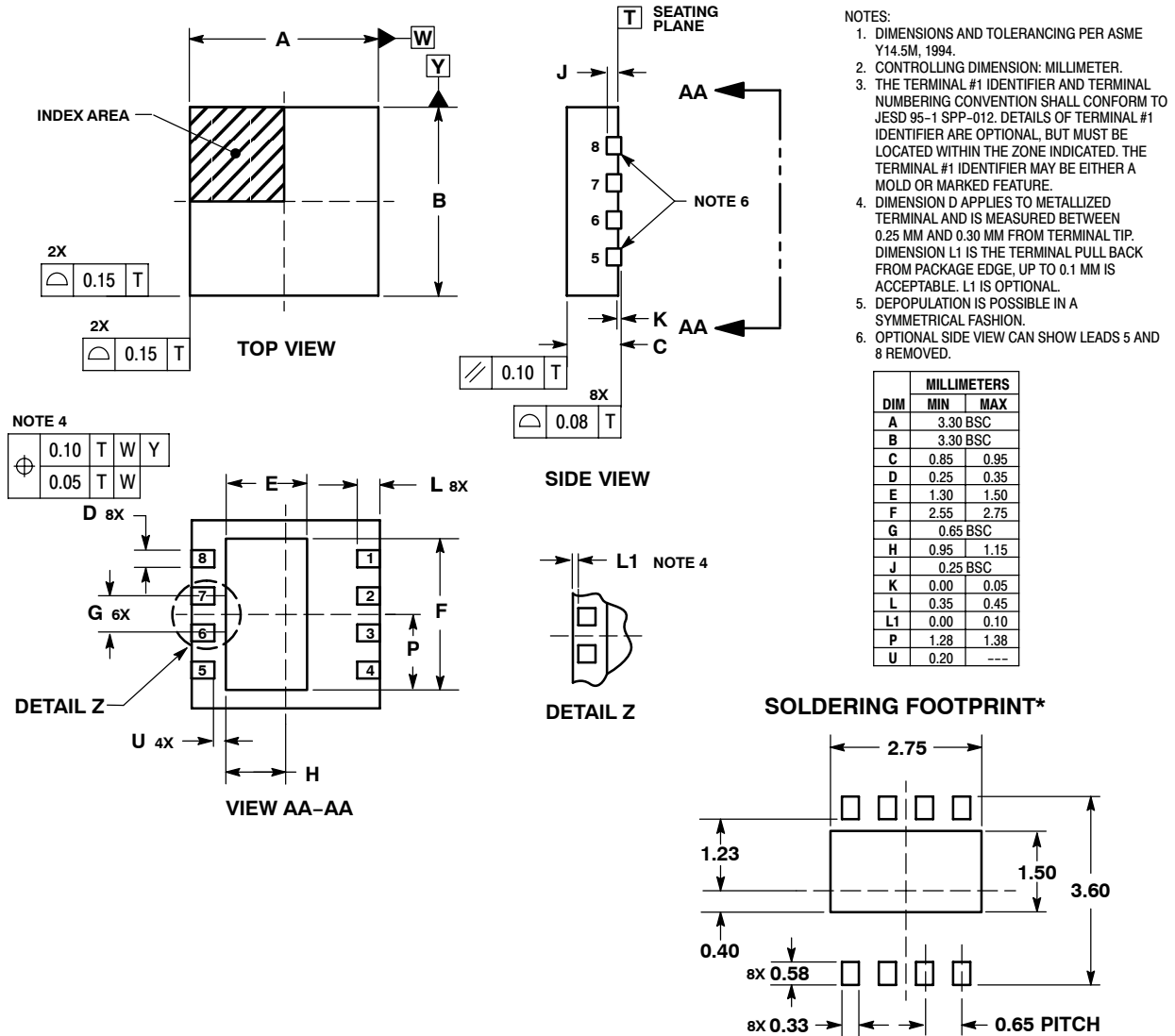


Figure 12. Diode Forward Voltage versus Current

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PACKAGE DIMENSIONS

MICRO8 LEADLESS CASE 846C-01 ISSUE B



*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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