

MOSFET – Power

-60 V, -20 A, 52 mΩ

NTTFS5116PL

Features

- Low $R_{DS(on)}$
- Fast Switching
- These Devices are Pb-Free and are RoHS Compliant

Applications

- Load Switches
- DC Motor Control
- DC-DC Conversion

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

Parameter	Symbol	Value	Unit	
Drain-to-Source Voltage	V_{DSS}	-60	V	
Gate-to-Source Voltage	V_{GS}	± 20	V	
Continuous Drain Current $R_{\theta JA}$ (Note 1)	I_D	$T_A = 25\text{ }^\circ\text{C}$	-5.7	A
		$T_A = 100\text{ }^\circ\text{C}$	-4.0	
Power Dissipation $R_{\theta JA}$ (Note 1)	P_D	$T_A = 25\text{ }^\circ\text{C}$	3.2	W
		$T_A = 100\text{ }^\circ\text{C}$	1.6	
Continuous Drain Current $R_{\theta JC}$ (Note 1)	I_D	$T_C = 25\text{ }^\circ\text{C}$	-20	A
		$T_C = 100\text{ }^\circ\text{C}$	-14	
Power Dissipation $R_{\theta JC}$ (Note 1)	P_D	$T_C = 25\text{ }^\circ\text{C}$	40	W
		$T_C = 100\text{ }^\circ\text{C}$	20	
Pulsed Drain Current	$t_p = 10\text{ }\mu\text{s}$	I_{DM}	-76	A
Operating Junction and Storage Temperature	T_J, T_{stg}	-55 to +175	$^\circ\text{C}$	
Source Current (Body Diode)	I_S	-20	A	
Single Pulse Drain-to-Source Avalanche Energy	$L = 0.1\text{ mH}$	E_{AS}	45	mJ
		I_{AS}	30	A
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)	T_L	260	$^\circ\text{C}$	

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

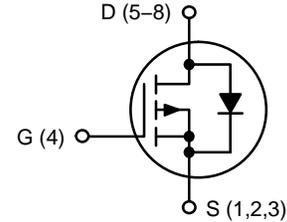
THERMAL RESISTANCE MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Junction-to-Case – Steady State (Note 1)	$R_{\theta JC}$	3.8	$^\circ\text{C/W}$
Junction-to-Ambient – Steady State (Note 1)	$R_{\theta JA}$	47	

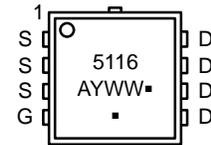
1. Surface-mounted on FR4 board using 1 in sq pad size (Cu area = 1.127 in sq [2 oz] including traces).

$V_{(BR)DSS}$	$R_{DS(on)}$ MAX	I_D MAX
-60 V	52 mΩ @ -10 V	-20 A
	72 mΩ @ -4.5 V	

P-Channel MOSFET



MARKING DIAGRAM



5116 = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week
▪ = Pb-Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

Device	Package	Shipping†
NTTFS5116PLTAG	WDFN8 (Pb-Free)	1500/Tape & Reel
NTTFS5116PLTWG	WDFN8 (Pb-Free)	5000/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](#).

NTTFS5116PL

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

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = -250 μA	-60			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	V _{(BR)DSS} /T _J			69.7		mV/°C
Zero Gate Voltage Drain Current	I _{DSS}	V _{GS} = 0 V, V _{DS} = -60 V	T _J = 25 °C		-1.0	μA
			T _J = 125 °C		-100	
Gate-to-Source Leakage Current	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±20 V			±100	nA

ON CHARACTERISTICS (Note 2)

Gate Threshold Voltage	V _{GS(TH)}	V _{GS} = V _{DS} , I _D = -250 μA	-1		-3	V
Negative Threshold Temperature Coefficient	V _{GS(TH)} /T _J			-6.2		mV/°C
Drain-to-Source On Resistance	R _{DS(on)}	V _{GS} = -10 V	I _D = -6 A	37	52	mΩ
		V _{GS} = -4.5 V	I _D = -4.4 A	51	72	
Forward Transconductance	g _{FS}	V _{DS} = -15 V, I _D = -6 A		11		S

CHARGES, CAPACITANCES AND GATE RESISTANCE

Input Capacitance	C _{iss}	V _{GS} = 0 V, f = 1.0 MHz, V _{DS} = -30 V		1258		pF	
Output Capacitance	C _{oss}			127			
Reverse Transfer Capacitance	C _{rss}			84			
Total Gate Charge	Q _{G(TOT)}	V _{GS} = -10 V, V _{DS} = -48 V, I _D = -5 A		25		nC	
			V _{GS} = -4.5 V, V _{DS} = -48 V, I _D = -5 A		14		
Threshold Gate Charge	Q _{G(TH)}	V _{GS} = -4.5 V, V _{DS} = -48 V, I _D = -5 A		1		nC	
Gate-to-Source Charge	Q _{GS}			4			
Gate-to-Drain Charge	Q _{GD}			7			
Plateau Voltage	V _{GP}			3.1			V
Gate Resistance	R _G			5.3			Ω

SWITCHING CHARACTERISTICS (Note 3)

Turn-On Delay Time	t _{d(on)}	V _{GS} = -4.5 V, V _{DS} = -48 V, I _D = -5 A, R _G = 6 Ω		15		ns
Rise Time	t _r			58		
Turn-Off Delay Time	t _{d(off)}			30		
Fall Time	t _f			37		

DRAIN-SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	V _{SD}	V _{GS} = 0 V, I _S = -5 A	T _J = 25 °C	-0.79	-1.2	V
			T _J = 125 °C	-0.64		
Reverse Recovery Time	t _{RR}	V _{GS} = 0 V, dI _S /d _t = -100 A/μs, I _S = -5 A		20		ns
Charge Time	t _a			15		
Discharge Time	t _b			5		
Reverse Recovery Charge	Q _{RR}			19		

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

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

3. Switching characteristics are independent of operating junction temperatures.

TYPICAL CHARACTERISTICS

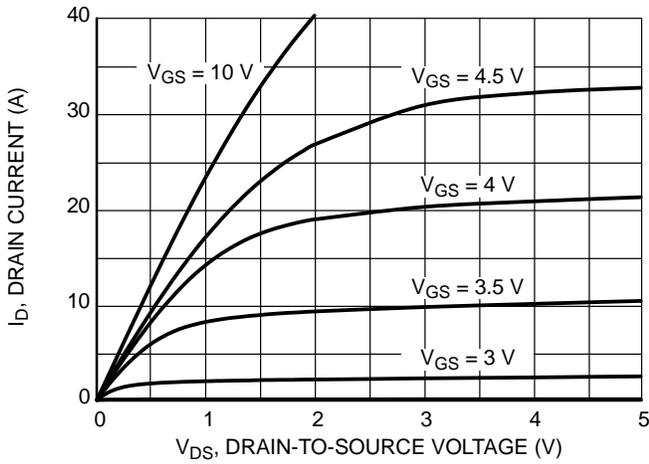


Figure 1. On-Region Characteristics

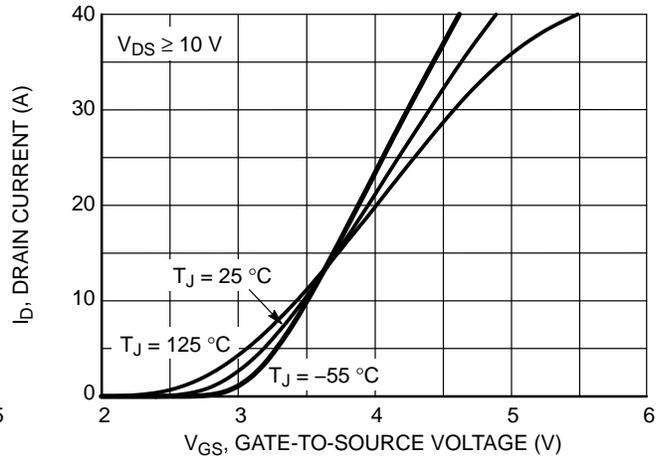


Figure 2. Transfer Characteristics

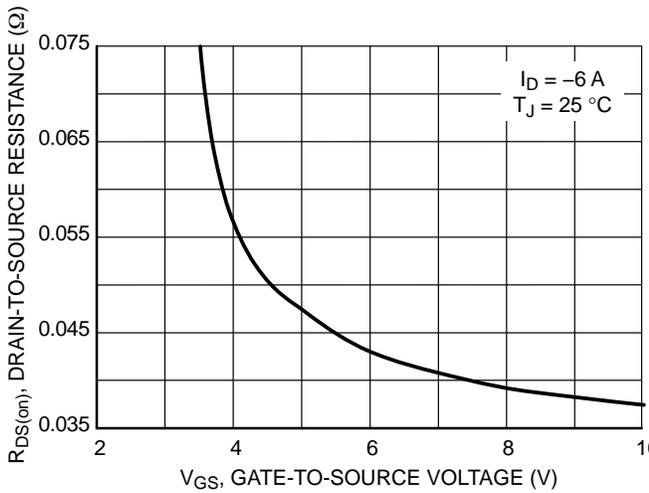


Figure 3. On-Resistance vs. Gate-to-Source Voltage

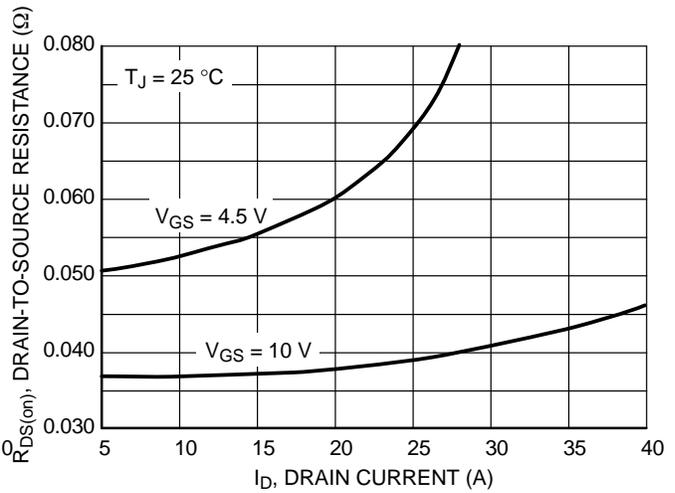


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

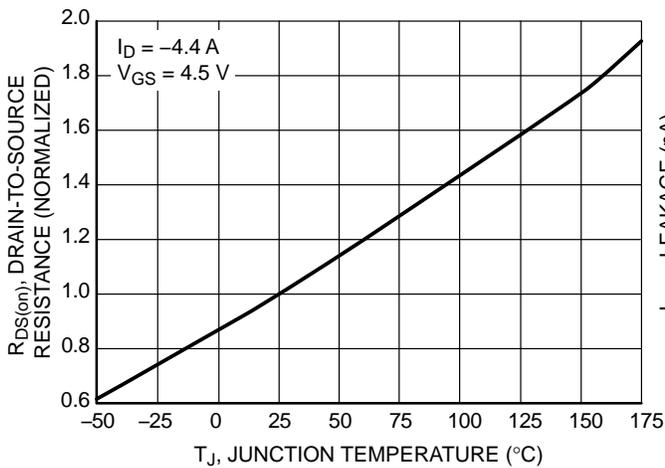


Figure 5. On-Resistance Variation with Temperature

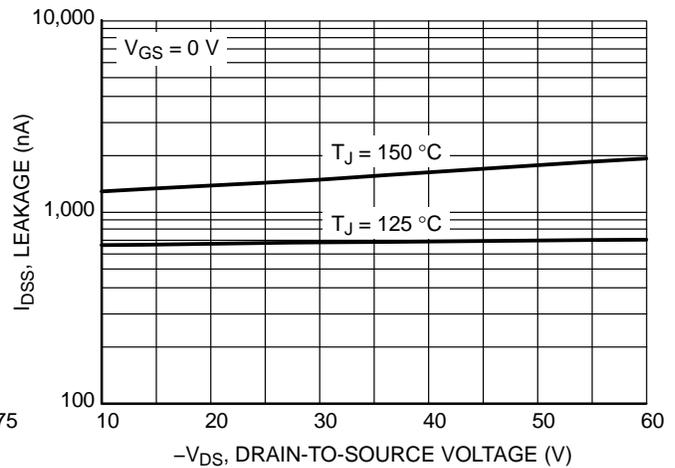


Figure 6. Drain-to-Source Leakage Current vs. Voltage

TYPICAL CHARACTERISTICS

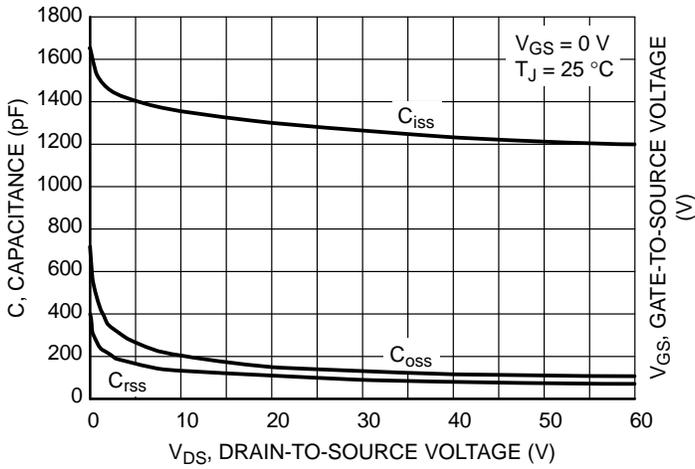


Figure 7. Capacitance Variation

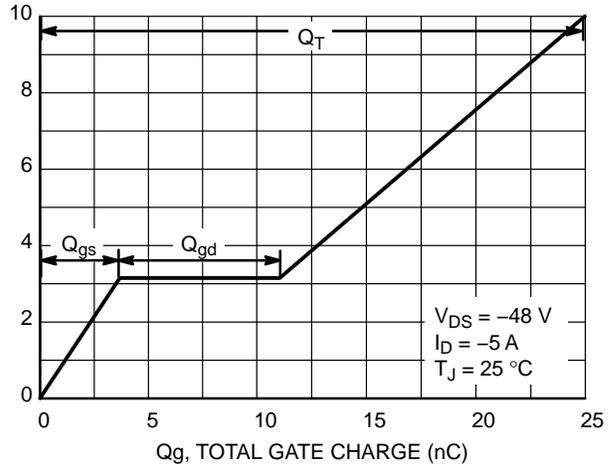


Figure 8. Gate-to-Source and Drain-to-Source Voltage vs. Total Charge

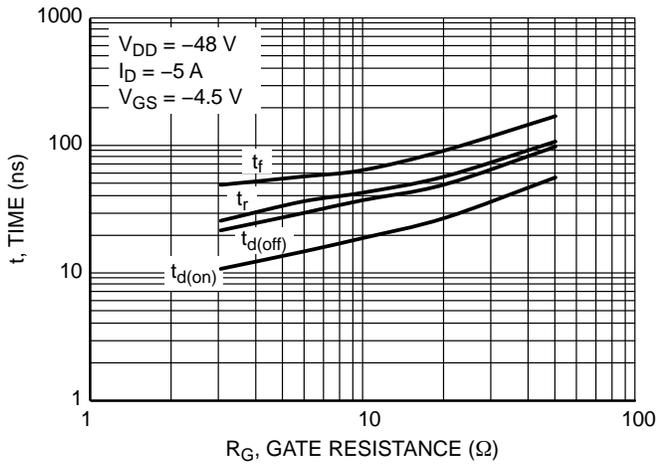


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

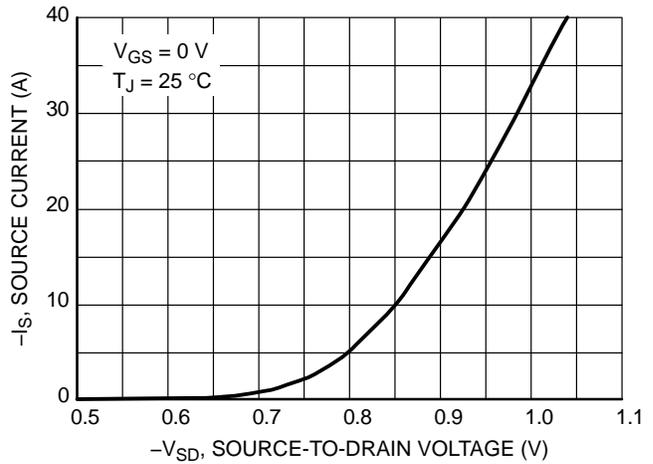


Figure 10. Diode Forward Voltage vs. Current

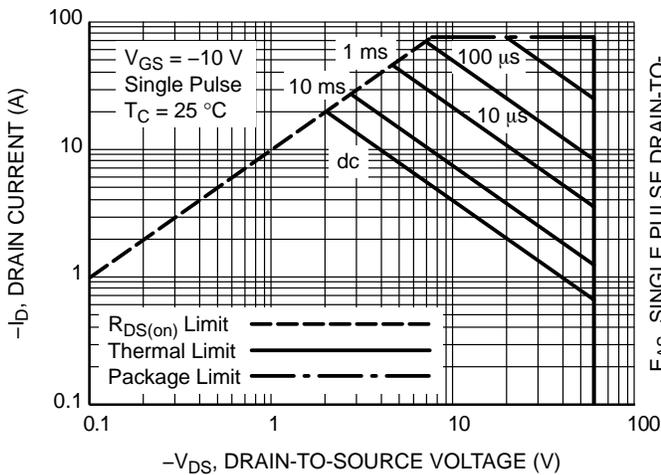


Figure 11. Maximum Rated Forward Biased Safe Operating Area

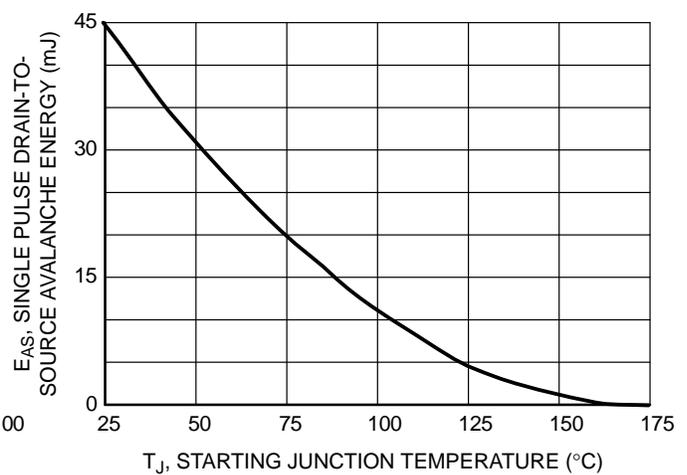


Figure 12. Maximum Avalanche Energy vs. Starting Junction Temperature

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TYPICAL CHARACTERISTICS

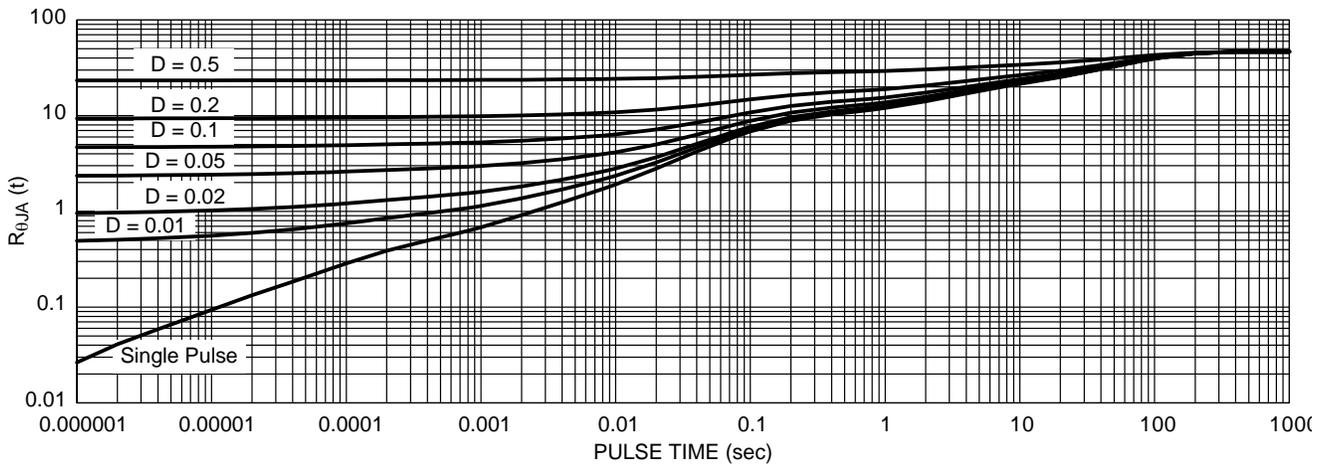


Figure 13. Thermal Response

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REVISION HISTORY

Revision	Description of Changes	Date
3	Rebranded the Data Sheet to onsemi format.	10/17/2025

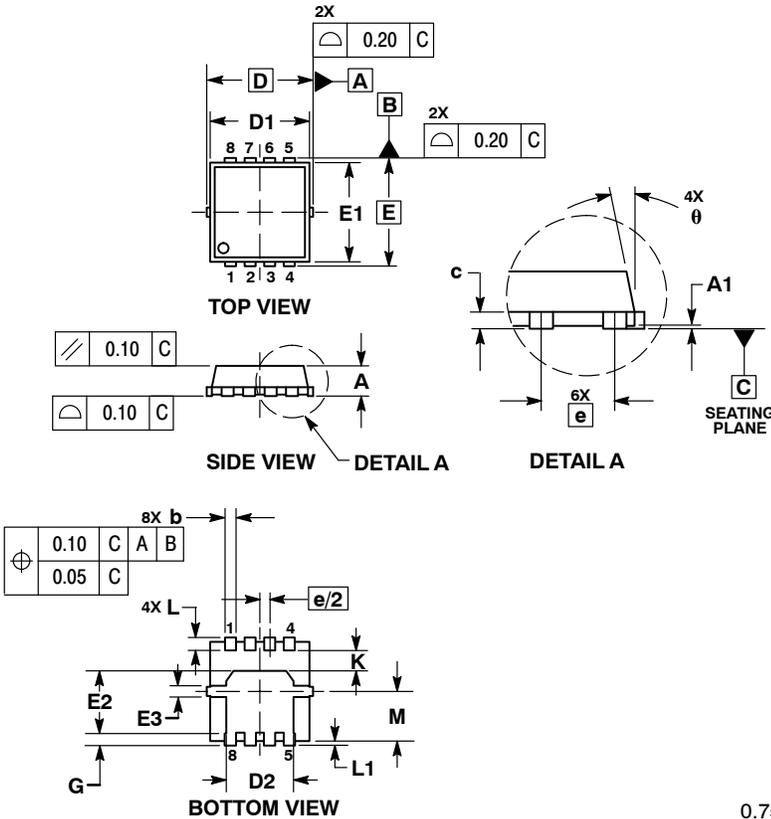
This document has undergone updates prior to the inclusion of this revision history table. The changes tracked here only reflect updates made on the noted approval dates.



SCALE 2:1

WDFN8 3.3x3.3, 0.65P
CASE 511AB
ISSUE D

DATE 23 APR 2012

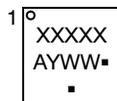


NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION D1 AND E1 DO NOT INCLUDE MOLD FLASH PROTRUSIONS OR GATE BURRS.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.70	0.75	0.80	0.028	0.030	0.031
A1	0.00	---	0.05	0.000	---	0.002
b	0.23	0.30	0.40	0.009	0.012	0.016
c	0.15	0.20	0.25	0.006	0.008	0.010
D	3.30 BSC			0.130 BSC		
D1	2.95	3.05	3.15	0.116	0.120	0.124
D2	1.98	2.11	2.24	0.078	0.083	0.088
E	3.30 BSC			0.130 BSC		
E1	2.95	3.05	3.15	0.116	0.120	0.124
E2	1.47	1.60	1.73	0.058	0.063	0.068
E3	0.23	0.30	0.40	0.009	0.012	0.016
e	0.65 BSC			0.026 BSC		
G	0.30	0.41	0.51	0.012	0.016	0.020
K	0.65	0.80	0.95	0.026	0.032	0.037
L	0.30	0.43	0.56	0.012	0.017	0.022
L1	0.06	0.13	0.20	0.002	0.005	0.008
M	1.40	1.50	1.60	0.055	0.059	0.063
θ	0 °	---	12 °	0 °	---	12 °

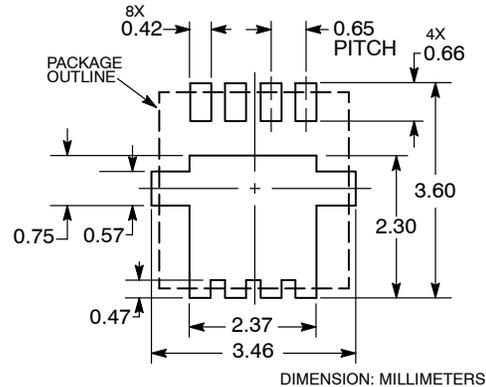
GENERIC MARKING DIAGRAM*



- XXXXX = Specific Device Code
- A = Assembly Location
- Y = Year
- WW = Work Week
- = Pb-Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "■", may or may not be present. Some products may not follow the Generic Marking.

SOLDERING FOOTPRINT*



DIMENSION: MILLIMETERS

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

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