

# MOSFET – N-Channel, POWERTRENCH®

100 V, 4.4 A, 60 mΩ

## FDM3622

### General Description

This N-Channel MOSFET is produced using onsemi's advanced POWERTRENCH process that has been especially tailored to minimize the on-state resistance and yet maintain low gate charge for superior switching performance.

### Features

- Max  $r_{DS(on)}$  = 60 mΩ at  $V_{GS} = 10\text{ V}$ ,  $I_D = 4.4\text{ A}$
- Max  $r_{DS(on)}$  = 80 mΩ at  $V_{GS} = 6.0\text{ V}$ ,  $I_D = 3.8\text{ A}$
- Low Miller Charge
- Low QRR Body Diode
- Optimized efficiency at high frequencies
- UIS Capability (Single Pulse and Repetitive Pulse)
- This Device is Pb-Free, Halide Free and is RoHS Compliant

### MOSFET MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ , unless otherwise noted)

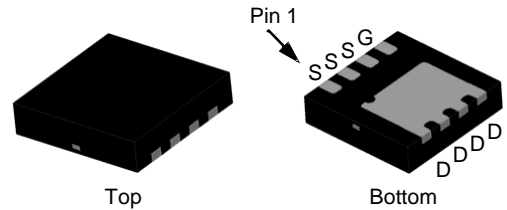
Symbol	Parameter	Ratings	Unit
$V_{DS}$	Drain to Source Voltage	100	V
$V_{GS}$	Gate to Source Voltage	±20	V
$I_D$	Drain Current – Continuous (Note 1a) – Pulsed	4.4 20	A
$E_{AS}$	Single Pulse Avalanche Energy (Note 3)	54	mJ
$P_D$	Power Dissipation (Note 1a) (Note 1b)	2.1 0.9	W
$T_J, T_{STG}$	Operating and Storage Junction Temperature Range	–55 to +150	°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 CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ , unless otherwise noted)

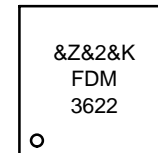
Symbol	Parameter	Ratings	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case (Note 1)	3.0	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Note 1a)	60	

$V_{DS}$	$r_{DS(on)}$ MAX	$I_D$ MAX
100 V	60 mΩ @ 10 V	4.4 A
	80 mΩ @ 6.0 V	



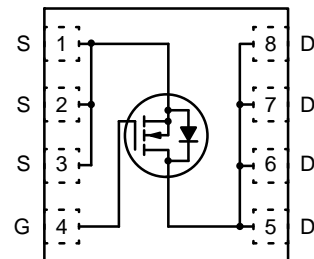
WDFN8 3.3x3.3, 0.65P  
(MLP 3x3)  
CASE 511DH

### MARKING DIAGRAM



&Z = Assembly Plant Code  
&2 = 2-Digit Date Code  
&K = 2-Digits Lot Run Traceability Code  
FDM3622 = Specific Device Code

### PIN ASSIGNMENT



### ORDERING INFORMATION

See detailed ordering and shipping information on page 5 of this data sheet.

# FDM3622

## ELECTRICAL CHARACTERISTICS (T<sub>J</sub> = 25°C unless otherwise noted)

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
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### OFF CHARACTERISTICS

BV <sub>DSS</sub>	Drain to Source Breakdown Voltage	I <sub>D</sub> = 250 μA, V <sub>GS</sub> = 0 V	100	–	–	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> = 80 V, V <sub>GS</sub> = 0 V	–	–	1	μA
		V <sub>DS</sub> = 80 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 100°C	–	–	250	
I <sub>GSS</sub>	Gate to Source Leakage Current	V <sub>GS</sub> = ±20 V, V <sub>DS</sub> = 0 V	–	–	±100	nA

### ON CHARACTERISTICS

V <sub>GS(th)</sub>	Gate to Source Threshold Voltage	V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> = 250 μA	2	–	4	V
r <sub>DS(on)</sub>	Static Drain to Source On Resistance	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 4.4 A	–	44	60	mΩ
		V <sub>GS</sub> = 6.0 V, I <sub>D</sub> = 3.8 A	–	56	80	
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 4.4 A, T <sub>J</sub> = 150°C	–	92	120	

### DYNAMIC CHARACTERISTICS

C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> = 25 V, V <sub>GS</sub> = 0 V, f = 1 MHz	–	820	1090	pF
C <sub>oss</sub>	Output Capacitance		–	125	170	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		–	35	55	pF
R <sub>g</sub>	Gate Resistance	V <sub>DS</sub> = 15 mV, f = 1 MHz	0.1	3.1	6.2	Ω

### SWITCHING CHARACTERISTICS

t <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> = 50 V, I <sub>D</sub> = 4.4 A, V <sub>GS</sub> = 10 V, R <sub>GEN</sub> = 24 Ω	–	11	20	ns
t <sub>r</sub>	Rise Time		–	25	40	ns
t <sub>d(off)</sub>	Turn-Off Delay Time		–	35	56	ns
t <sub>f</sub>	Fall Time		–	26	42	ns
Q <sub>g</sub>	Total Gate Charge	V <sub>GS</sub> = 10 V, V <sub>DD</sub> = 50 V, I <sub>D</sub> = 4.4 A	–	13	17	nC
Q <sub>gs</sub>	Gate to Source Gate Charge		–	3.6	–	nC
Q <sub>gd</sub>	Gate to Drain "Miller" Charge		–	3.4	–	nC

### DRAIN-SOURCE CHARACTERISTICS

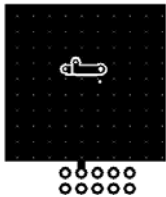
V <sub>SD</sub>	Source to Drain Diode Forward Voltage	V <sub>GS</sub> = 0 V, I <sub>S</sub> = 4.4 A	–	–	1.25	V
		V <sub>GS</sub> = 0 V, I <sub>S</sub> = 2.2 A	–	–	1.0	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>F</sub> = 4.4 A, di/dt = 100 A/μs	–	–	56	ns
Q <sub>rr</sub>	Reverse Recovery Charge		–	–	108	nC

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.

1. R<sub>θJA</sub> is determined with the device mounted on a 1 in<sup>2</sup> oz copper pad on a 1.5x1.5 in. board of FR-4 material. R<sub>θJC</sub> is guaranteed by design while R<sub>θJA</sub> is determined by the user's board design.

(a) R<sub>θJA</sub> = 60°C/W when mounted on a 1 in<sup>2</sup> pad of 2 oz copper, 1.5'x1.5'x0.062' thick PCB.

(b) R<sub>θJA</sub> = 135°C/W when mounted on a minimum pad of 2 oz copper.



a. 60°C/W when mounted on a 1 in<sup>2</sup> pad of 2 oz copper.



b. 135°C/W when mounted on a minimum pad of 2 oz copper.

2. Pulse Test: Pulse Width < 300 μs, Duty cycle < 2.0%.

3. E<sub>AS</sub> of 54 mJ is based on starting T<sub>J</sub> = 25°C; N-ch: L = 3 mH, I<sub>AS</sub> = 6 A, V<sub>DD</sub> = 100 V, V<sub>GS</sub> = 10 V.

TYPICAL CHARACTERISTICS ( $T_J = 25^\circ\text{C}$ , unless otherwise noted)

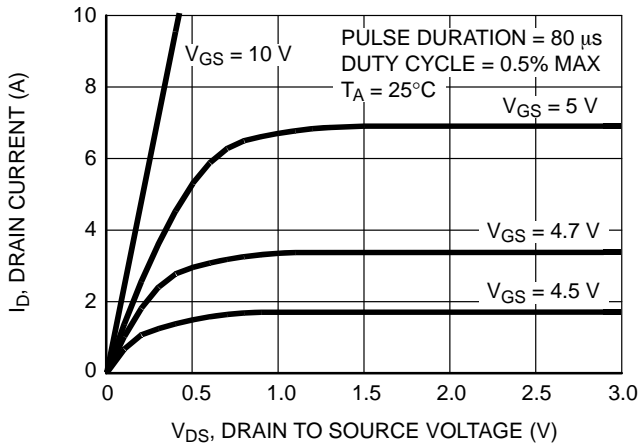


Figure 1. On-Region Characteristics

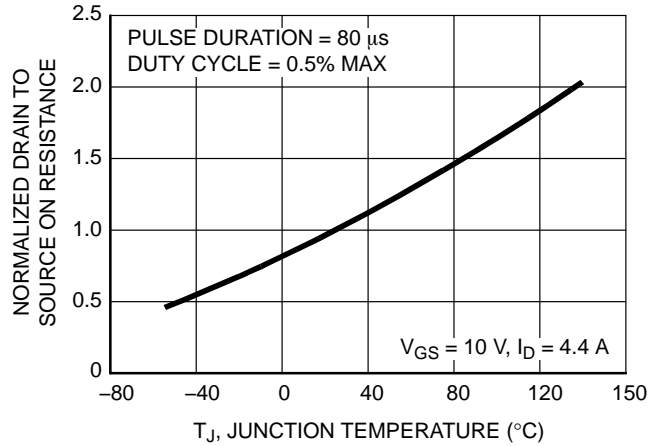


Figure 2. Normalized On-Resistance vs. Junction Temperature

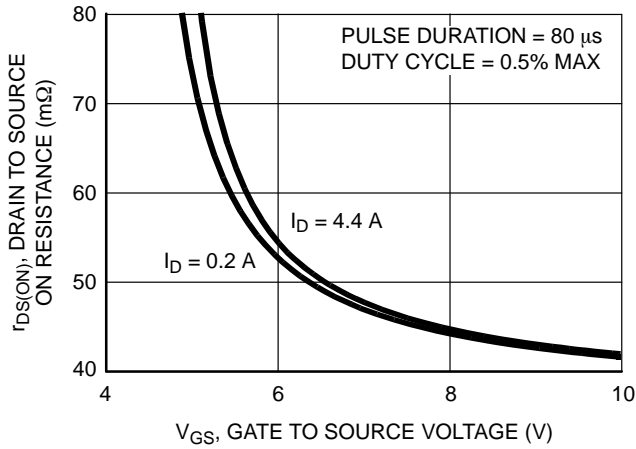


Figure 3. On-Resistance vs. Gate to Source Voltage

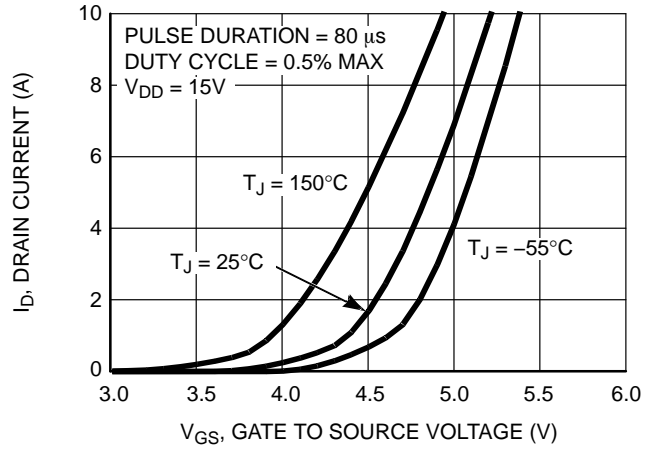


Figure 4. Transfer Characteristics

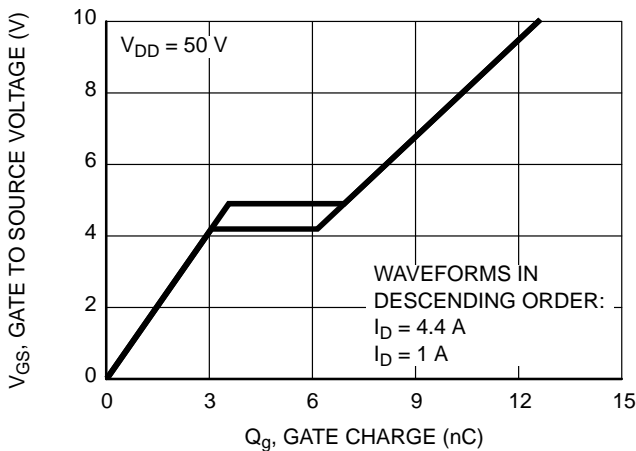


Figure 5. Gate Charge Characteristics

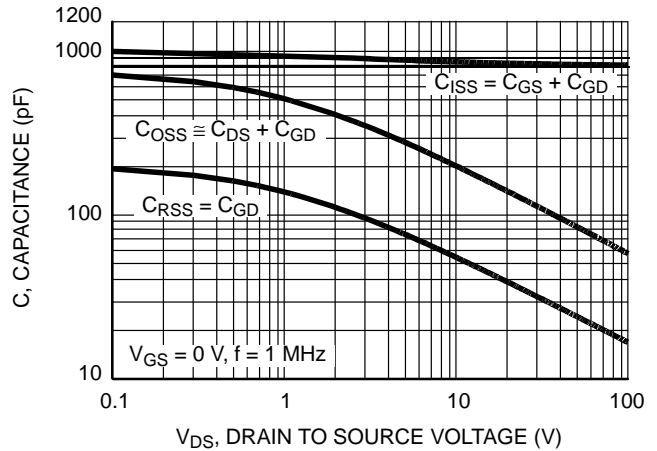


Figure 6. Capacitance vs. Drain to Source Voltage

TYPICAL CHARACTERISTICS ( $T_J = 25^\circ\text{C}$ , unless otherwise noted) (continued)

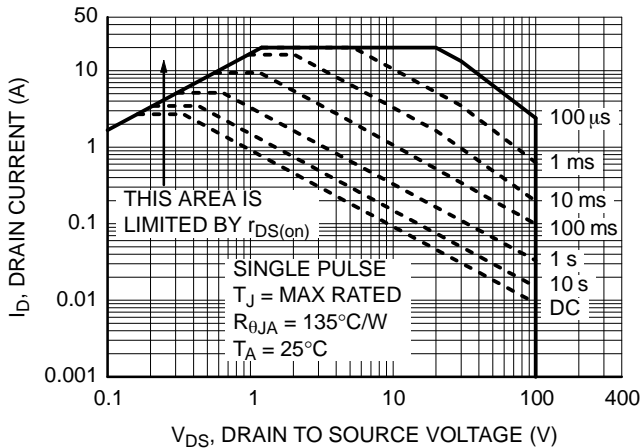


Figure 7. Forward Bias Safe Operating Area

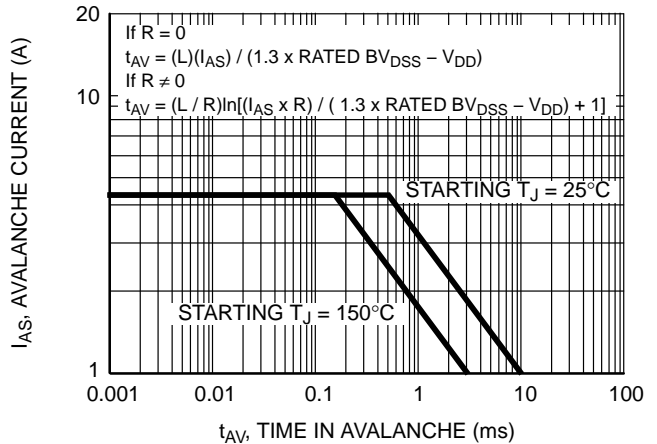


Figure 8. Uncalamped Inductive Switching Capability

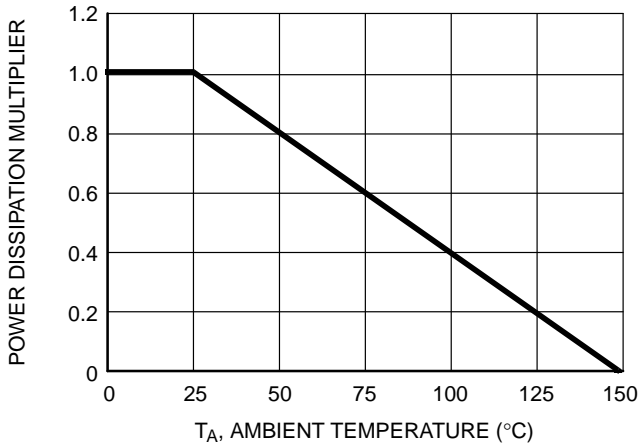


Figure 9. Normalized Power Dissipation vs. Ambient Temperature

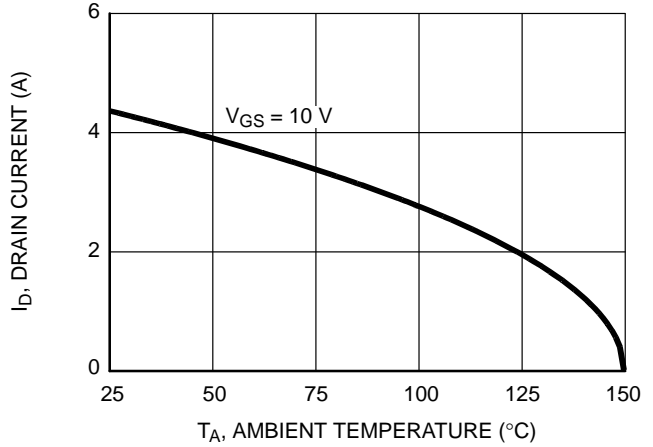


Figure 10. Maximum Continuous Drain Current vs. Ambient Temperature

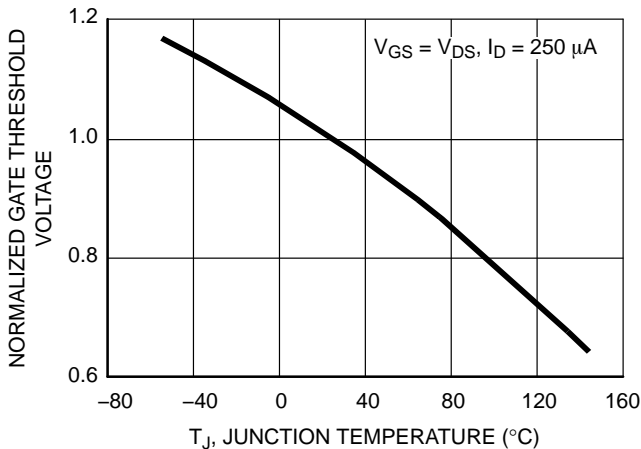


Figure 11. Normalized Gate Threshold Voltage vs. Junction Temperature

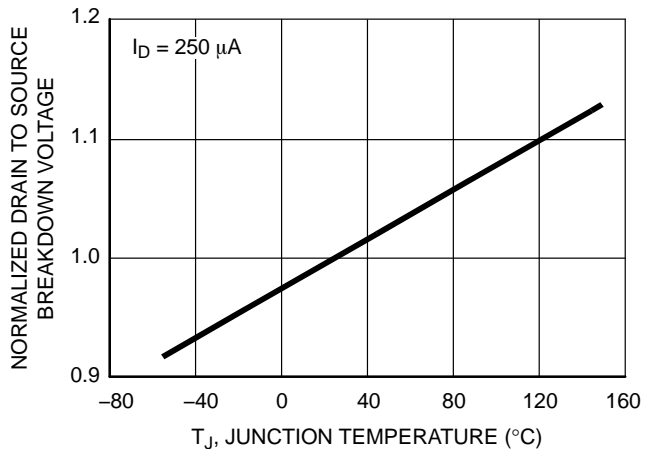


Figure 12. Normalized Drain to Source Breakdown Voltage vs. Junction Temperature

# FDM3622

## TYPICAL CHARACTERISTICS ( $T_J = 25^\circ\text{C}$ , unless otherwise noted) (continued)

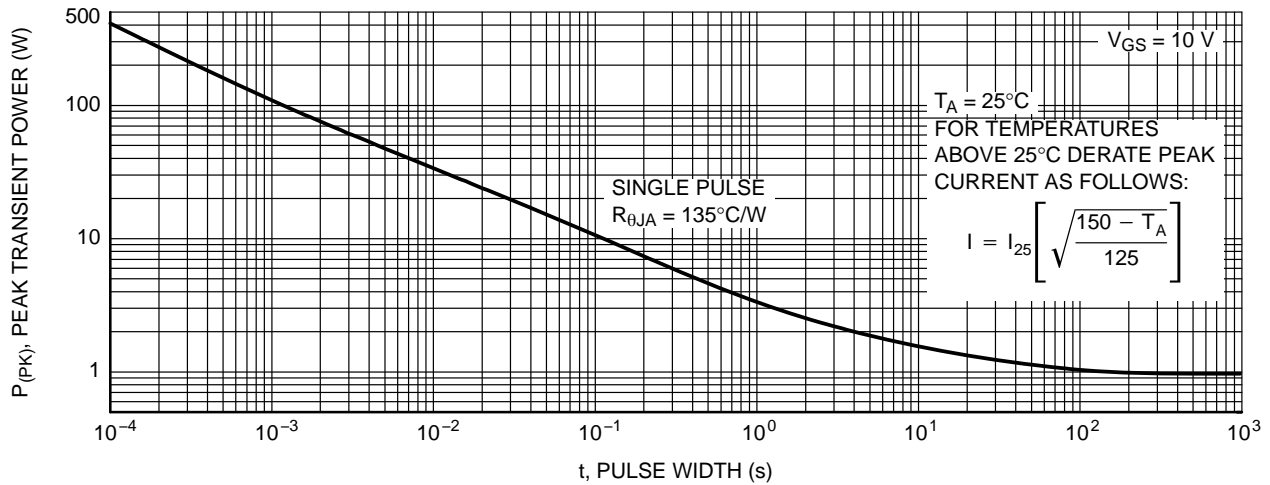


Figure 13. Peak Current Capability

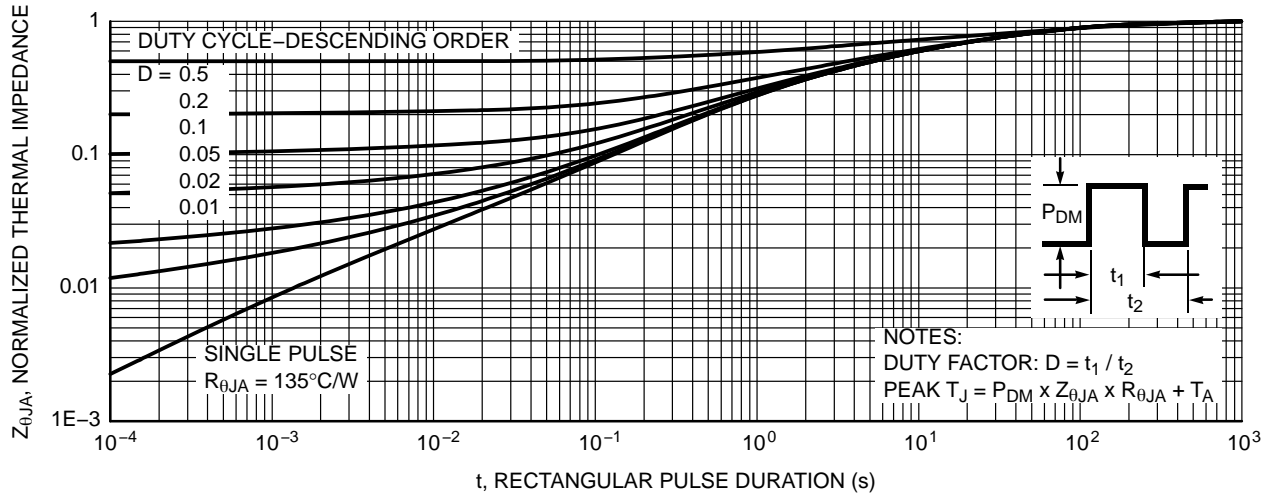


Figure 14. Transient Thermal Response Curve

### PACKAGE MARKING AND ORDERING INFORMATION

Device	Device Marking	Package	Reel Size	Tape Width	Shipping†
FDM3622	FDM3622	WDFN8 3.3x3.3, 0.65P (MLP 3x3) (Pb-Free, Halide Free)	13"	12 mm	3000 / Tape & Reel

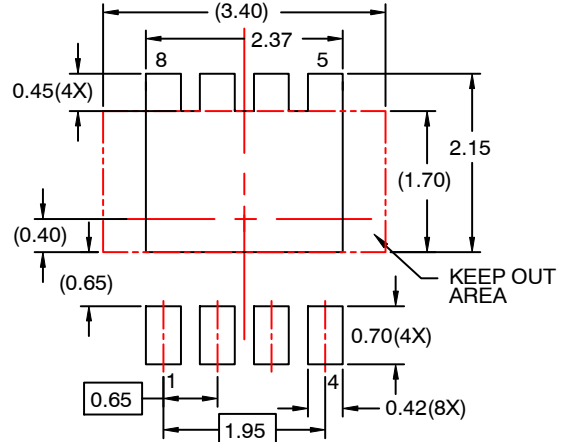
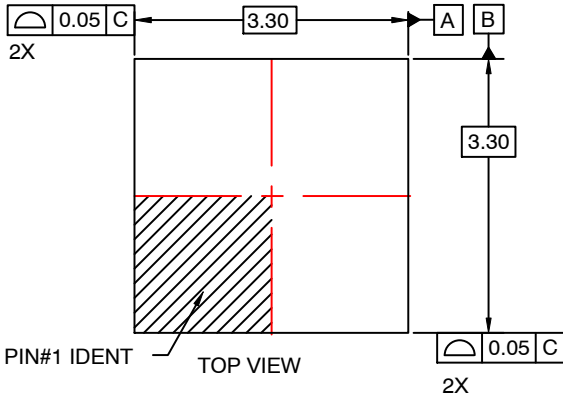
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

**MECHANICAL CASE OUTLINE**  
**PACKAGE DIMENSIONS**

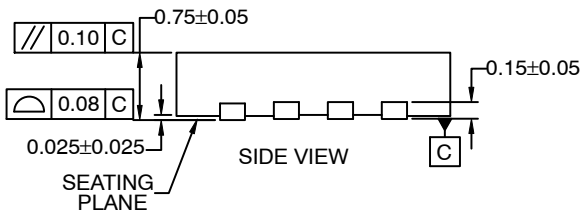


**WDFN8 3.3x3.3, 0.65P**  
CASE 511DH  
ISSUE O

DATE 31 JUL 2016

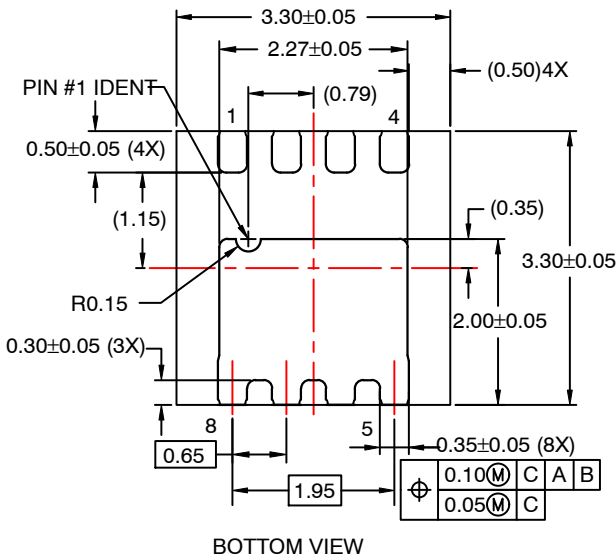


RECOMMENDED LAND PATTERN



NOTES:

- A. DOES NOT CONFORM TO JEDEC REGISTRATION MO-229
- B. DIMENSIONS ARE IN MILLIMETERS.
- C. DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 2009.
- D. LAND PATTERN RECOMMENDATION IS EXISTING INDUSTRY LAND PATTERN.



BOTTOM VIEW

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