

MOSFET – N-Channel, UltraFET Trench

250 V, 14 A, 122 mΩ

FDMS2734

General Description

UltraFET devices combine characteristics that enable benchmark efficiency in power conversion applications. Optimized for $R_{DS(on)}$, low ESR, low total and Miller gate charge, these devices are ideal for high frequency DC to DC converters.

Features

- Max $R_{DS(on)}$ = 122 mΩ at V_{GS} = 10 V, I_D = 2.8 A
- Max $R_{DS(on)}$ = 130 mΩ at V_{GS} = 6 V, I_D = 1.7 A
- Low Miller Charge
- Optimized Efficiency at High Frequencies
- Pb-Free, Halide Free and RoHS Compliant

Applications

- DC – DC Conversion

MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)

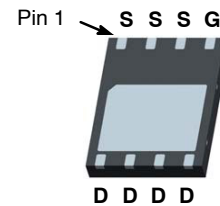
Symbol	Parameter	Value	Unit
V_{DS}	Drain to Source Voltage	250	V
V_{GS}	Gate to Source Voltage	±20	V
I_D	Drain Current: – Continuous (Silicon limited) T_C = 25°C – Continuous T_A = 25°C (Note 1a) – Pulsed	14 2.8 30	A
P_D	Power Dissipation: T_C = 25°C T_A = 25°C (Note 1a)	78 2.5	W
T_J , T_{STG}	Operating 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

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case	1.6	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Note 1a)	50	

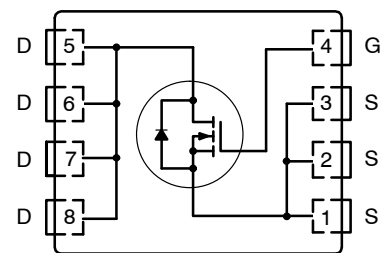
V_{DS}	$R_{DS(on)}$ MAX	I_D MAX
250 V	122 mΩ @ 10 V	14 A
	130 mΩ @ 6 V	



Bottom View

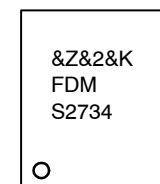
WDFN8 5×6, 1.27P
(Power 56)
CASE 506DP

ELECTRICAL CONNECTION



N-CHANNEL MOSFET

MARKING DIAGRAM



&Z = Assembly Plant Code
&2 = 2-Digit Date Code (Year and Week)
&K = 2-Digit Lot Run Code
FDMS2734 = Specific Device Code

ORDERING INFORMATION

Device	Package	Shipping†
FDMS2734	WDFN8 5×6, 1.27P (Power 56) (Pb-Free, Halide Free)	3000 / 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](http://www.onsemi.com/BRD8011/D).

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

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
BV_{DSS}	Drain to Source Breakdown Voltage	$I_D = 250\ \mu\text{A}$, $V_{GS} = 0\ \text{V}$	250	–	–	V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D = 250\ \mu\text{A}$, Referenced to 25°C	–	250	–	mV/ $^\circ\text{C}$
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 200\ \text{V}$	–	–	1	μA
I_{GSS}	Gate to Source Leakage Current	$V_{GS} = \pm 20\ \text{V}$, $V_{DS} = 0\ \text{V}$	–	–	± 100	nA

ON CHARACTERISTICS (Note 2)

$V_{GS(th)}$	Gate to Source Threshold Voltage	$V_{GS} = V_{DS}$, $I_D = 250\ \mu\text{A}$	2	3	4	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate to Source Threshold Voltage Temperature Coefficient	$I_D = 250\ \mu\text{A}$, Referenced to 25°C	–	–11	–	mV/ $^\circ\text{C}$
$R_{DS(on)}$	Static Drain to Source On Resistance	$V_{GS} = 10\ \text{V}$, $I_D = 2.8\ \text{A}$	–	105	122	m Ω
		$V_{GS} = 6\ \text{V}$, $I_D = 1.7\ \text{A}$	–	110	130	
		$V_{GS} = 10\ \text{V}$, $I_D = 2.8\ \text{A}$, $T_J = 125^\circ\text{C}$	–	217	258	
g_{FS}	Forward Transconductance	$V_{DS} = 10\ \text{V}$, $I_D = 2.8\ \text{A}$	–	11	–	S

DYNAMIC CHARACTERISTICS

C_{iss}	Input Capacitance	$V_{DS} = 100\ \text{V}$, $V_{GS} = 0\ \text{V}$, $f = 1\ \text{MHz}$	–	1775	2365	pF
C_{oss}	Output Capacitance		–	80	110	pF
C_{rss}	Reverse Transfer Capacitance		–	25	40	pF
R_g	Gate Resistance	$f = 1\ \text{MHz}$	–	0.9	–	Ω

SWITCHING CHARACTERISTICS

$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 125\ \text{V}$, $I_D = 2.8\ \text{A}$, $V_{GS} = 10\ \text{V}$, $R_{GEN} = 6\ \Omega$	–	22	36	ns
t_r	Rise Time		–	10	20	ns
$t_{d(off)}$	Turn-Off Delay Time		–	36	58	ns
t_f	Fall Time		–	12	22	ns
$Q_{g(TOT)}$	Total Gate Charge at 10 V	$V_{GS} = 0\ \text{V}$ to $10\ \text{V}$, $V_{DD} = 125\ \text{V}$, $I_D = 2.8\ \text{A}$	–	30	42	nC
Q_{gs}	Gate to Source Gate Charge	$V_{DD} = 125\ \text{V}$, $I_D = 2.8\ \text{A}$	–	7	–	nC
Q_{gd}	Gate to Drain “Miller” Charge	$V_{DD} = 125\ \text{V}$, $I_D = 2.8\ \text{A}$	–	9	–	nC

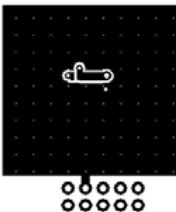
DRAIN-SOURCE DIODE CHARACTERISTICS

V_{SD}	Source to Drain Diode Forward Voltage	$V_{GS} = 0\ \text{V}$, $I_S = 2.8\ \text{A}$ (Note 2)	–	0.75	1.20	V
t_{rr}	Reverse Recovery Time	$I_F = 2.8\ \text{A}$, $di/dt = 100\ \text{A}/\mu\text{s}$	–	79	119	ns
Q_{rr}	Reverse Recovery Charge		–	214	321	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.

NOTES:

- $R_{\theta JA}$ is determined with the device mounted on a 1 in² pad 2 oz copper pad on a 1.5 x 1.5 in. board of FR-4 material. $R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design.



a) $50^\circ\text{C}/\text{W}$ when mounted on a 1 in² pad of 2 oz copper.



b) $125^\circ\text{C}/\text{W}$ when mounted on a minimum pad of 2 oz copper.

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

TYPICAL CHARACTERISTICS

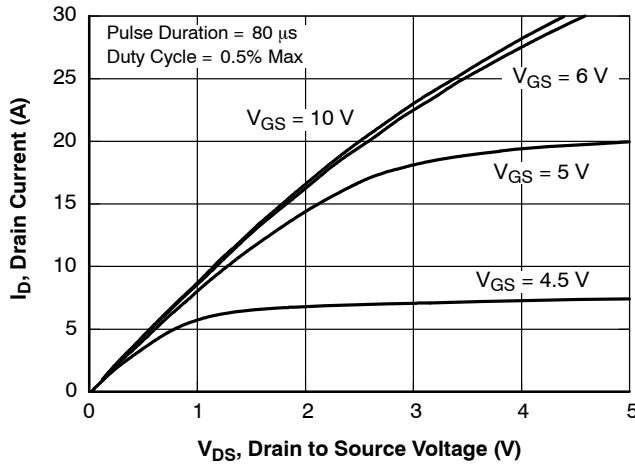
 $(T_J = 25^\circ\text{C}$ unless otherwise noted)

Figure 1. On Region Characteristics

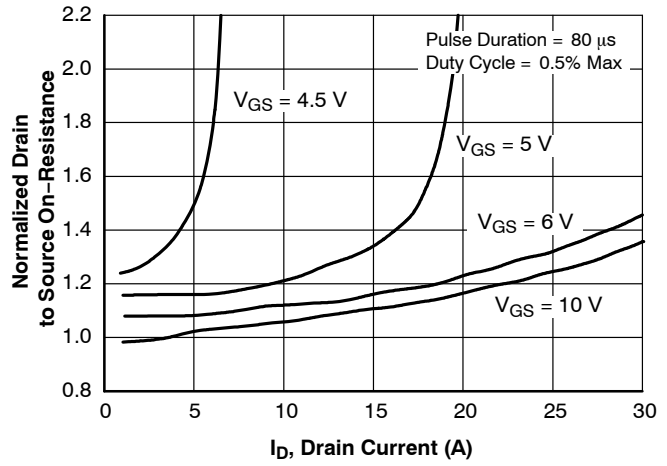


Figure 2. Normalized On-Resistance vs. Drain Current and Gate Voltage

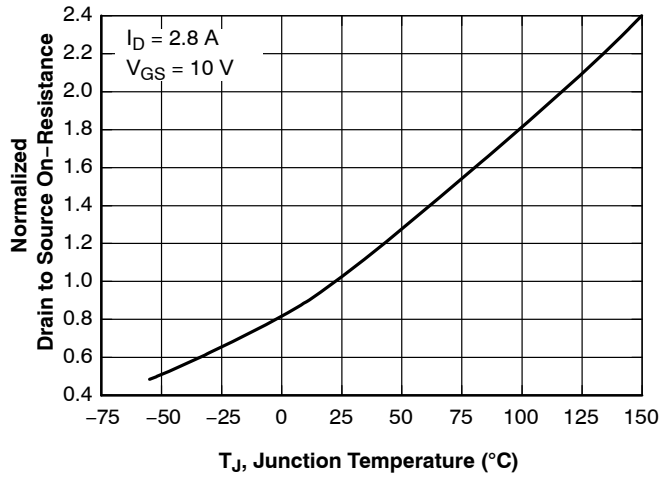


Figure 3. Normalized On Resistance vs. Junction Temperature

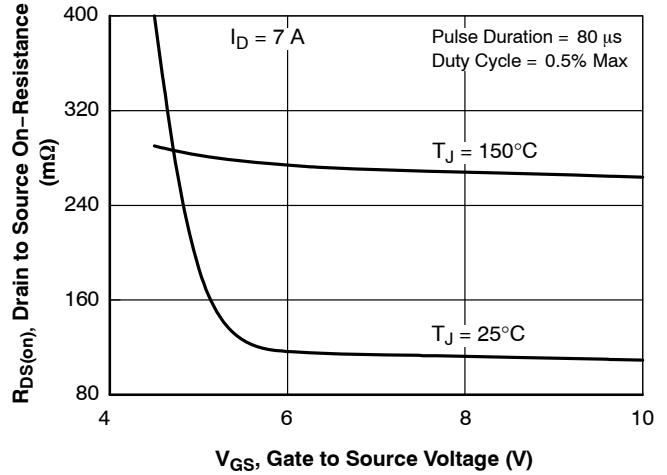


Figure 4. On-Resistance vs. Gate to Source Voltage

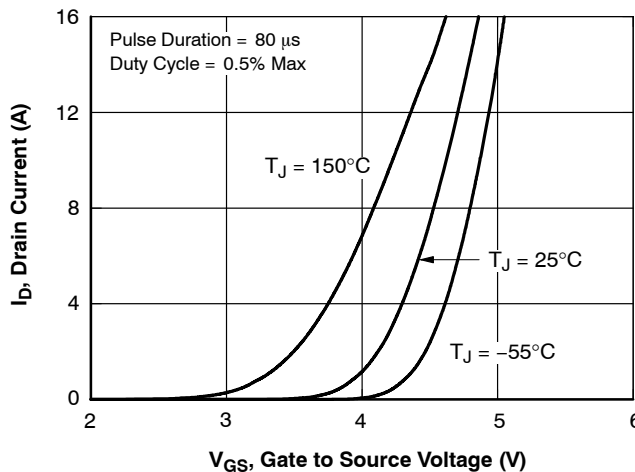


Figure 5. Transfer Characteristics

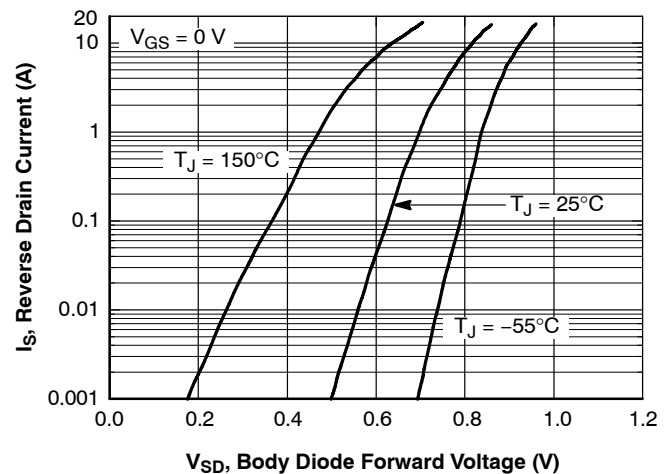


Figure 6. Source to Drain Diode Forward Voltage vs. Source Current

TYPICAL CHARACTERISTICS (continued)

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

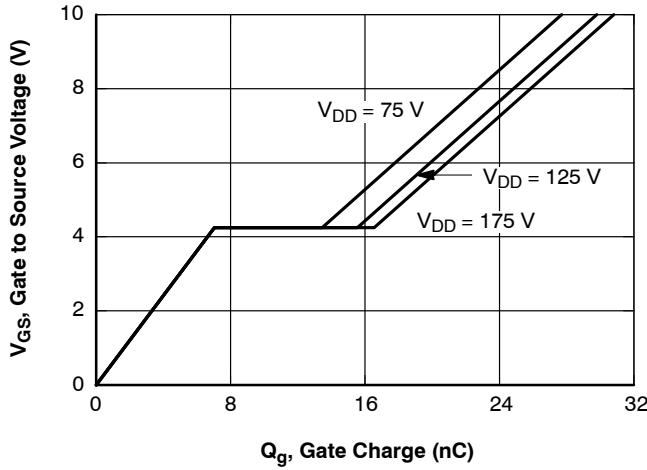


Figure 7. Gate Charge Characteristics

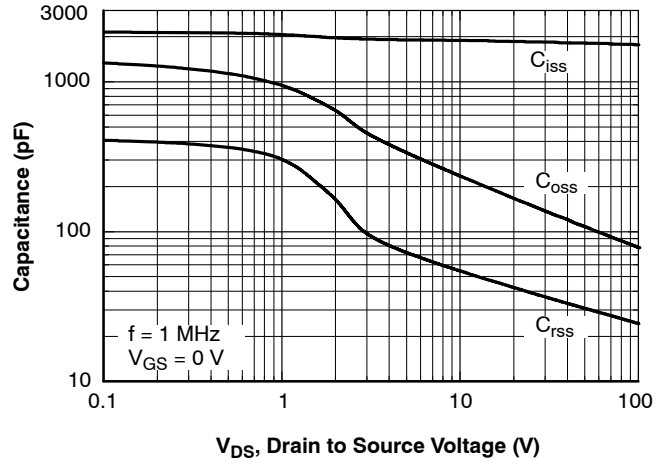


Figure 8. Capacitance vs. Drain to Source Voltage

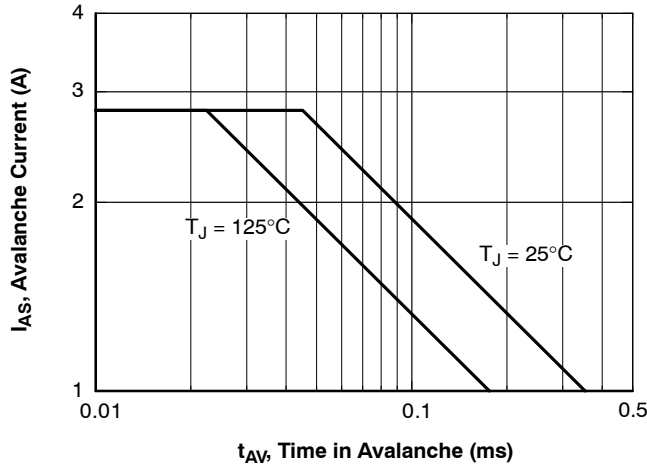


Figure 9. Unclamped Inductive Switching Capability

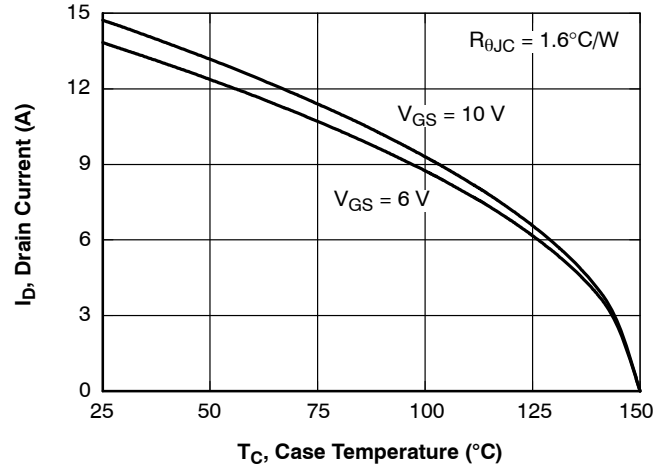


Figure 10. Maximum Continuous Drain Current vs. Case Temperature

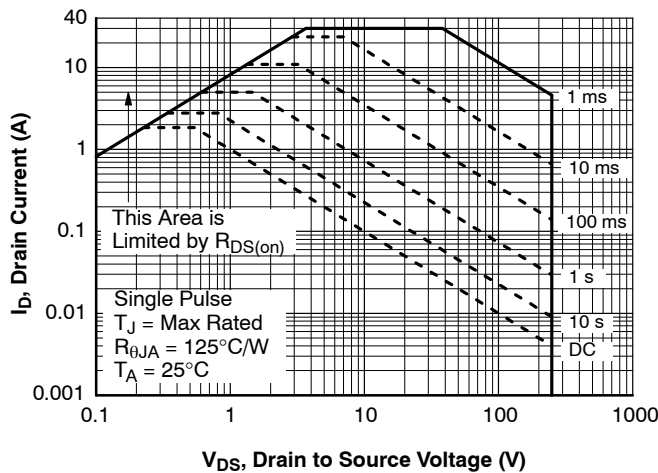


Figure 11. Forward Bias Safe Operating Area

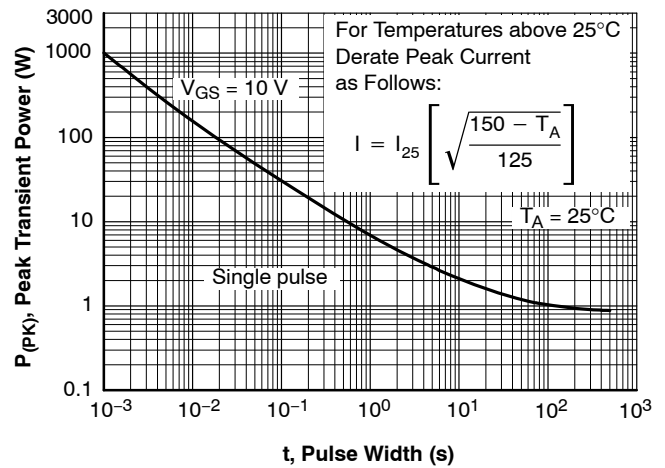


Figure 12. Single Pulse Maximum Power Dissipation

TYPICAL CHARACTERISTICS (continued)

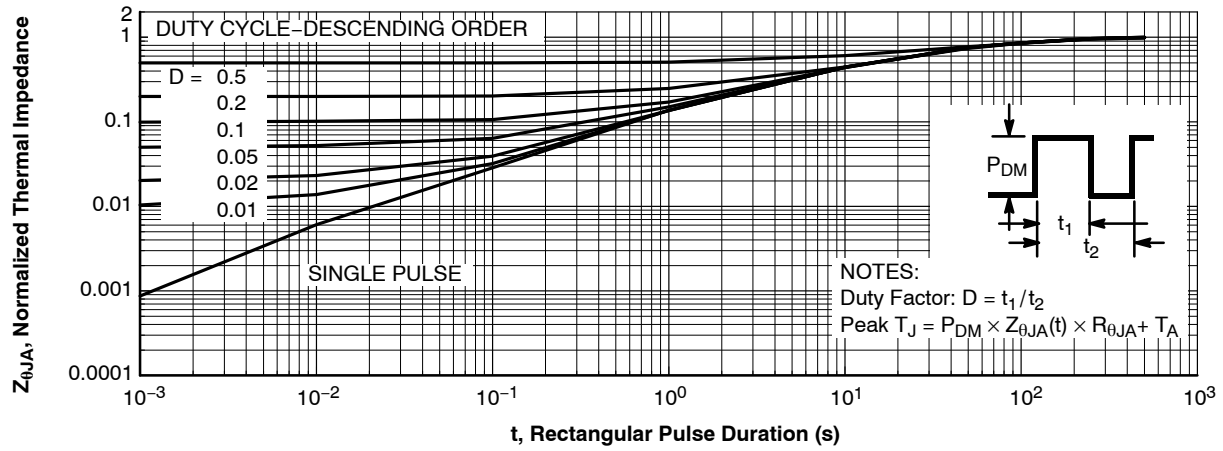
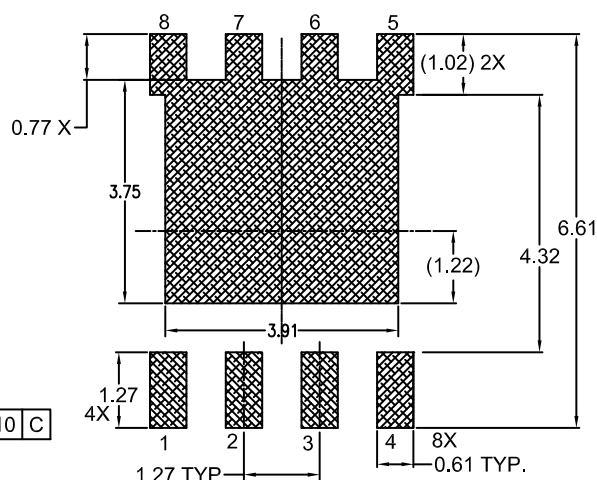
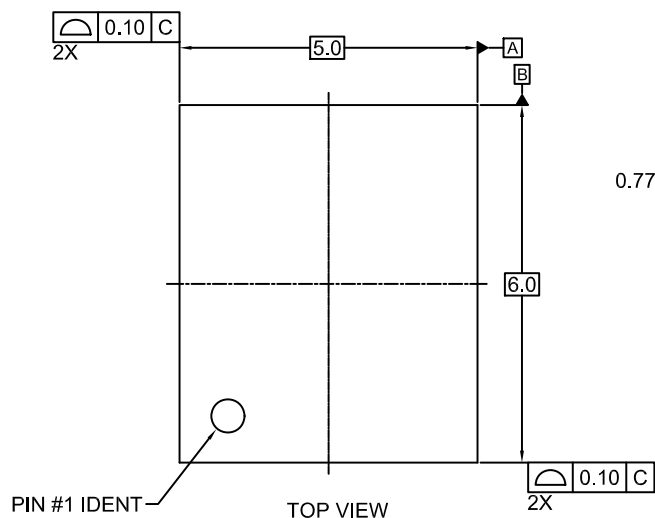
(T_J = 25°C unless otherwise noted)

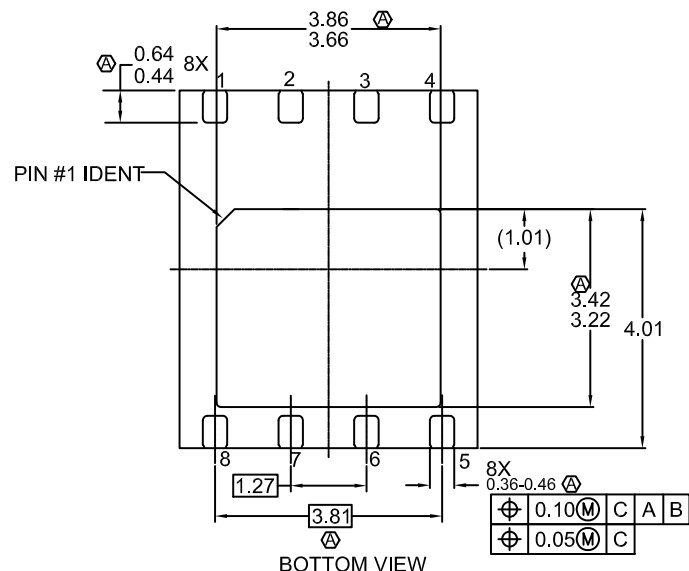
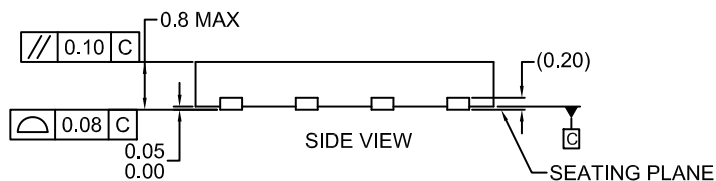
Figure 13. Transient Thermal Response Curve

WDFN8 5x6, 1.27P
CASE 506DP
ISSUE O

DATE 31 AUG 2016



RECOMMENDED LAND PATTERN



NOTES:

- A. DOES NOT FULLY CONFORM TO JEDEC REGISTRATION,
MO-229.**
- B. DIMENSIONS ARE IN MILLIMETERS.**
- C. DIMENSIONS AND TOLERANCES PER
ASME Y14.5M, 1994**
- D. TERMINALS 5,6,7 AND 8 ARE TIED
TO THE EXPOSED PADDLE**

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