

MOSFET – N-Channel, UltraFET Trench

200 V, 20 A, 77 mΩ

FDMS2672

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 $r_{DS(on)}$ = 77 mΩ at $V_{GS} = 10\text{ V}$, $I_D = 3.7\text{ A}$
- Max $r_{DS(on)}$ = 88 mΩ at $V_{GS} = 6\text{ V}$, $I_D = 3.5\text{ A}$
- Low Miller Charge
- This Device is Pb-Free and is RoHS Compliant

Application

- DC-DC Conversion

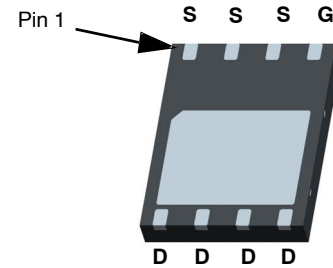
MOSFET MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Ratings	Unit
V_{DS}	Drain to Source Voltage	200	V
V_{GS}	Gate to Source Voltage	±20	V
I_D	Drain Current: – Continuous, $T_C = 25^\circ\text{C}$ (Note 5) – Continuous, $T_C = 100^\circ\text{C}$ (Note 5) – Continuous, $T_A = 25^\circ\text{C}$ (Note 1a) – Pulsed (Note 4)	20 13 3.7 96	A
E_{AS}	Single Pulse Avalanche Energy (Note 3)	33.8	mJ
P_D	Power Dissipation: $T_C = 25^\circ\text{C}$ $T_A = 25^\circ\text{C}$ (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

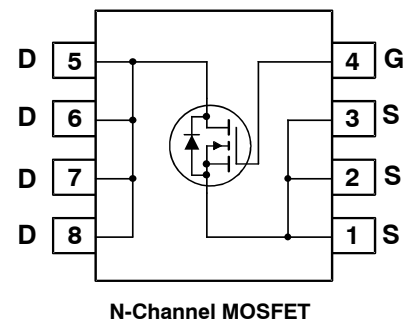
Symbol	Parameter	Ratings	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case	1.6	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Note 1a)	50	



Power 56 (Bottom View)

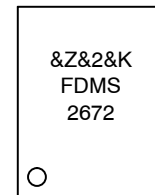
WDFN8 5x6, 1.27P
CASE 506DP

ELECTRICAL CONNECTION



N-Channel MOSFET

MARKING DIAGRAM



- &Z = Assembly Plant Code
- &2 = Numeric Date Code
- &K = Lot Code
- FDMS2672 = Specific Device Code

ORDERING INFORMATION

See detailed ordering and shipping information on page 2 of this data sheet.

FDMS2672

ORDERING INFORMATION AND PACKAGE MARKING

Device	Device Marking	Package	Shipping [†]
FDMS2672	FDMS2672	WDFN8 5x6, 1.27P (Pb-Free)	3000 Units / 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.

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

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

BV _{DSS}	Drain to Source Breakdown Voltage	I _D = 250 μA, V _{GS} = 0 V	200			V
ΔBV _{DSS} /ΔT _J	Breakdown Voltage Temperature Coefficient	I _D = 250 μA, referenced to 25°C		210		mV/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 160 V			1	μA
I _{GSS}	Gate to Source Leakage Current	V _{GS} = ±20 V, V _{DS} = 0 V			±100	nA

ON CHARACTERISTICS

V _{GS(th)}	Gate to Source Threshold Voltage	V _{GS} = V _{DS} , I _D = 250 μA	2	3.1	4	V
ΔV _{GS(th)} /ΔT _J	Gate to Source Threshold Voltage Temperature Coefficient	I _D = 250 μA, referenced to 25 °C		-10		mV/°C
r _{DS(on)}	Drain to Source On Resistance	V _{GS} = 10 V, I _D = 3.7 A		64	77	mΩ
		V _{GS} = 6 V, I _D = 3.5 A		69	88	
		V _{GS} = 10 V, I _D = 3.7 A, T _J = 125 °C		129	156	
g _{FS}	Forward Transconductance	V _{DS} = 10 V, I _D = 3.7 A		14		S

DYNAMIC CHARACTERISTICS

C _{iss}	Input Capacitance	V _{DS} = 100 V, V _{GS} = 0 V, f = 1 MHz		1740	2315	pF
C _{oss}	Output Capacitance			95	125	pF
C _{rss}	Reverse Transfer Capacitance			30	45	pF
R _g	Gate Resistance		0.1	1	5	Ω

SWITCHING CHARACTERISTICS

t _{d(on)}	Turn-On Delay Time	V _{DD} = 100 V, I _D = 3.7 A, V _{GS} = 10 V, R _{GEN} = 6 Ω		22	34	ns
t _r	Rise Time			11	22	ns
t _{d(off)}	Turn-Off Delay Time			36	57	ns
t _f	Fall Time			10	20	ns
Q _{g(TOT)}	Total Gate Charge at 10 V	V _{GS} = 0 V to 10 V, V _{DD} = 100 V, I _D = 3.7 A		30	42	nC
Q _{gs}	Gate to Source Gate Charge	V _{DD} = 100 V, I _D = 3.7 A		7		nC
Q _{gd}	Gate to Drain "Miller" Charge			8		nC

DRAIN-SOURCE DIODE CHARACTERISTICS

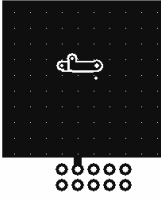
V _{SD}	Source to Drain Diode Forward Voltage	V _{GS} = 0 V, I _S = 3.7 A (Note 2)		0.8	1.2	V
t _{rr}	Reverse Recovery Time	I _F = 3.7 A, di/dt = 100 A/μs		70	105	ns
Q _{rr}	Reverse Recovery Charge			238	357	nC

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.

FDMS2672

NOTES:

1. $R_{\theta JA}$ is determined with the device mounted on a 1 in² pad 2 oz copper pad on a 1.5 × 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°C/W when mounted on a 1 in² pad of 2 oz copper.



- b) 125°C/W when mounted on a minimum pad of 2 oz copper.

2. Pulse Test: Pulse Width < 300 μ s, Duty cycle < 2.0%.
3. E_{AS} of 33.8 mJ is based on starting $T_J = 25^\circ\text{C}$, $L = 3$ mH, $I_{AS} = 4.75$ A, $V_{DD} = 25$ V. $V_{GS} = 10$ V.
4. Pulsed I_d please refer to Figure 11 SOA graph for more details.
5. Computed continuous current limited to Max Junction Temperature only, actual continuous current will be limited by thermal & electro-mechanical application board design.

TYPICAL CHARACTERISTICS

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

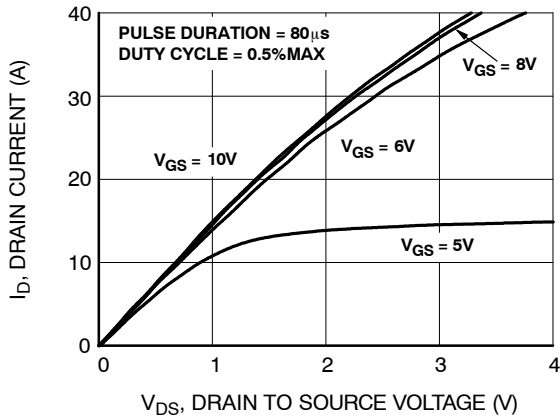


Figure 1. On-Region Characteristics

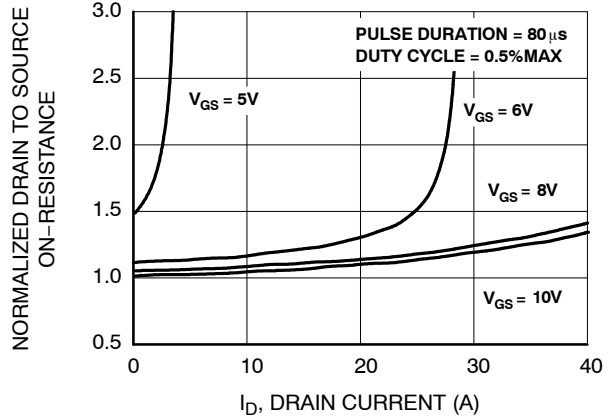


Figure 2. Normalized On-Resistance vs. Drain Current and Gate Voltage

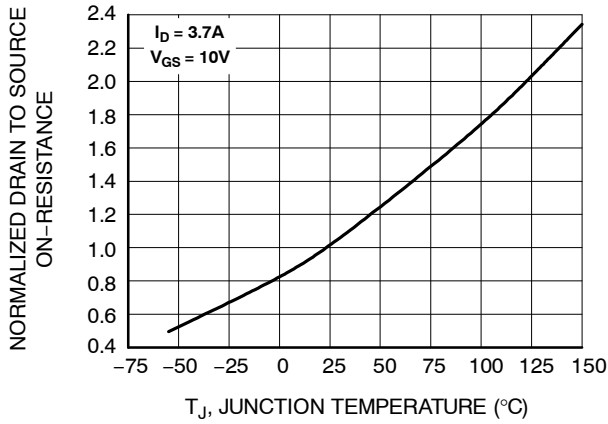


Figure 3. Normalized On-Resistance vs. Junction Temperature

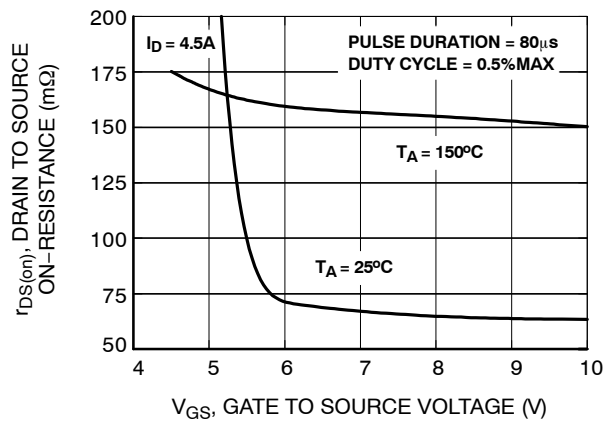


Figure 4. On-Resistance vs. Gate to Source Voltage

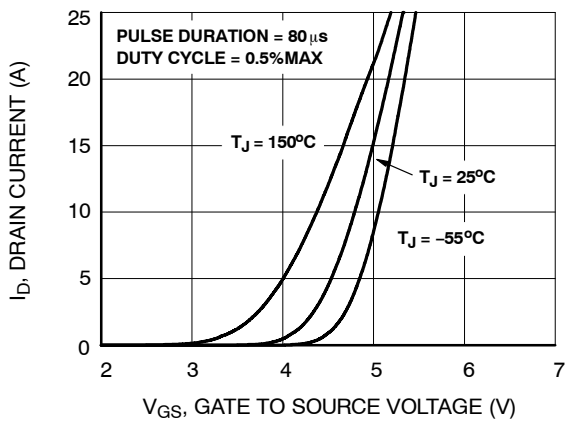


Figure 5. Transfer Characteristics

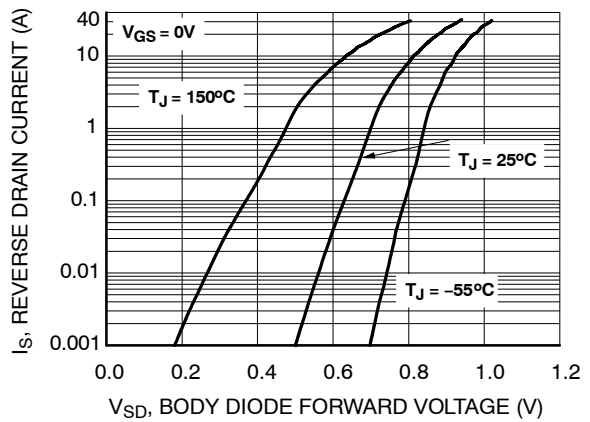


Figure 6. Source to Drain Diode Forward Voltage vs. Source Current

TYPICAL CHARACTERISTICS (continued)

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

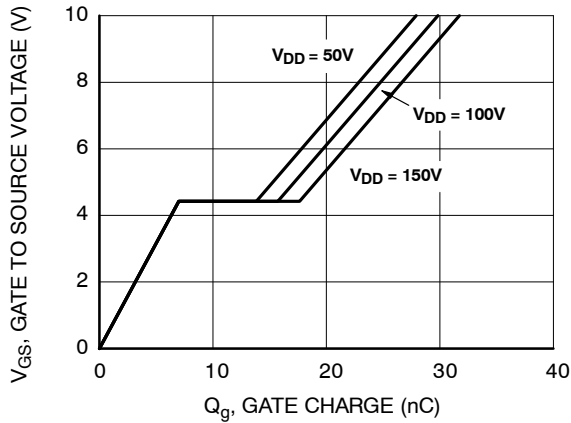


Figure 7. Gate Charge Characteristics

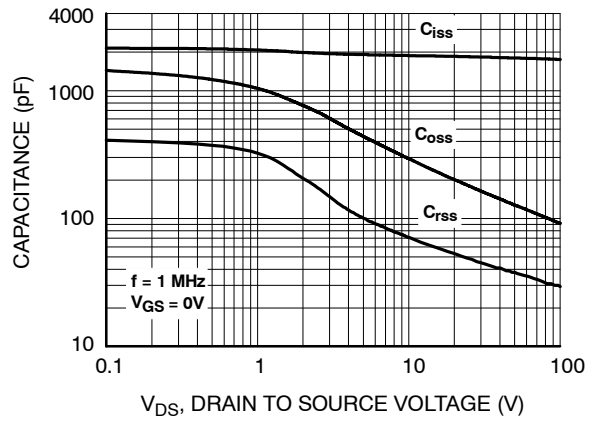


Figure 8. Capacitance vs. Drain to Source Voltage

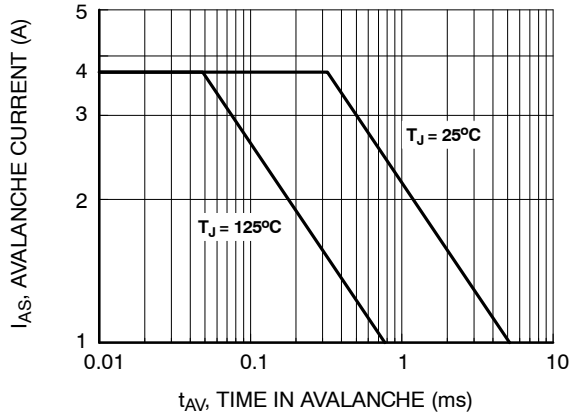


Figure 9. Unclamped Inductive Switching Capability

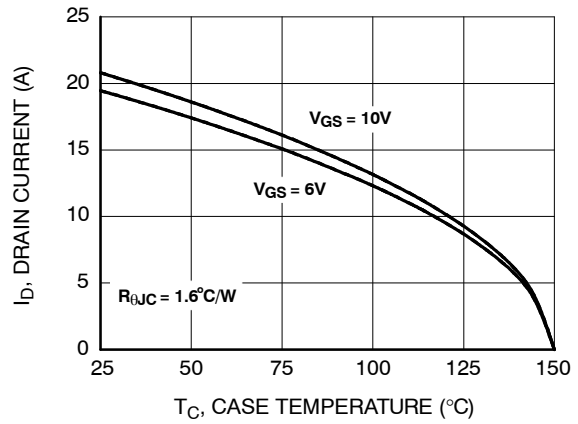


Figure 10. Maximum Continuous Drain Current vs. Ambient Temperature

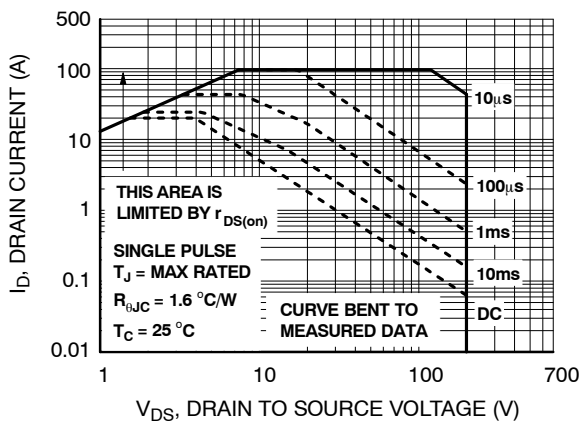


Figure 11. Forward Bias Safe Operating Area

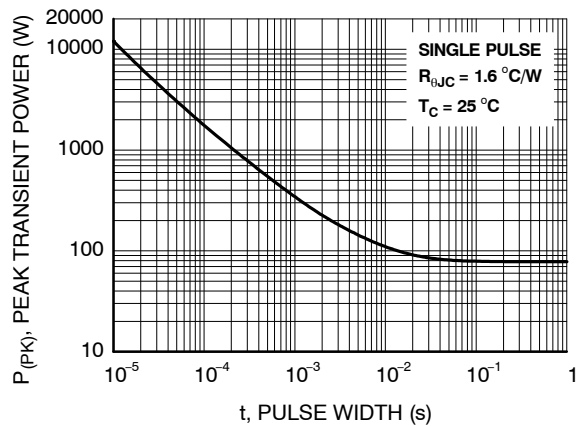


Figure 12. Single Pulse Maximum Power Dissipation

TYPICAL CHARACTERISTICS (continued)

(T_J = 25°C unless otherwise noted)

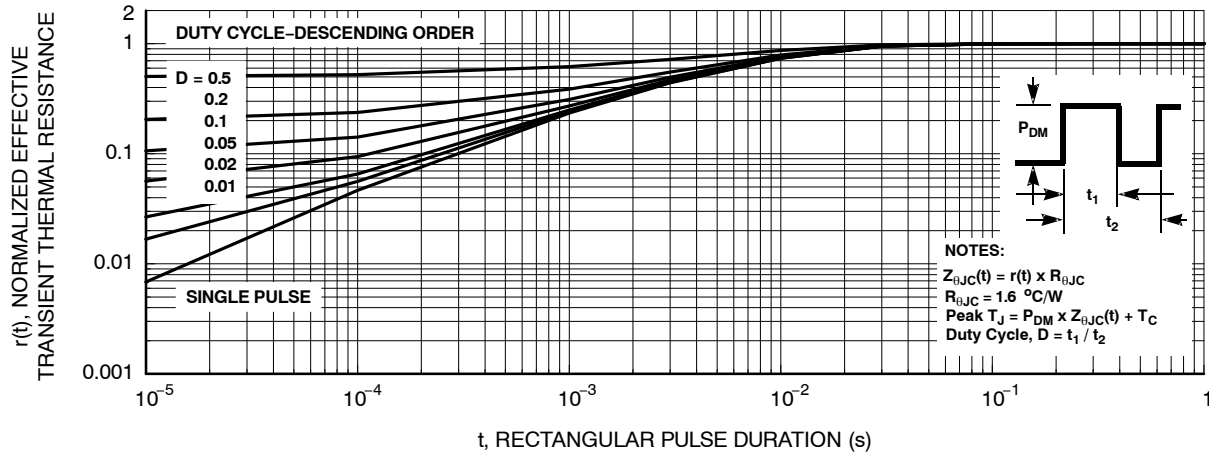


Figure 13. Junction-to-Case Transient Thermal Response Curve

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MECHANICAL CASE OUTLINE

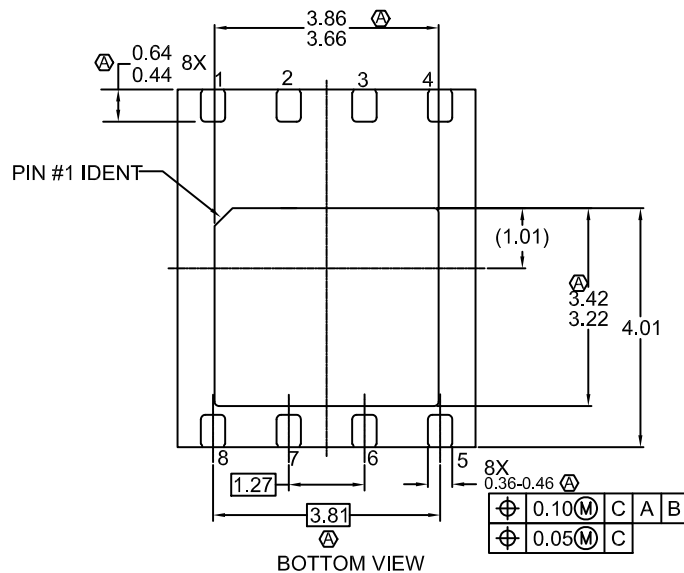
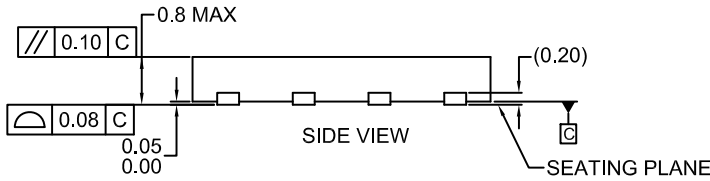
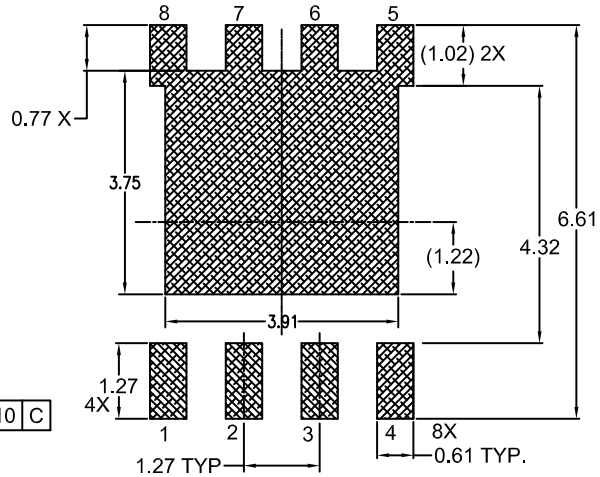
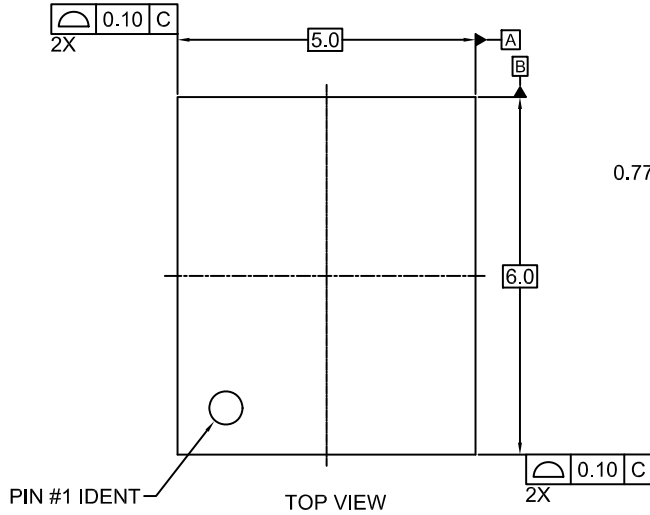
PACKAGE DIMENSIONS

ON Semiconductor®



WDFN8 5x6, 1.27P
CASE 506DP
ISSUE O

DATE 31 AUG 2016



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
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