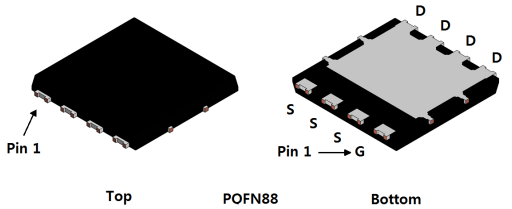
MOSFET – Power, Single N-Channel, DFNW8

80 V, 229 A, 2 mΩ

NTMTS002N08MC

$V_{(BR)DSS}$	$R_{DS(ON)}$ MAX	I_D MAX
80 V	2 mΩ @ 10 V	229 A
	5.1 mΩ @ 6 V	



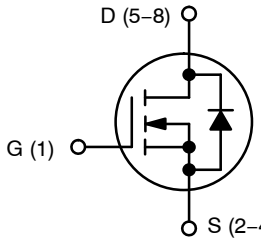
DFNW8
CASE 507AP

Features

- Small Footprint (8x8 mm) for Compact Design
- Low $R_{DS(on)}$ to Minimize Conduction Losses
- Low Q_G and Capacitance to Minimize Driver Losses
- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant

Typical Applications

- Power Tools, Battery Operated Vacuums
- UAV/Drones, Material Handling
- BMS/Storage, Home Automation



N−CHANNEL MOSFET

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

Symbol	Parameter			Value	Unit
V_{DSS}	Drain−to−Source Voltage			80	V
V_{GS}	Gate−to−Source Voltage			±20	V
I_D	Continuous Drain Current $R_{\theta JC}$ (Note 2)	Steady State	T_C = 25°C	229	A
P_D	Power Dissipation $R_{\theta JC}$ (Note 2)			208	W
I_D	Continuous Drain Current $R_{\theta JA}$ (Notes 1, 2)	Steady State	T_A = 25°C	29	A
P_D	Power Dissipation $R_{\theta JA}$ (Notes 1, 2)			3.3	W
I_{DM}	Pulsed Drain Current	T_C = 25°C, t_p = 10 μs		3577	A
T_J, T_{stg}	Operating Junction and Storage Temperature Range			−55 to +150	°C
E_{AS}	Single Pulse Drain−to−Source Avalanche Energy ($I_{L(pk)}$ = 29 A, L = 3 mH)			1261.5	mJ
T_L	Lead Temperature for Soldering Purposes (1/8″ from case for 10 s)			260	°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

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Junction−to−Case − Steady State (Note 2)	0.6	°C/W
$R_{\theta JA}$	Junction−to−Ambient − Steady State (Note 2)	38	

1. Surface−mounted on FR4 board using a 1 in^2 pad size, 1 oz. Cu pad.
2. The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.

MARKING DIAGRAM

002N08MC = Device Code
A = Assembly Location
WL = 2−digit Wafer Lot Code
Y = Year Code
WW = Work Week Code

ORDERING INFORMATION

See detailed ordering, marking and shipping information in the package dimensions section on page 5 of this data sheet.

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

Symbol	Parameter	Test Condition		Min	Typ	Max	Unit
OFF CHARACTERISTICS							
$V_{(BR)DSS}$	Drain−to−Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 μA		80			V
$V_{(BR)DSS}/T_J$	Drain−to−Source Breakdown Voltage Temperature Coefficient	I_D = 250 μA, ref to 25°C			68		mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS} = 0 V, V_{DS} = 80 V	T_J = 25°C			1	μA
			T_J = 125°C			250	
I_{GSS}	Gate−to−Source Leakage Current	V_{DS} = 0 V, V_{GS} = ±20 V				±100	nA
ON CHARACTERISTICS (Note 3)							
$V_{GS(TH)}$	Gate Threshold Voltage	V_{GS} = V_{DS}, I_D = 540 μA		2.0	2.7	4.0	V
$V_{GS(TH)}/T_J$	Negative Threshold Temperature Coefficient	I_D = 540 μA, ref to 25°C			−7.9		mV/°C
$R_{DS(on)}$	Drain−to−Source On Resistance	V_{GS} = 10 V	I_D = 90 A		1.3	2.0	mΩ
$R_{DS(on)}$	Drain−to−Source On Resistance	V_{GS} = 6 V	I_D = 48 A		1.8	5.1	mΩ
g_{FS}	Forward Transconductance	V_{DS} = 5 V, I_D = 90 A			214		S
R_G	Gate Resistance	T_A = 25°C			0.8		Ω
CHARGES, CAPACITANCES & GATE RESISTANCE							
C_{ISS}	Input Capacitance	V_{GS} = 0 V, f = 1 MHz, V_{DS} = 40 V			6350	8900	pF
C_{OSS}	Output Capacitance				2100	3000	
C_{RSS}	Reverse Transfer Capacitance				93	130	
$Q_{G(TOT)}$	Total Gate Charge	V_{GS} = 10 V, V_{DS} = 40 V; I_D = 90 A			89	125	nC
$Q_{G(TH)}$	Threshold Gate Charge				16	22	
Q_{GS}	Gate−to−Source Charge				25		
Q_{GD}	Gate−to−Drain Charge				19		
Q_{OSS}	Output Charge				117		
Q_{sync}	Sync Charge				72		
$V_{plateau}$	Plateau Voltage				4		V
SWITCHING CHARACTERISTICS, V_{GS} = 10 V (Note 3)							
$t_{d(ON)}$	Turn−On Delay Time	V_{GS} = 10 V, V_{DS} = 40 V, I_D = 90 A, R_G = 6 Ω			26		ns
t_r	Rise Time				20		
$t_{d(OFF)}$	Turn−Off Delay Time				65		
t_f	Fall Time				29		
DRAIN−SOURCE DIODE CHARACTERISTICS							
V_{SD}	Forward Diode Voltage	V_{GS} = 0 V, I_S = 2 A			0.7	1.2	V
		V_{GS} = 0 V, I_S = 90 A			0.8	1.3	
t_{RR}	Reverse Recovery Time	I_F = 45 A, di/dt = 300 A/μs			34	54	ns
Q_{RR}	Reverse Recovery Charge				71	114	
t_{RR}	Reverse Recovery Time	I_F = 45 A, di/dt = 1000 A/μs			27	43	
Q_{RR}	Reverse Recovery Charge				177	283	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.

3. Switching characteristics are independent of operating junction temperatures.

TYPICAL CHARACTERISTICS

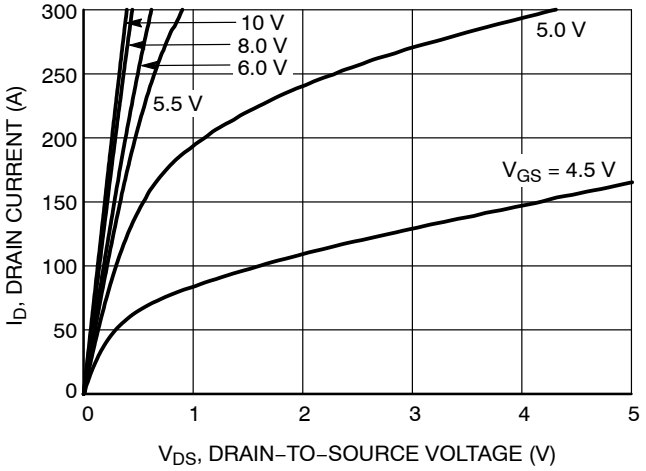


Figure 1. On−Region Characteristics

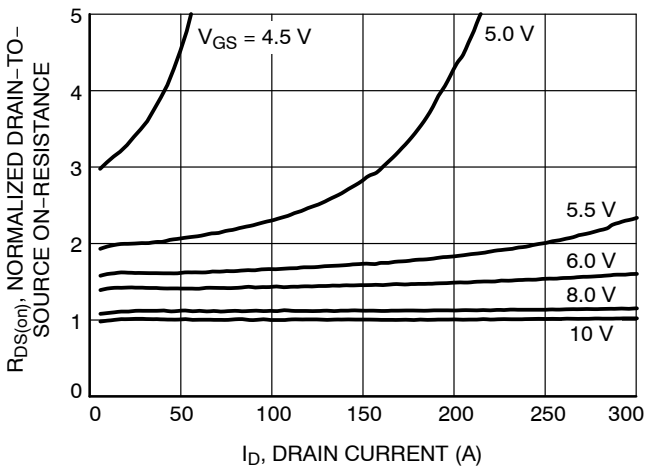


Figure 2. Normalized On−Resistance vs. Drain Current and Gate Voltage

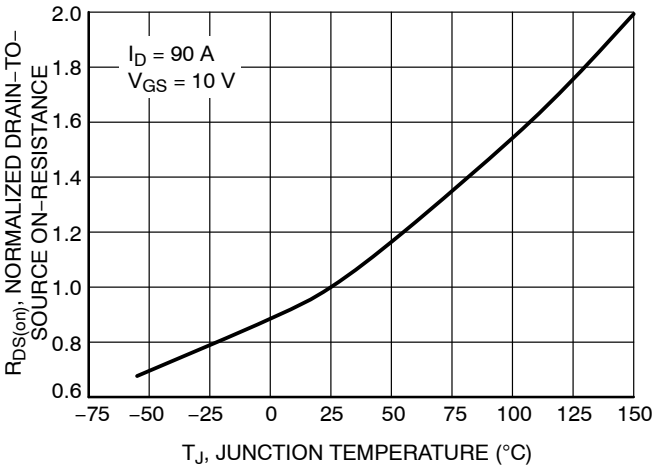


Figure 3. Normalized On Resistance vs. Junction Temperature

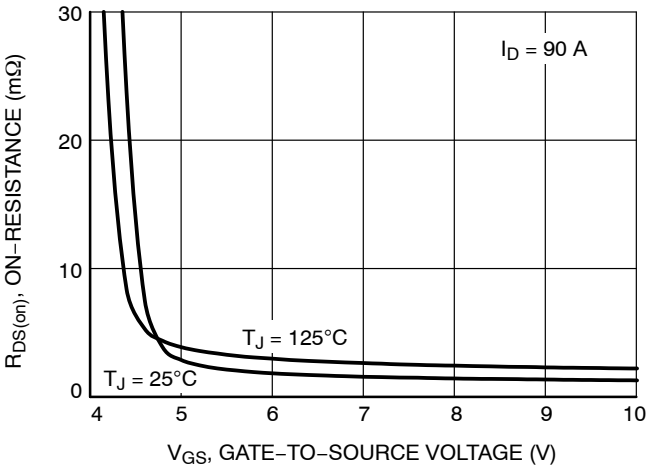


Figure 4. On−Resistance vs. Gate−to−Source Voltage

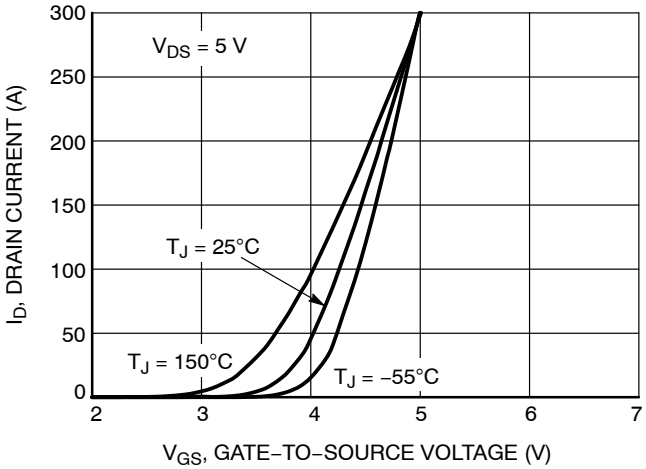


Figure 5. Transfer Characteristics

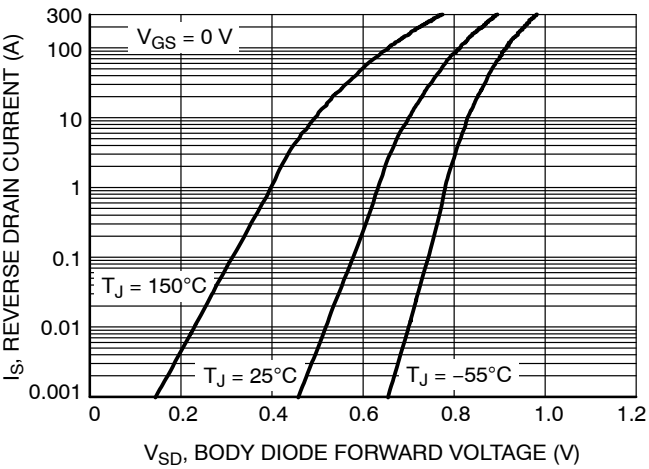


Figure 6. Source−to−Drain Diode Forward Voltage vs. Source Current

TYPICAL CHARACTERISTICS (continued)

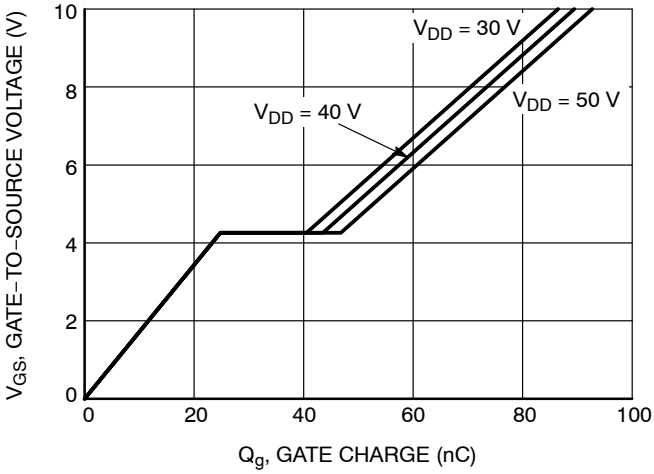


Figure 7. Gate Charge Characteristics

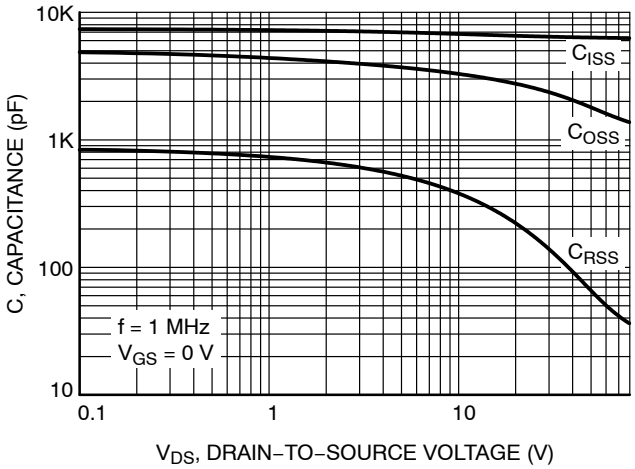


Figure 8. Capacitance vs. Drain−to−Source Voltage

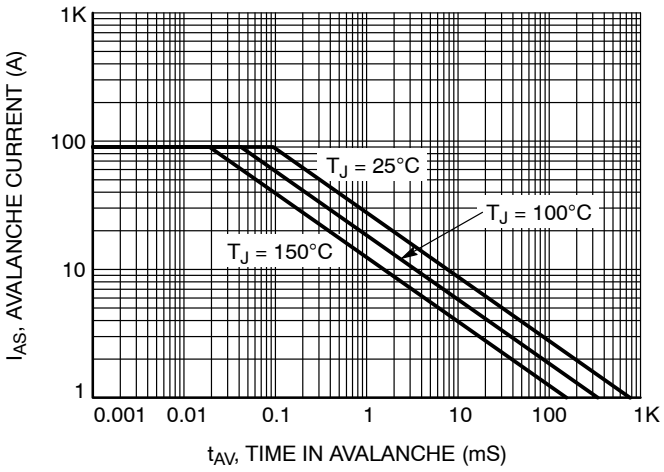


Figure 9. Unclamped Inductive Switching Capability

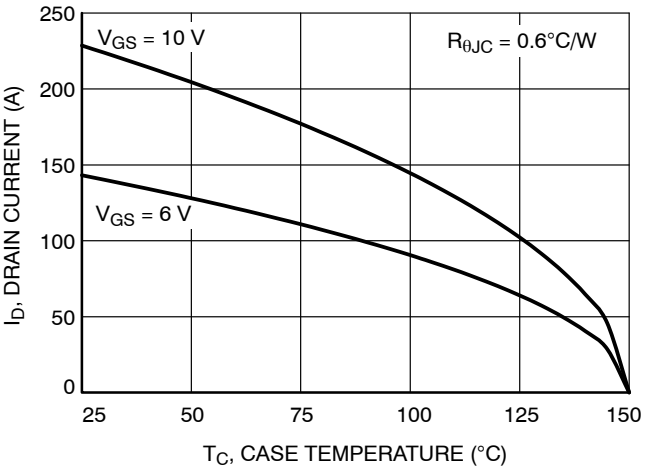


Figure 10. Maximum Continuous Drain Current vs. Case Temperature

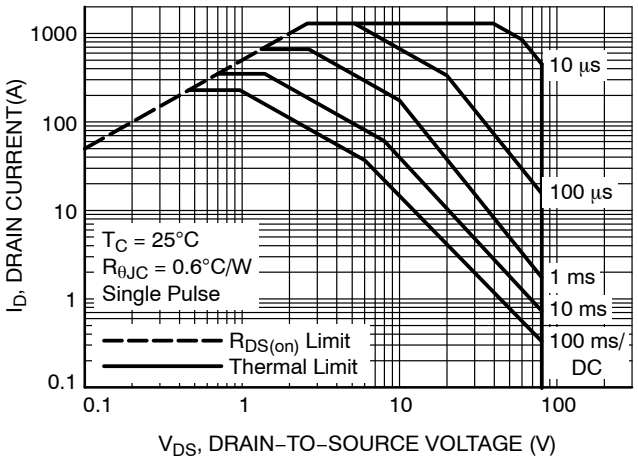


Figure 11. Forward Biased Safe Operating Area

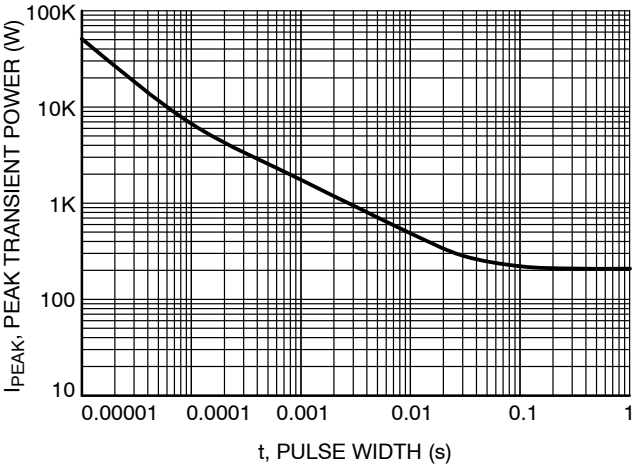


Figure 12. Single Pulse Maximum Power Dissipation

TYPICAL CHARACTERISTICS (continued)

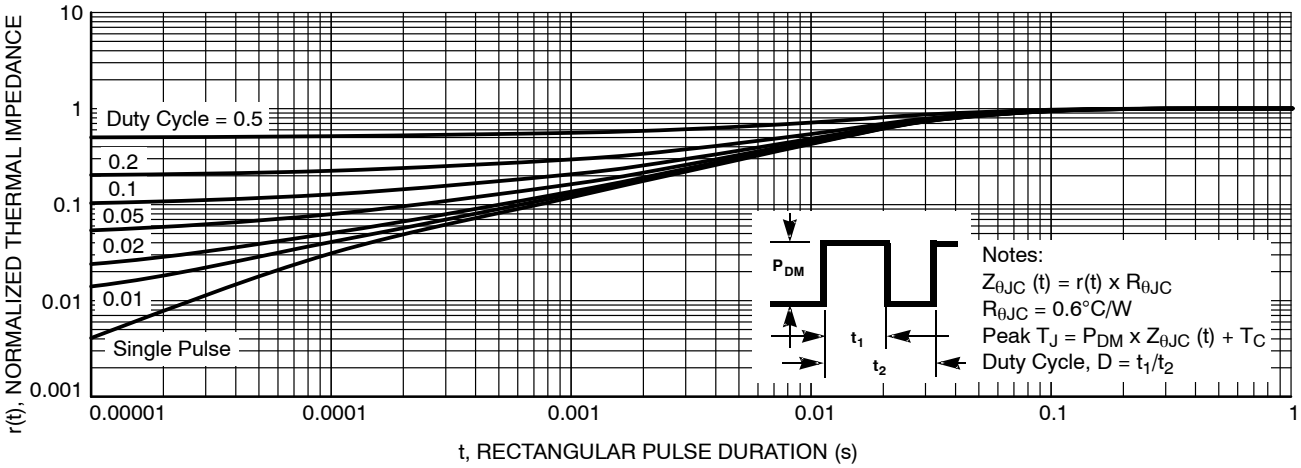
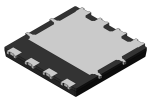


Figure 13. Transient Thermal Impedance

DEVICE ORDERING INFORMATION

Device	Marking	Package	Shipping†
NTMTS002N08MC	NTMTS 002N08MC	DFNW8 (Pb−Free)	3,000 / 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.



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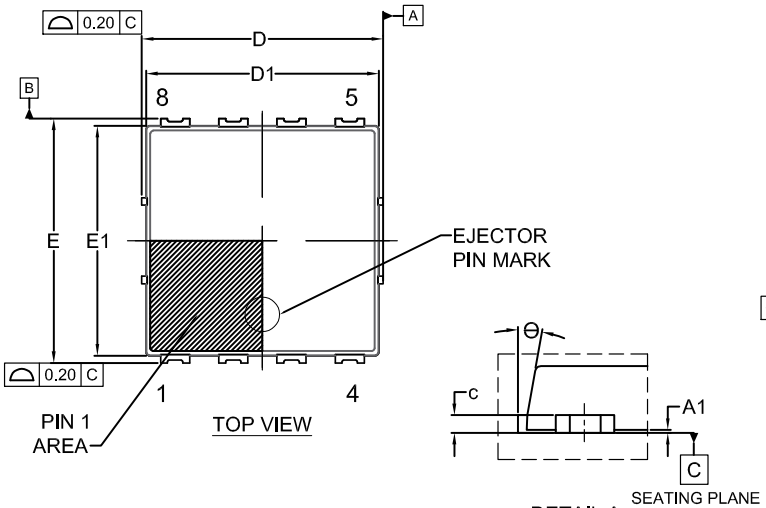
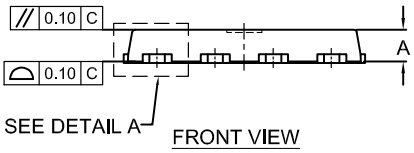
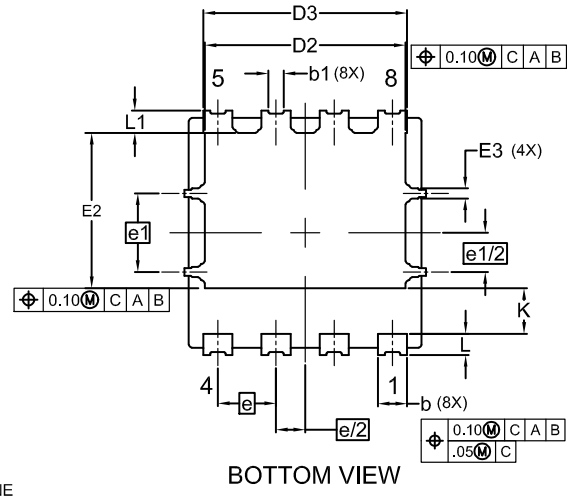
CASE 507AP
ISSUE E

DATE 08 MAY 2024

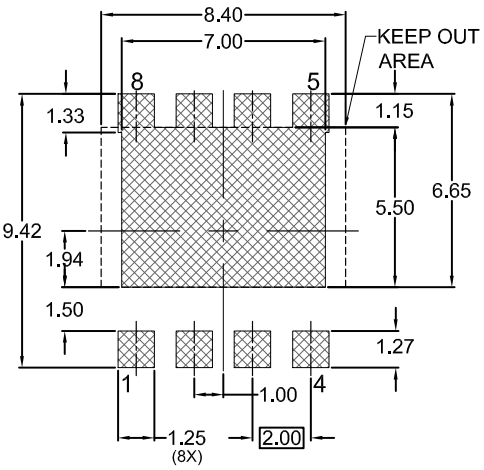




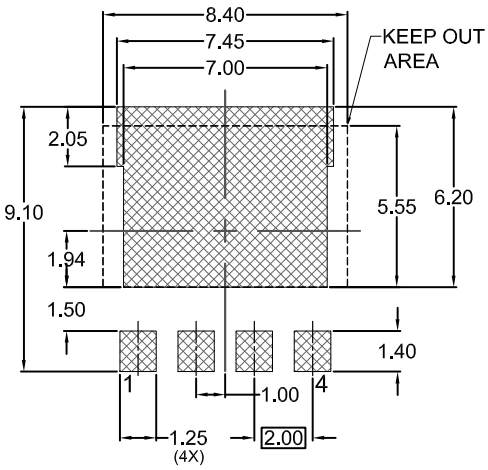


NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
2. CONTROLLING DIMENSION: MILLIMETERS
3. COPLANARITY APPLIES TO THE EXPOSED PADS AS WELL AS THE TERMINALS.
4. DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.
5. SEATING PLANE IS DEFINED BY THE TERMINALS. "A1" IS DEFINED AS THE DISTANCE FROM THE SEATING PLANE TO THE LOWEST POINT ON THE PACKAGE BODY.



RECOMMENDED LAND PATTERN*



UNIVERSAL LAND PATTERN*

*FOR ADDITIONAL INFORMATION ON OUR PB-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ONSEMI SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.

DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	1.00	1.10	1.20
A1	0.00	---	0.05
b	0.90	1.00	1.10
b1	0.35	0.45	0.55
c	0.23	0.28	0.33
D	8.20	8.30	8.40
D1	7.90	8.00	8.10
D2	6.80	6.90	7.00
D3	6.90	7.00	7.10
E	8.30	8.40	8.50
E1	7.80	7.90	8.00
E2	5.24	5.34	5.44
E3	0.25	0.35	0.45
e	2.00 BSC		
e/2	1.00 BSC		
e1	2.70 BSC		
e1/2	1.35 BSC		
K	1.50	1.57	1.70
L	0.64	0.74	0.84
L1	0.67	0.77	0.87
Θ	0°	---	12°

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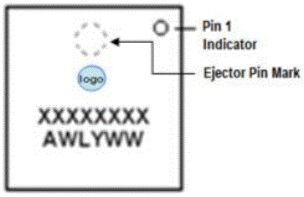
ISSUE E

DATE 08 MAY 2024

GENERIC
MARKING DIAGRAM*



XXXX = Specific Device Code
A = Assembly Location
WL = Wafer Lot Code
Y = Year Code
WW = Work Week Code

*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.

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:
Technical Library: www.onsemi.com/design/resources/technical−documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support
For additional information, please contact your local Sales Representative at www.onsemi.com/support/sales