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MOSFET – Power, Single N-Channel, TDFNW8 DUAL COOL®

150 V, 4.45 mΩ, 165 A

NVMTSC4D3N15MC

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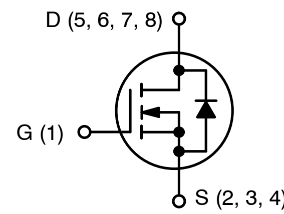
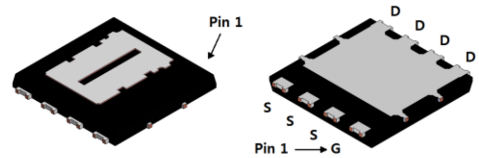
$V_{(BR)DSS}$	$R_{DS(ON)}$ MAX	I_D MAX
150 V	4.45 mΩ @ 10 V	165 A



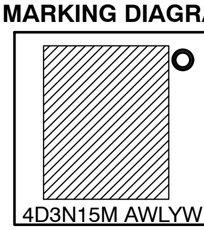
N–CHANNEL MOSFET



Top Bottom

TDFNW8
CASE 507AS

MARKING DIAGRAM



4D3N15M = Specific Device Code
A = Assembly Location
WL = Wafer Lot Code
Y = Year Code
W = Work Week Code

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
- AEC–Q101 Qualified and PPAP Capable
- These Devices are Pb–Free, Halogen Free/BFR Free and are RoHS Compliant

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

Symbol	Parameter			Value	Unit
V_{DSS}	Drain–to–Source Voltage			150	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	165	A
P_D	Power Dissipation $R_{\theta JC}$ (Note 2)			292	W
I_D	Continuous Drain Current $R_{\theta JC}$ (Note 2)	Steady State	T_C = 100°C	117	A
P_D	Power Dissipation $R_{\theta JC}$ (Note 2)			146	W
I_D	Continuous Drain Current $R_{\theta JA}$ (Notes 1, 2)	Steady State	T_A = 25°C	23	A
P_D	Power Dissipation $R_{\theta JA}$ (Notes 1, 2)			5	W
I_D	Continuous Drain Current $R_{\theta JA}$ (Notes 1, 2)	Steady State	T_A = 100°C	16	A
P_D	Power Dissipation $R_{\theta JA}$ (Notes 1, 2)			3	W
I_{DM}	Pulsed Drain Current	T_A = 25°C, t_p = 10 μs		900	A
T_J, T_{stg}	Operating Junction and Storage Temperature Range			−55 to +175	°C
I_S	Source Current (Body Diode)			243	A
E_{AS}	Single Pulse Drain–to–Source Avalanche Energy (I_L = 14.1 A_{pk},)			3390	mJ
T_L	Lead Temperature Soldering Reflow 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.

1. Surface–mounted on FR4 board using 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

ORDERING INFORMATION

Device	Package	Shipping†
NVMTSC4D3N15MC	TDFNW8 (Pb–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 Specifications Brochure, BRD8011/D.

THERMAL RESISTANCE RATINGS

Symbol	Parameter	Max	Unit
$R_{\theta JC}$	Junction−to−Case – Steady State (Note 2)	0.5	°C/W
$R_{\theta JC}$	Junction−to−Case Top (Note 2)	0.8	
$R_{\theta JA}$	Junction−to−Ambient – Steady State (Note 2)	28	

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

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		150	–	–	V
$V_{(BR)DSS}$ / T_J	Drain – to – Source Breakdown Voltage Temperature Coefficient	I_D = 250 μA, ref to 25°C		–	49.84	–	mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS} = 0 V, V_{DS} = 120 V	T_J = 25°C	–	–	1	μA
			T_J = 125°C	–	–	10	μA
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 = 521 μA		2.5	3.6	4.5	V
$V_{GS(TH)}$ / T_J	Negative Threshold Temperature Coefficient	I_D = 250 μA, ref to 25°C		–	−9.93	–	mV/°C
$R_{DS(on)}$	Drain – to – Source On Resistance	V_{GS} = 10 V, I_D = 95 A		–	3.4	4.45	mΩ
g_{FS}	Forward Transconductance	V_{DS} = 5 V, I_D = 95 A		–	177	–	S
R_G	Gate−Resistance	T_A = 25°C		–	1.1	–	Ω
CHARGES & CAPACITANCES							
C_{ISS}	Input Capacitance	V_{GS} = 0 V, f = 1 MHz, V_{DS} = 75 V		–	6514	–	pF
C_{OSS}	Output Capacitance			–	1750	–	
C_{RSS}	Reverse Transfer Capacitance			–	12.5	–	
$Q_{G(TOT)}$	Total Gate Charge	V_{GS} = 10 V, V_{DS} = 75 V, I_D = 95 A		–	79	–	nC
$Q_{G(TH)}$	Threshold Gate Charge			–	21	–	
Q_{GS}	Gate−to−Source Charge			–	36	–	
Q_{GD}	Gate−to−Drain Charge			–	11	–	
V_{GP}	Plateau Voltage			–	5.8	–	
SWITCHING CHARACTERISTICS, V_{GS} = 10 V (Note 3)							
$t_{d(ON)}$	Turn – On Delay Time	V_{GS} = 10 V, V_{DS}=75 V, I_D = 95 A, R_G = 6 Ω		–	38	–	ns
t_r	Rise Time			–	11	–	
$t_{d(OFF)}$	Turn – Off Delay Time			–	48	–	
t_f	Fall Time			–	8	–	
DRAIN−SOURCE DIODE CHARACTERISTICS							
V_{SD}	Forward Diode Voltage	V_{GS} = 0 V, I_S = 95 A	T_J = 25°C	–	0.86	1.2	V
			T_J = 125°C	–	0.80	–	
t_{RR}	Reverse Recovery Time	V_{GS} = 0 V, dI_S/dt = 100 A/μs, I_S = 95 A		–	85	–	ns
t_a	Charge Time			–	58	–	
t_b	Discharge Time			–	38	–	
Q_{RR}	Reverse Recovery Charge			–	194	–	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

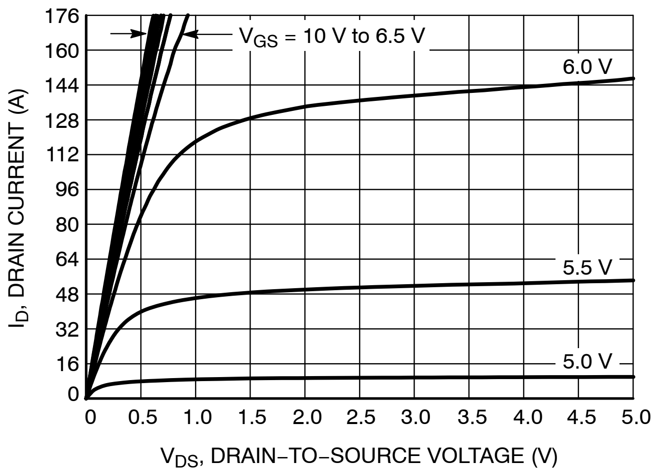


Figure 1. On−Region Characteristics

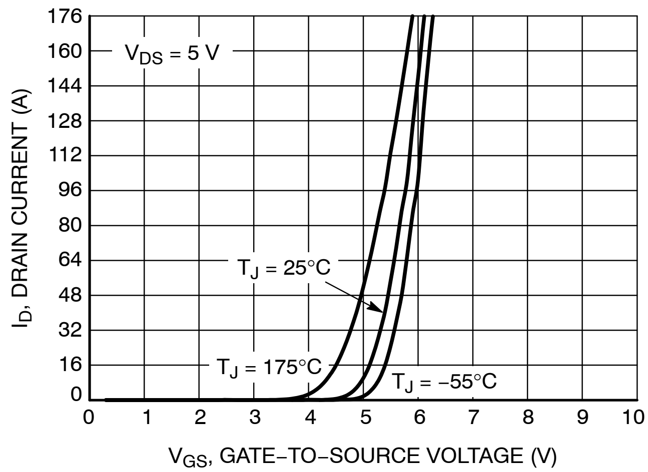


Figure 2. Transfer Characteristics

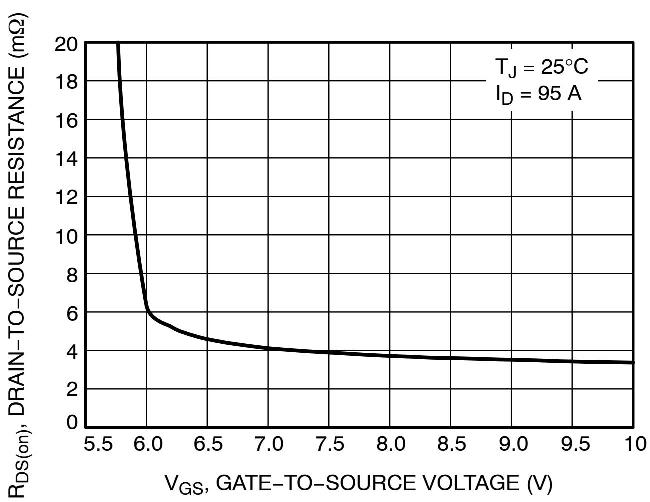


Figure 3. On−Resistance vs. Gate−to−Source Voltage

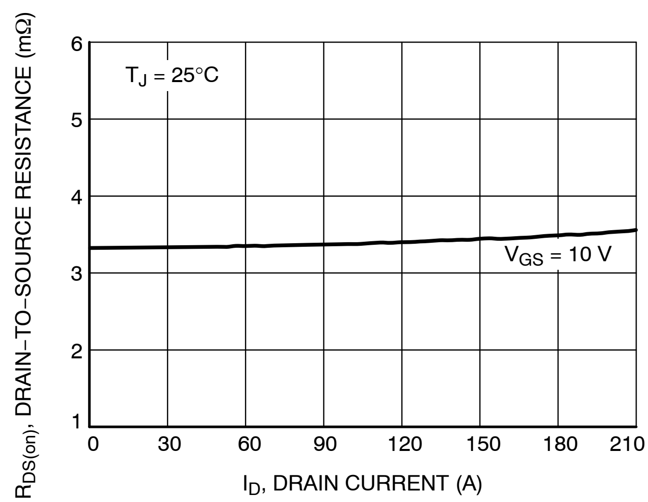


Figure 4. On−Resistance vs. Drain Current and Gate Voltage

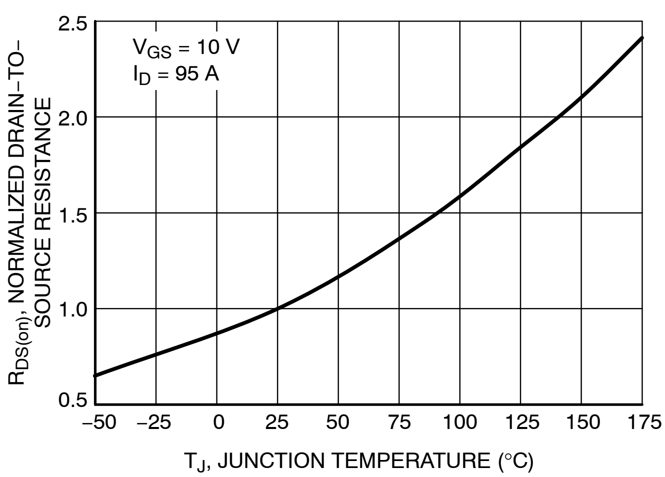


Figure 5. On−Resistance Variation with Temperature

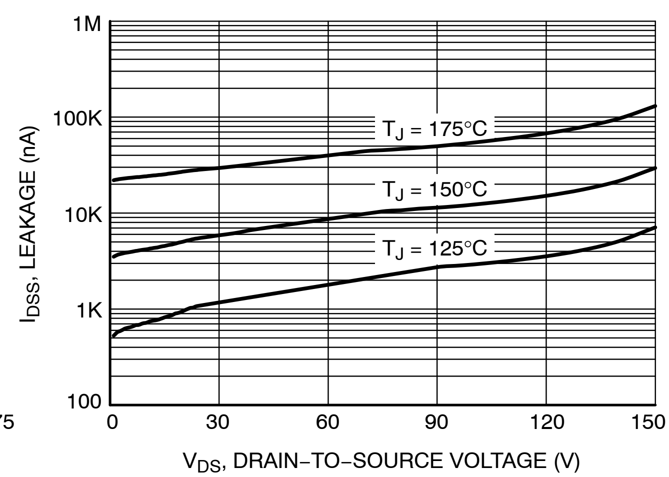


Figure 6. Drain−to−Source Leakage Current vs. Voltage

TYPICAL CHARACTERISTICS

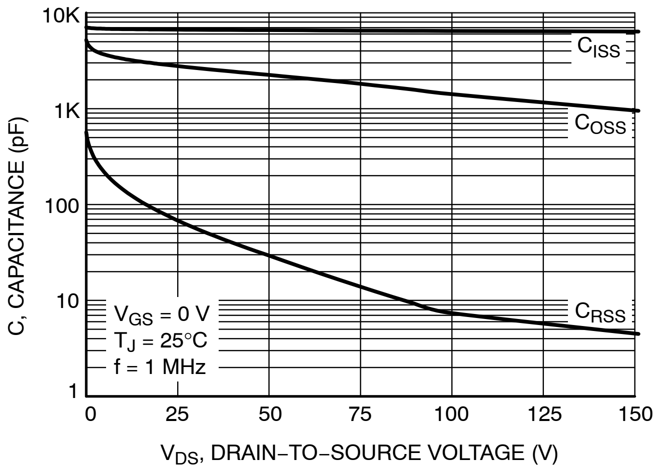


Figure 7. Capacitance Variation

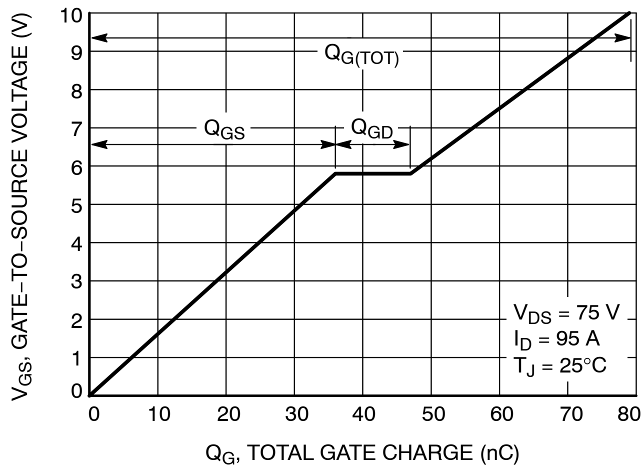


Figure 8. Gate−to−Source and Drain−to−Source Voltage vs. Total Charge

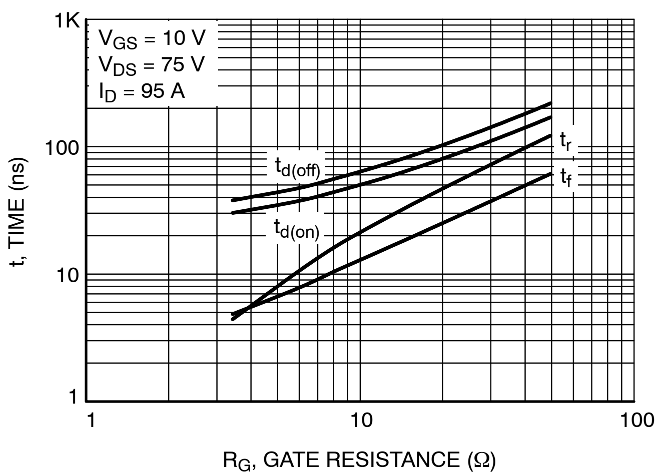


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

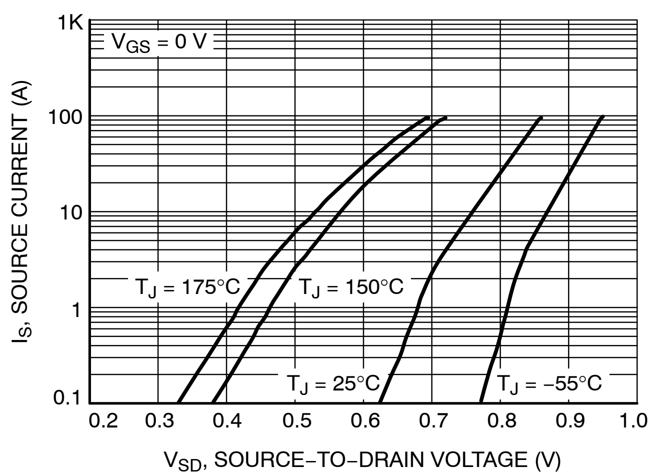


Figure 10. Diode Forward Voltage vs. Current

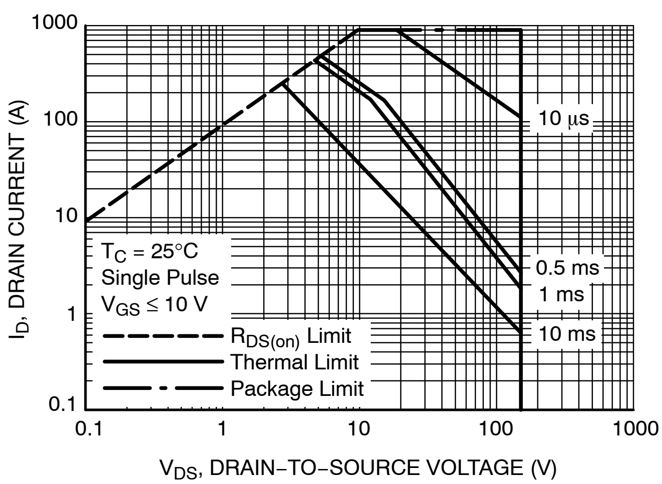


Figure 11. Safe Operating Area

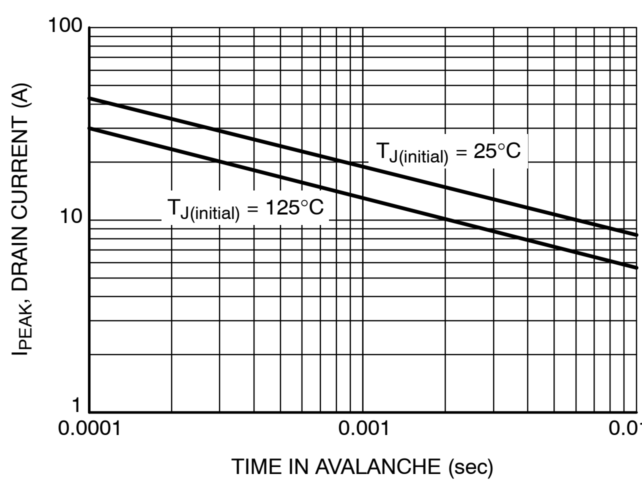


Figure 12. I_{PEAK} vs. Time in Avalanche

TYPICAL CHARACTERISTICS

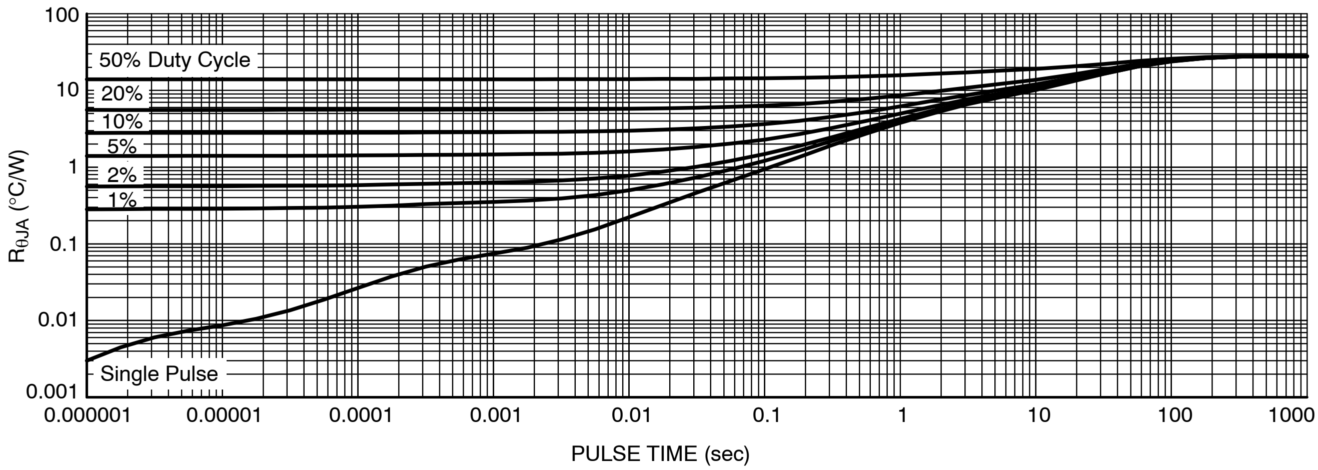
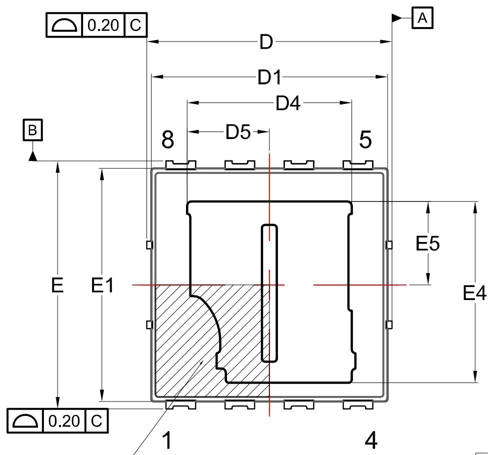


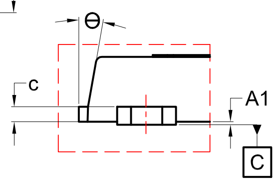
Figure 13. Thermal Characteristics

PACKAGE DIMENSIONS

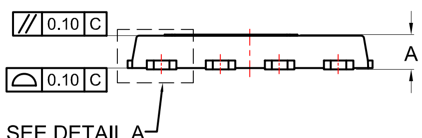
TDFNW8 8.3x8.4, 2P
CASE 507AS
ISSUE A



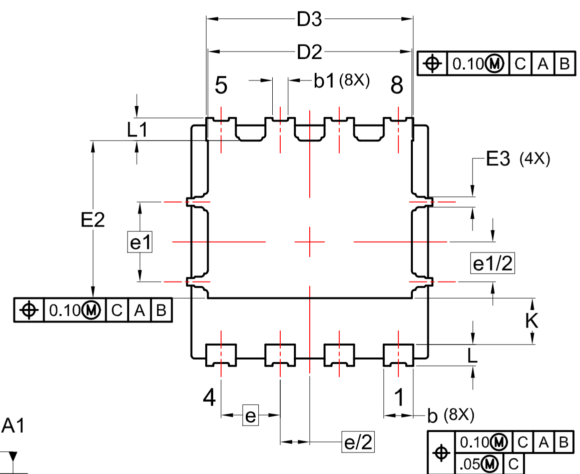
TOP VIEW



DETAIL A
SCALE: 2X



FRONT VIEW

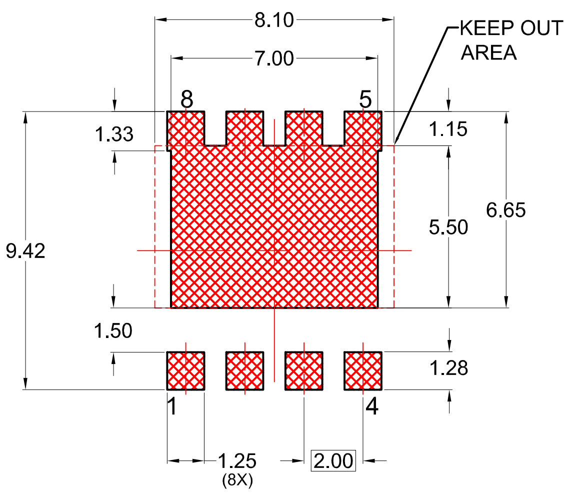


BOTTOM VIEW

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.

DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.82	0.92	1.02
A1	0.00	---	0.05
b	0.90	1.00	1.10
b1	0.43	0.53	0.63
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
D4	5.47	5.57	5.67
D5	2.69	2.79	2.89
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
E4	6.03	6.13	6.23
E5	2.72	2.82	2.92
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°



RECOMMENDED LAND PATTERN

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