NTMTSC1D5N08MC

MOSFET – Power, Single N-Channel, DFNW8, DUAL COOL®

80 V, 1.56 mΩ, 287 A

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

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

Parameter			Symbol	Value	Unit
Drain−to−Source Voltage			V_{DSS}	80	V
Gate−to−Source Voltage			V_{GS}	±20	V
Continuous Drain Current $R_{\theta JC}$ (Note 2)	Steady State	T_C = 25°C	I_D	287	A
Power Dissipation $R_{\theta JC}$ (Note 2)	Steady State	T_C = 25°C	P_D	250	W
Continuous Drain Current $R_{\theta JA}$ (Notes 1, 2)	Steady State	T_A = 25°C	I_D	33	A
Power Dissipation $R_{\theta JA}$ (Notes 1, 2)	Steady State	T_A = 25°C	P_D	3.3	W
Pulsed Drain Current	T_C = 25°C, t_p = 10 μs		I_{DM}	3500	A
Operating Junction and Storage Temperature Range			T_J, T_{stg}	−55 to +150	°C
Single Pulse Drain−to−Source Avalanche Energy ($I_{L(pk)}$ = 31 A, L = 3 mH)			E_{AS}	1441	mJ
Lead Temperature for Soldering Purposes (1/8″ from case for 10 s)			T_L	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

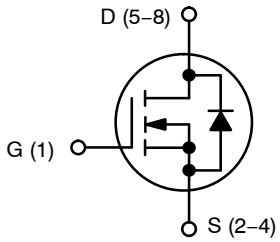
Parameter	Symbol	Value	Unit
Junction−to−Case − Steady State (Note 2)	$R_{\theta JC}$	0.5	°C/W
Junction−to−Ambient − Steady State (Note 2)	$R_{\theta JA}$	38	

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.

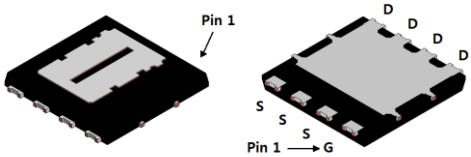
ON Semiconductor®

www.onsemi.com

$V_{(BR)DSS}$	$R_{DS(ON)}$ MAX	I_D MAX
80 V	1.56 mΩ @ 10 V	287 A
	4.0 mΩ @ 6 V	

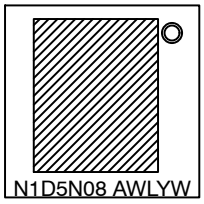


N−CHANNEL MOSFET



DFNW8
DUAL COOL
CASE 507AS

MARKING DIAGRAM



N1D5N08 = Specific Device Code
A = Assembly Location
WL = 2−digit Wafer Lot Code
Y = Year Code
W = 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)

Parameter	Symbol	Test Condition		Min	Typ	Max	Unit
OFF CHARACTERISTICS							
Drain−to−Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 250 μA		80			V
Drain−to−Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$	I_D = 250 μA, ref to 25°C			82		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS} = 0 V, V_{DS} = 80 V	T_J = 25°C			1	μA
			T_J = 125°C			250	
Gate−to−Source Leakage Current	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V				±100	nA
ON CHARACTERISTICS (Note 3)							
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_D = 650 μA		2.0	3.0	4.0	V
Negative Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$	I_D = 650 μA, ref to 25°C			−8.3		mV/°C
Drain−to−Source On Resistance	$R_{DS(on)}$	V_{GS} = 10 V	I_D = 80 A		1.10	1.56	mΩ
Drain−to−Source On Resistance	$R_{DS(on)}$	V_{GS} = 6 V	I_D = 58 A		1.75	4.0	mΩ
Forward Transconductance	g_{FS}	V_{DS} = 5 V, I_D = 80 A			219		S
Gate Resistance	R_G	T_A = 25°C			0.9		Ω
CHARGES, CAPACITANCES & GATE RESISTANCE							
Input Capacitance	C_{ISS}	V_{GS} = 0 V, f = 1 MHz, V_{DS} = 40 V			7420	10,400	pF
Output Capacitance	C_{OSS}				2555	3600	
Reverse Transfer Capacitance	C_{RSS}				101	175	
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = 10 V, V_{DS} = 40 V; I_D = 80 A			101	140	nC
Threshold Gate Charge	$Q_{G(TH)}$				20	28	
Gate−to−Source Charge	Q_{GS}				32		
Gate−to−Drain Charge	Q_{GD}				21		
Output Charge	Q_{OSS}				141		
Sync Charge	Q_{sync}				82		
Plateau Voltage	$V_{plateau}$				5		V
SWITCHING CHARACTERISTICS, V_{GS} = 10 V (Note 3)							
Turn−On Delay Time	$t_{d(ON)}$	V_{GS} = 10 V, V_{DS} = 40 V, I_D = 80 A, R_G = 6 Ω			30		ns
Rise Time	t_r				24		
Turn−Off Delay Time	$t_{d(OFF)}$				69		
Fall Time	t_f				31		
DRAIN−SOURCE DIODE CHARACTERISTICS							
Forward Diode Voltage	V_{SD}	V_{GS} = 0 V, I_S = 2 A			0.7	1.2	V
		V_{GS} = 0 V, I_S = 80 A			0.8	1.3	
Reverse Recovery Time	t_{RR}	I_F = 40 A, di/dt = 300 A/μs			39	62	ns
Reverse Recovery Charge	Q_{RR}				89	142	nC
Reverse Recovery Time	t_{RR}	I_F = 40 A, di/dt = 1000 A/μs			31	50	ns
Reverse Recovery Charge	Q_{RR}				209	335	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

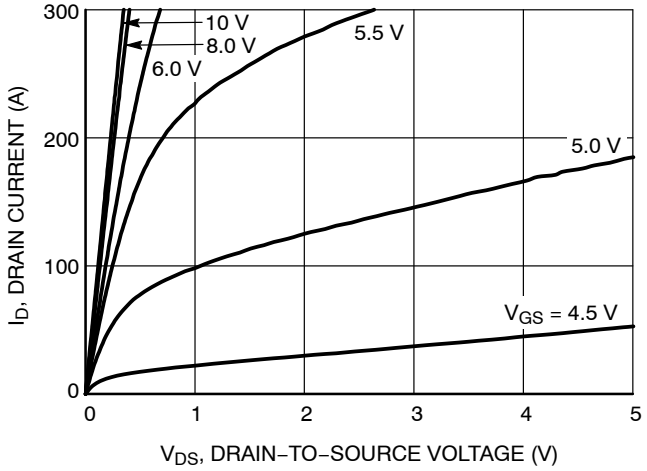


Figure 1. On−Region Characteristics

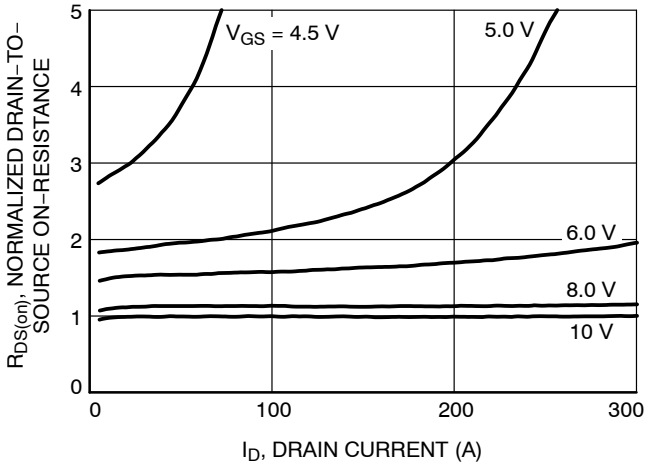


Figure 2. Normalized On−Resistance vs. Drain Current and Gate Voltage

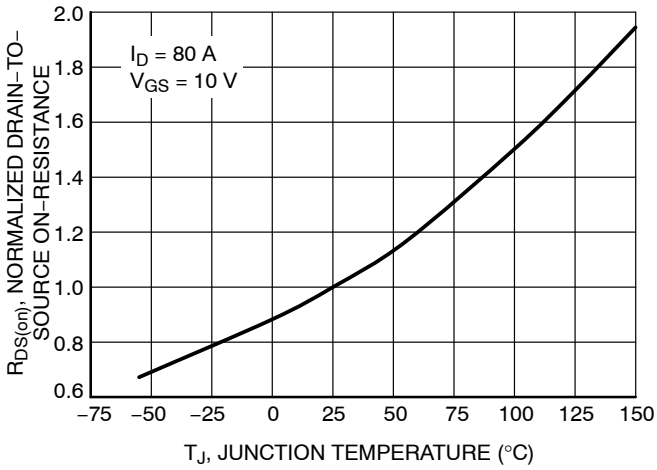


Figure 3. Normalized On Resistance vs. Junction Temperature

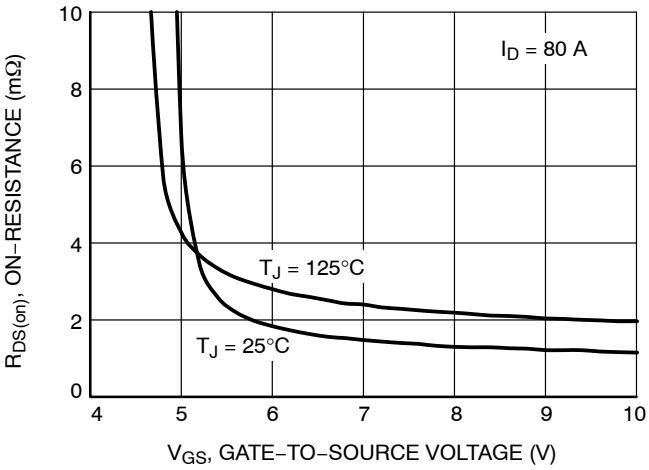


Figure 4. On−Resistance vs. Gate−to−Source Voltage

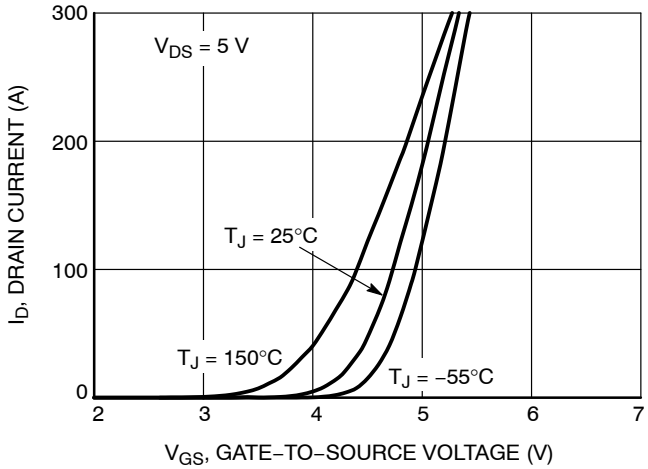


Figure 5. Transfer Characteristics

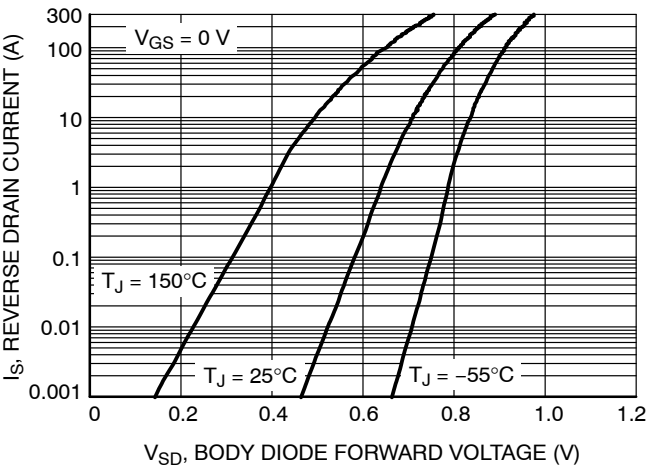


Figure 6. Source−to−Drain Diode Forward Voltage vs. Source Current

TYPICAL CHARACTERISTICS

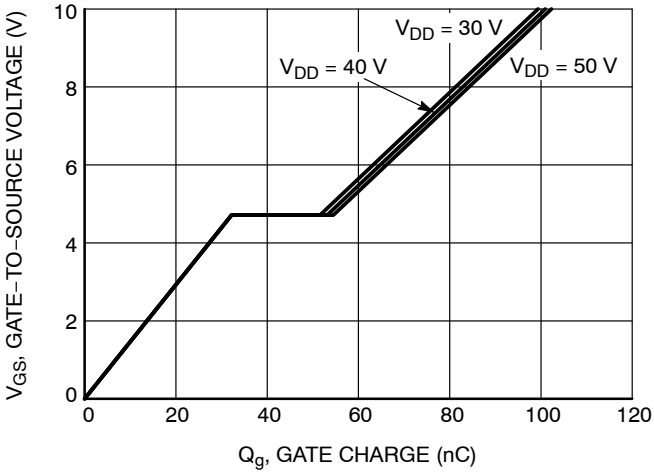


Figure 7. Gate Charge Characteristics

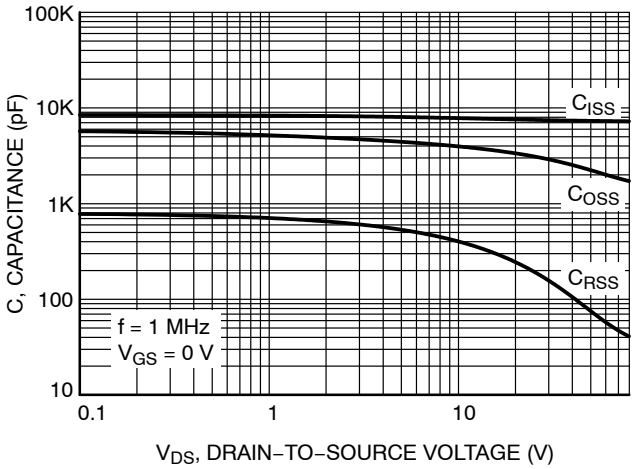


Figure 8. Capacitance vs. Drain−to−Source Voltage

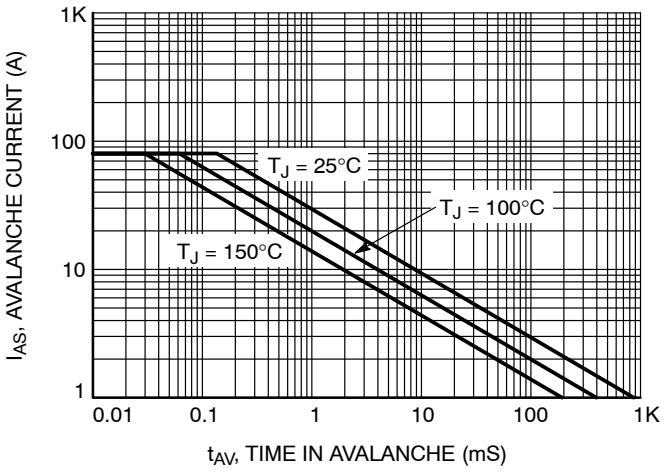


Figure 9. Unclamped Inductive Switching Capability

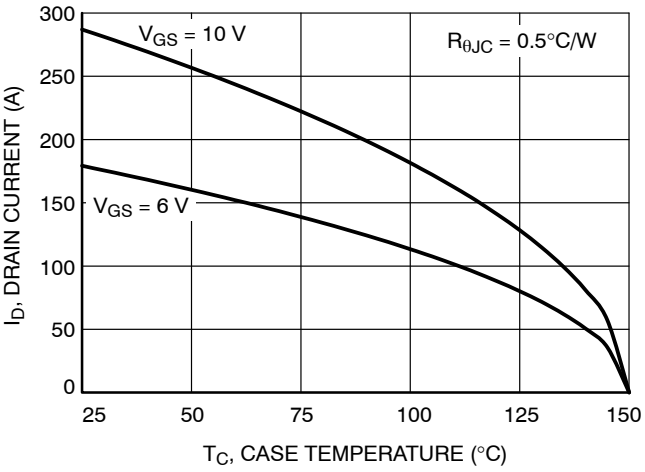


Figure 10. Maximum Continuous Drain Current vs. Case Temperature

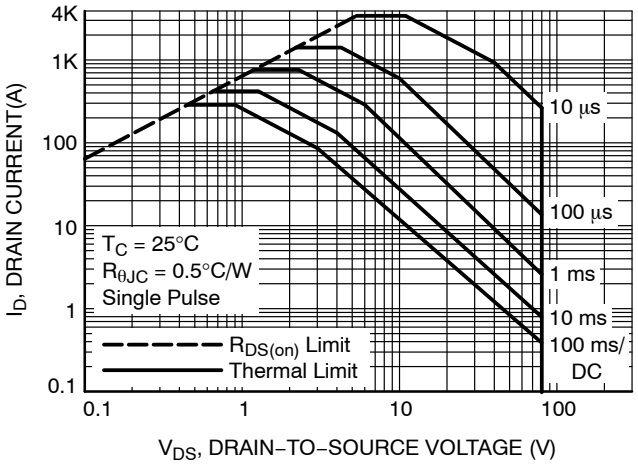


Figure 11. Forward Biased Safe Operating Area

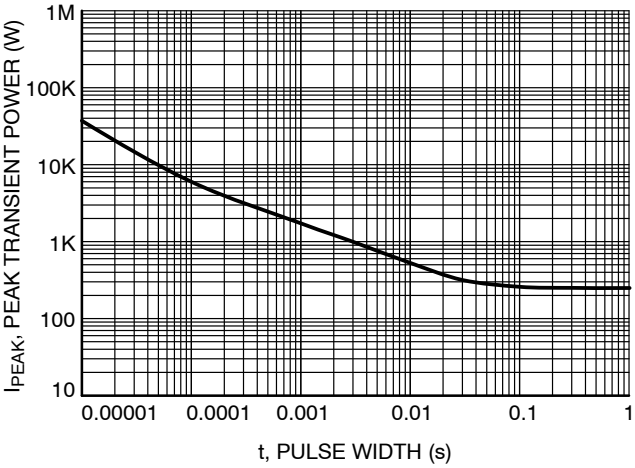


Figure 12. Single Pulse Maximum Power Dissipation

TYPICAL CHARACTERISTICS

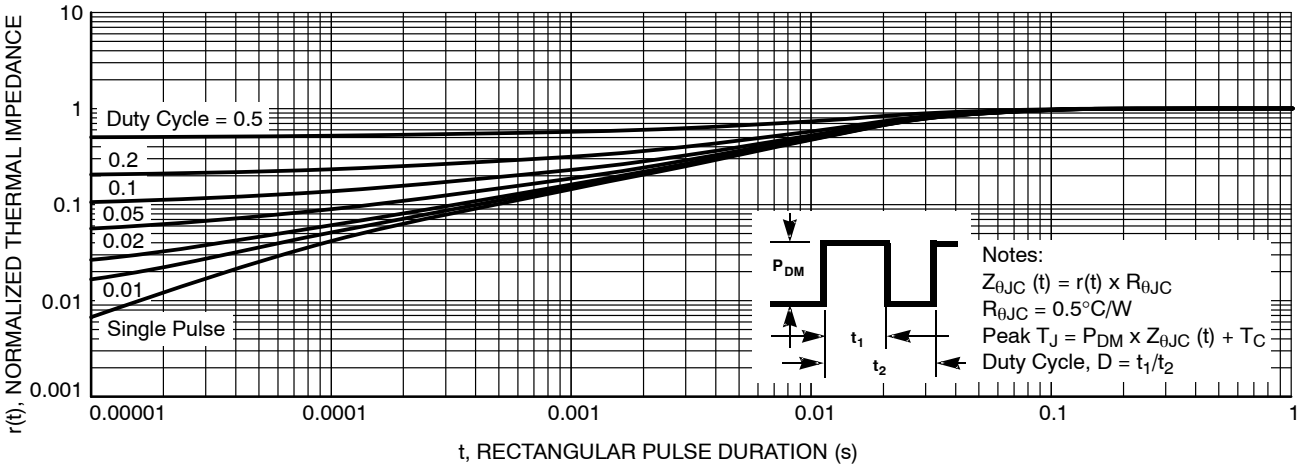


Figure 13. Transient Thermal Impedance

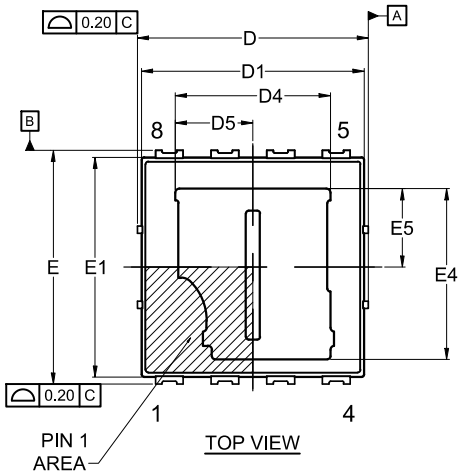
DEVICE ORDERING INFORMATION

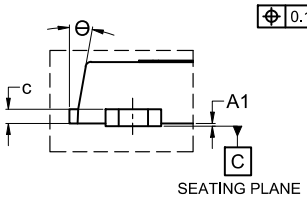
Device	Marking	Package	Shipping†
NTMTSC1D5N08MC	N1D5N08	DFNW8 DUAL COOL (Pb−Free)	3000 / Tape & Reel

†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.

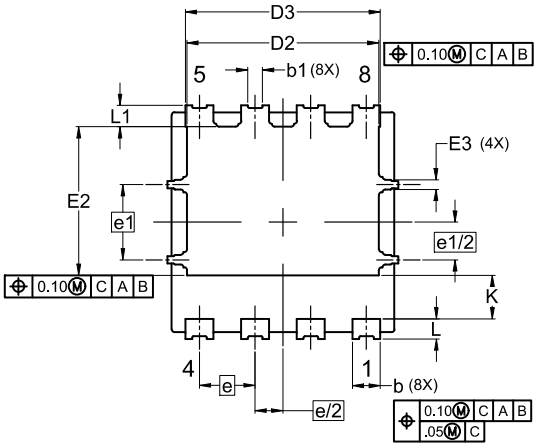
PACKAGE DIMENSIONS

DFNW8 8.3x8.4, 2P
CASE 507AS
ISSUE O

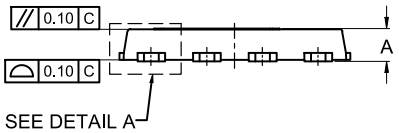




DETAIL A
SCALE: 2X



BOTTOM VIEW

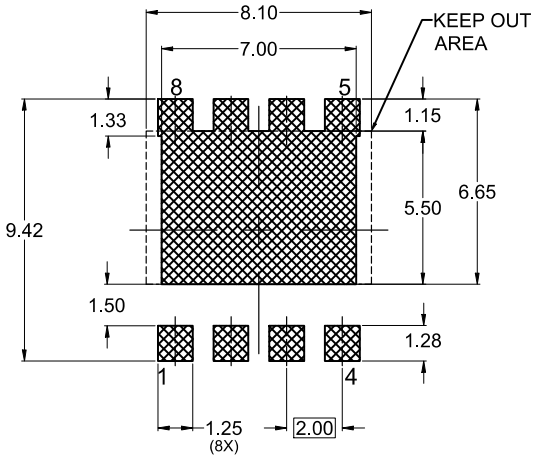


FRONT VIEW

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	0.85	0.95	1.05
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

DUAL COOL is a registered trademark of Semiconductor Components Industries, LLC.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA
Phone: 303−675−2175 or 800−344−3860 Toll Free USA/Canada
Fax: 303−675−2176 or 800−344−3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800−282−9855 Toll Free USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910

ON Semiconductor Website: **www.onsemi.com**

Order Literature: http://www.onsemi.com/orderlit

For additional information, please contact your local Sales Representative