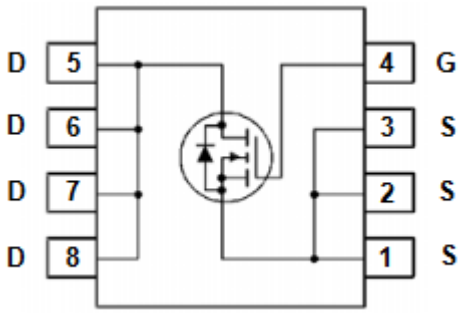
MOSFET - Power, DUAL COOL® N-Channel, PQFN8
150 V, 11.4 mΩ, 80 A
NTMFSC012N15MC

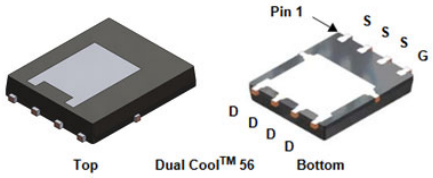
$V_{(BR)DSS}$	$R_{DS(ON)}$ MAX	I_D MAX
150 V	11.4 mΩ @ 10 V	44 A
	14.5 mΩ @ 8 V	22 A

Features
- Advanced Dual−sided Cooled Packaging
- Ulra Low $R_{DS(on)}$
- MSL1 Robust Packaging Design

Typical Applications
- Primary DC−DC FET
- Synchronous Rectifier
- DC−DC Conversion

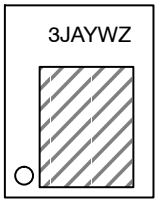
N−CHANNEL MOSFET





DFN8 5x6.15
CASE 506EG

MARKING DIAGRAM



3J = Specific Device Code
A = Assembly Location
Y = Year
W = Work Week
Z = Assembly Lot Code

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

Parameter			Symbol	Value	Unit
Drain−to−Source Voltage			V_{DSS}	150	V
Gate−to−Source Voltage			V_{GS}	±20	V
Continuous Drain Current $R_{\theta JC}$ (Notes 1, 3)	Steady State	T_C = 25°C	I_D	80	A
		T_C = 100°C		50	
Power Dissipation $R_{\theta JC}$ (Note 1)		T_C = 25°C	P_D	147	W
		T_C = 100°C		58	
Continuous Drain Current $R_{\theta JA}$ (Notes 1, 2, 3)	Steady State	T_A = 25°C	I_D	10	A
		T_A = 100°C		6	
Power Dissipation $R_{\theta JA}$ (Notes 1, 2)		T_A = 25°C	P_D	2.7	W
		T_A = 100°C		1	
Pulsed Drain Current	T_C = 25°C, t_p = 10 μs		I_{DM}	1067	A
Operating Junction / Storage Temperature Max			T_J, T_{stg}	+150	°C
Source Current (Body Diode)			I_S	122	A
Single Pulse Drain−to−Source Avalanche Energy ($I_{L(pk)}$ = 35 A)			E_{AS}	161	mJ
Lead Temperature Soldering Reflow 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	$R_{\theta JC}$	0.85	°C/W
Junction−to−Case Top − Steady State	$R_{\theta JT}$	1.5	
Junction−to−Ambient − Steady State (Note 2)	$R_{\theta JA}$	46	

1. The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.
2. Surface−mounted on FR4 board using a 650 mm^2, 2 oz. Cu pad.
3. Maximum current for pulses as long as 1 second is higher but is dependent on pulse duration and duty cycle.

ORDERING INFORMATION

Device	Package	Shipping†
NTMFSC012N15MC	PQFN8 (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 Specification Brochure, BRD8011/D.

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		150			V
Drain−to−Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$	I_D = 250 μA, ref to 25°C			6.9		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS} = 0 V, V_{DS} = 150 V	T_J = 25°C			1	μA
			T_J = 125°C			100	
Gate−to−Source Leakage Current	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V				±100	nA
ON CHARACTERISTICS (Note 4)							
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_D = 194 μA		2.5		4.5	V
Negative Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$	I_D = 194 μA, ref to 25°C			8		mV/°C
Drain−to−Source On Resistance	$R_{DS(on)}$	V_{GS} = 10 V	I_D = 44 A		8.9	11.4	mΩ
		V_{GS} = 8 V	I_D = 22 A		9.5	14.5	
Gate−Resistance	R_G	T_A = 25°C			0.7		Ω
CHARGES & CAPACITANCES							
Input Capacitance	C_{ISS}	V_{GS} = 0 V, f = 1 MHz, V_{DS} = 75 V			2490		pF
Output Capacitance	C_{OSS}				676		
Reverse Transfer Capacitance	C_{RSS}				9.0		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = 6 V, V_{DS} = 75 V, I_D = 44 A			20.4		nC
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = 10 V, V_{DS} = 75 V, I_D = 44 A			32.4		
Gate−to−Source Charge	Q_{GS}				13.9		
Gate−to−Drain Charge	Q_{GD}				5.5		
Plateau Voltage	V_{GP}				5.7		V
SWITCHING CHARACTERISTICS (Note 4)							
Turn−On Delay Time	$t_{d(ON)}$	V_{GS} = 10 V, V_{DS} = 75 V, I_D = 44 A, R_G = 2.5 Ω			18.4		ns
Rise Time	t_r				3.7		
Turn−Off Delay Time	$t_{d(OFF)}$				21.3		
Fall Time	t_f				3		
DRAIN−SOURCE DIODE CHARACTERISTICS							
Forward Diode Voltage	V_{SD}	V_{GS} = 0 V, I_S = 44 A	T_J = 25°C		0.88		V
			T_J = 125°C		0.76		
Reverse Recovery Time	t_{RR}	V_{GS} = 0 V, dI_S/dt = 1000 A/μs, I_S = 44 A			42.7		ns
Reverse Recovery Charge	Q_{RR}				559		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.

4. Switching characteristics are independent of operating junction temperatures.

TYPICAL CHARACTERISTICS

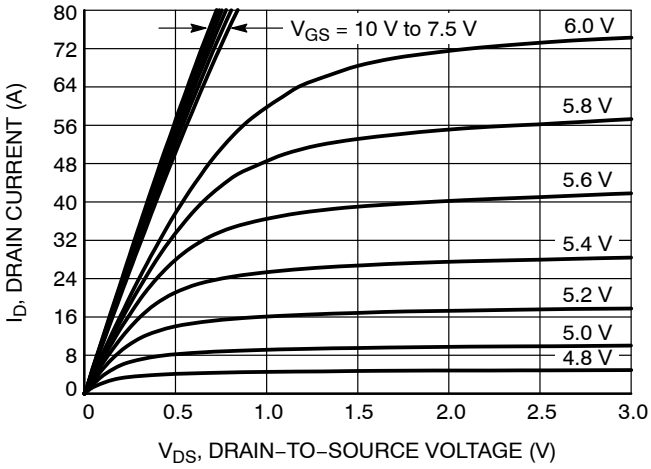


Figure 1. On−Region Characteristics

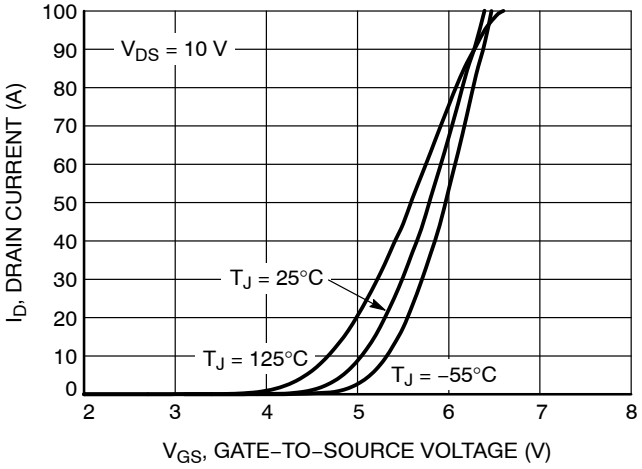


Figure 2. Transfer Characteristics

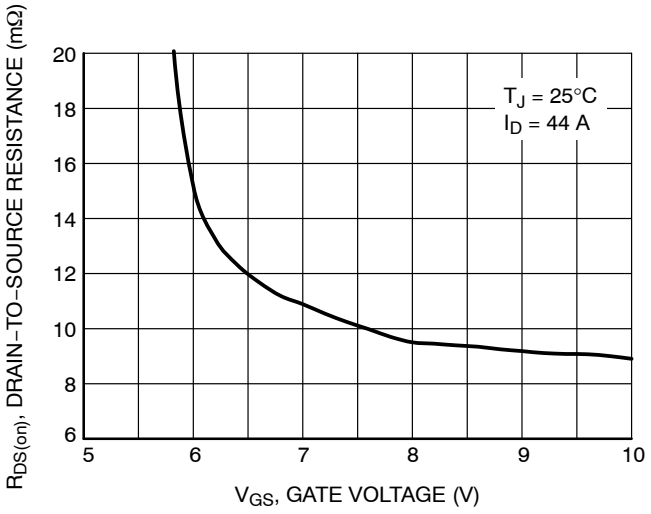


Figure 3. On−Resistance vs. Gate−to−Source Voltage

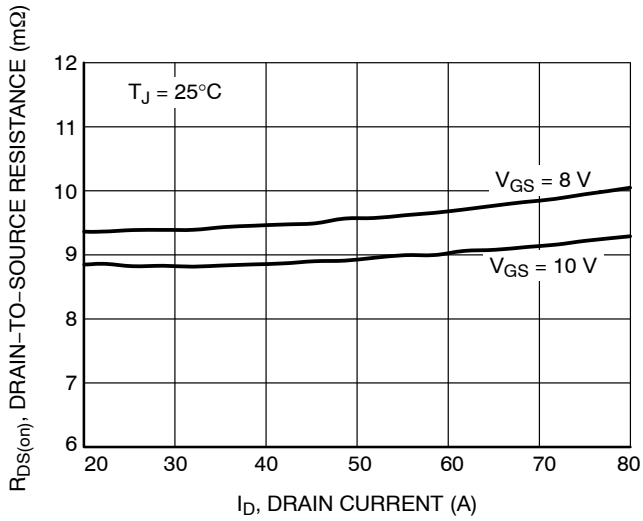


Figure 4. On−Resistance vs. Drain Current and Gate Voltage

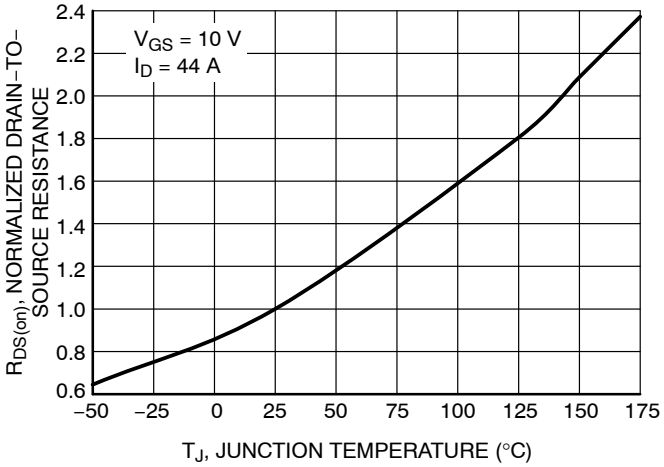


Figure 5. On−Resistance Variation with Temperature

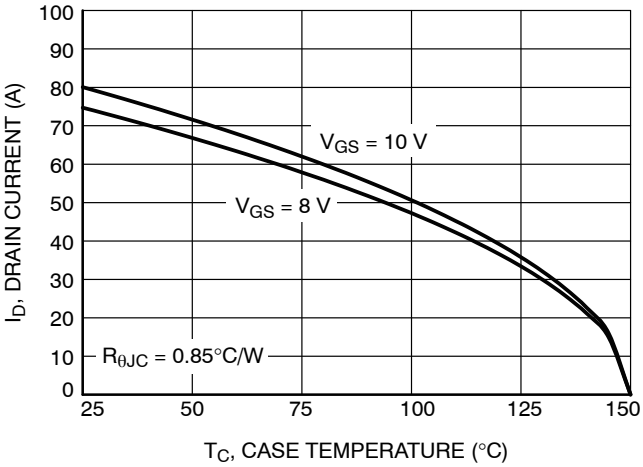


Figure 6. Maximum Continuous Drain Current vs. Case Temperature

TYPICAL CHARACTERISTICS

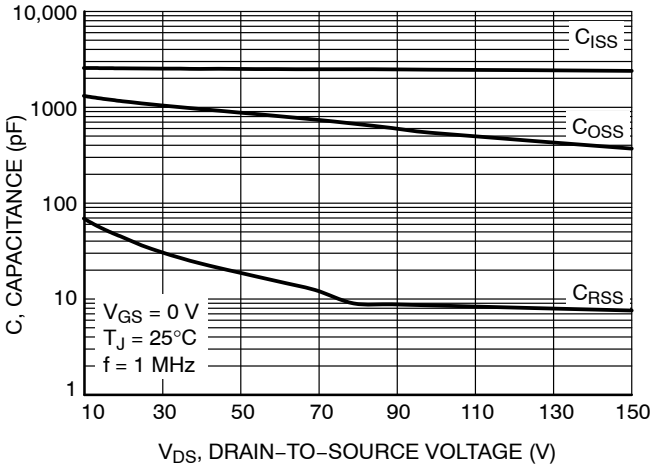


Figure 7. Capacitance Variation

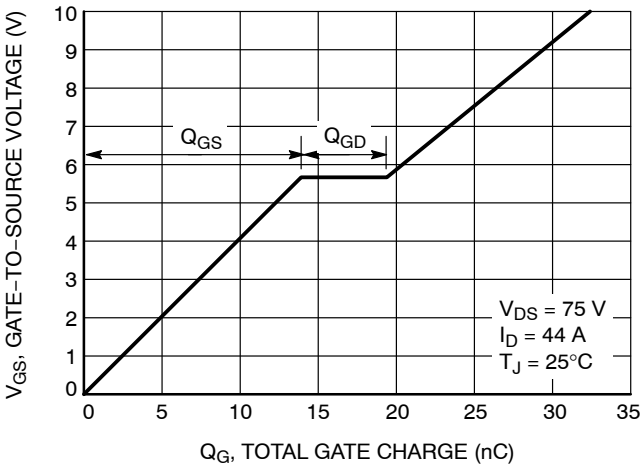


Figure 8. Gate−to−Source and Drain−to−Source Voltage vs. Total Charge

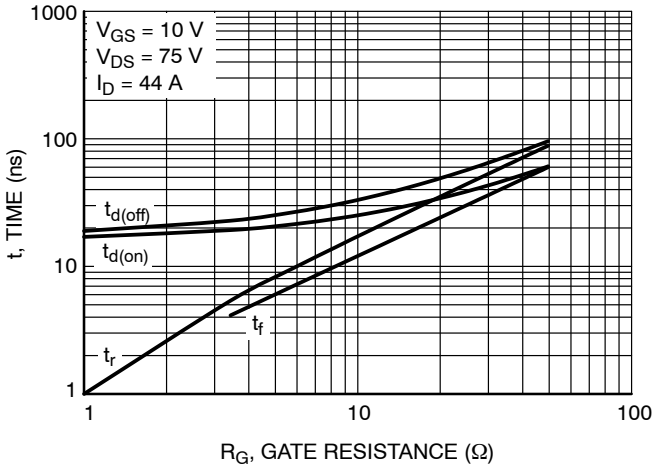


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

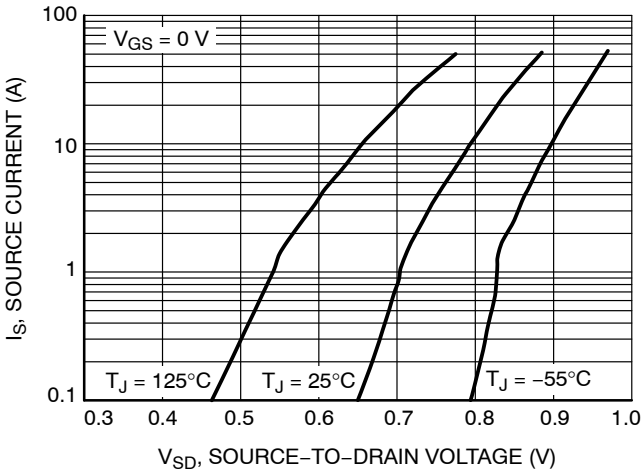


Figure 10. Diode Forward Voltage vs. Current

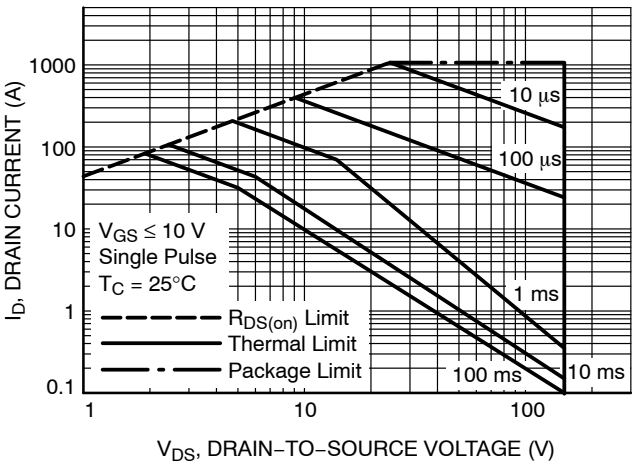


Figure 11. Safe Operating Area

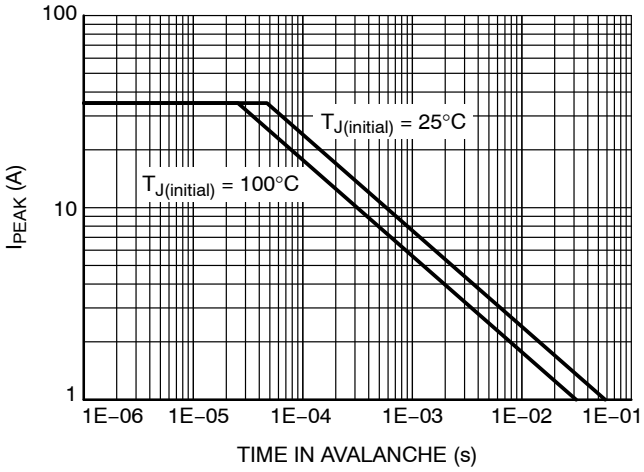


Figure 12. I_{PEAK} vs. Time in Avalanche

TYPICAL CHARACTERISTICS

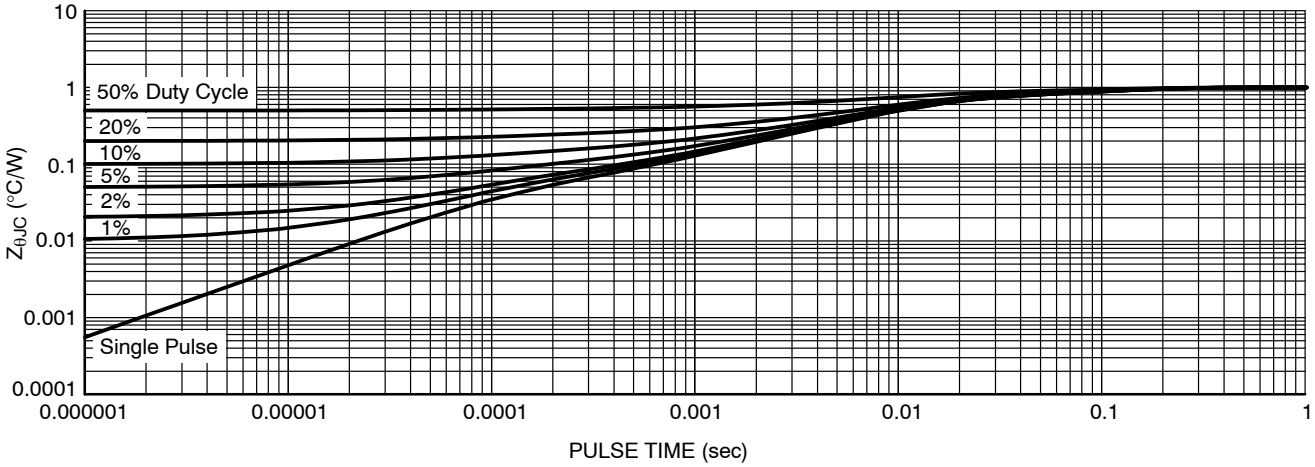
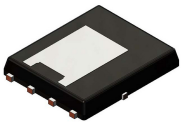


Figure 13. Thermal Characteristics



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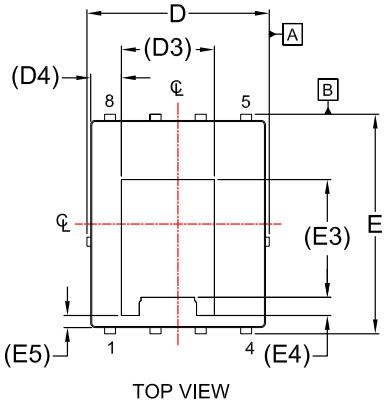
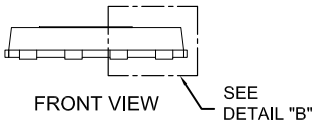
ISSUE D

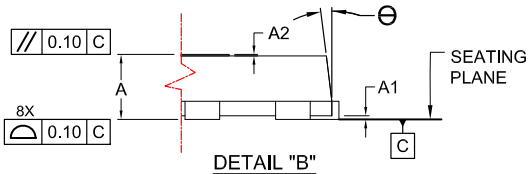
DATE 25 AUG 2020

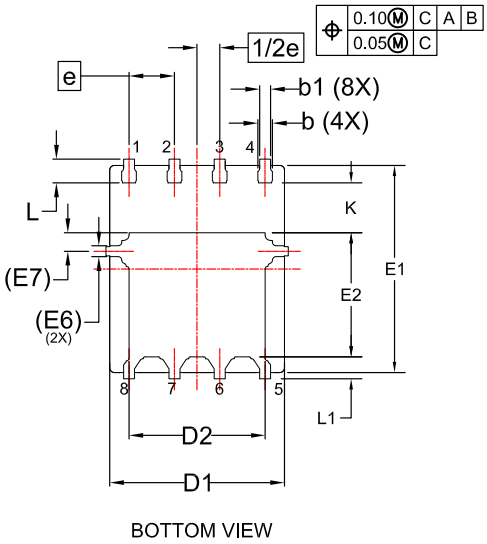


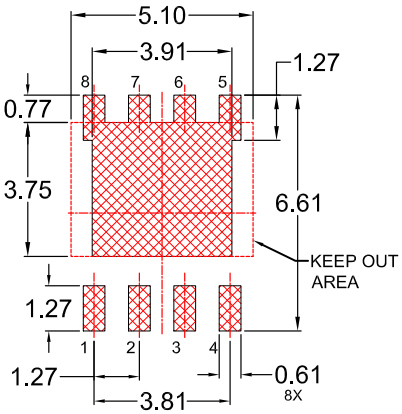
NOTES:

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.





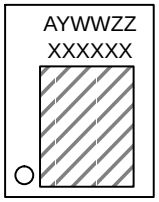




*FOR ADDITIONAL INFORMATION ON OUR PB-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ON SEMICONDUCTOR SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.

DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.85	0.90	0.95
A1	-	-	0.05
A2	-	-	0.05
b	0.31	0.41	0.51
b1	0.21	0.31	0.41
c	0.20	0.25	0.30
D	4.90	5.00	5.10
D1	4.80	4.90	5.00
D2	3.67	3.82	3.97
D3	2.60 REF		
D4	0.86 REF		
E	6.05	6.15	6.25
E1	5.70	5.80	5.90
E2	3.38	3.48	3.58
E3	3.30 REF		
E4	0.50 REF		
E5	0.34 REF		
E6	0.30 REF		
E7	0.52 REF		
e	1.27 BSC		
1/2e	0.635 BSC		
K	1.30	1.40	1.50
L	0.56	0.66	0.76
L1	0.52	0.62	0.72
Θ	0°	---	12°

GENERIC MARKING DIAGRAM*



XXXX = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week
ZZ = Assembly Lot 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.

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DESCRIPTION:	**DFN8 5x6.15, 1.27P, DUAL COOL**	**PAGE 1 OF 1**

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