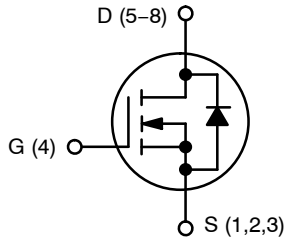
MOSFET - Power, Single N-Channel, Logic Level, μ8FL

80 V, 5.3 mΩ, 79 A

NTTFS5D6N08XL

$V_{(BR)DSS}$	$R_{DS(ON)}$ MAX	I_D MAX
80 V	5.3 mΩ @ 10 V	79 A
	7.7 mΩ @ 4.5 V	



N–CHANNEL MOSFET

Features

- Low Q_{RR}, Soft Recovery Body Diode
- 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

- Synchronous Rectification (SR) in DC–DC and AC–DC
- Primary Switch in Isolated DC–DC Converter
- Motor Drives

WDFN8 (μ8FL) CASE 511DY

MARKING DIAGRAM

S5D6
AYWW

S5D6 = Specific Device Code
A = Assembly Location
Y = Year Code
WW = Work Week Code

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

Parameter		Symbol	Value	Unit
Drain–to–Source Voltage		V_{DSS}	80	V
Gate–to–Source Voltage		V_{GS}	±20	V
Continuous Drain Current (Notes 1, 2)	T_C = 25°C	I_D	79	A
	T_C = 100°C		56	
Power Dissipation (Note 1)	T_C = 25°C	P_D	82	W
	T_C = 100°C		41	
Pulsed Drain Current	T_C = 25°C, t_p = 100 μs	I_{DM}	290	A
Pulsed Source Current (Body Diode)		I_{SM}	290	
Operating Junction and Storage Temperature Range		T_J, T_{STG}	−55 to +175	°C
Source Current (Body Diode)		I_S	118	A
Single Pulse Avalanche Energy (I_{PK} = 34 A) (Note 3)		E_{AS}	57	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.

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. Actual continuous current will be limited by thermal & electromechanical application board design.
3. E_{AS} of 57 mJ is based on T_J = 25°C; L = 0.1 mH, I_{AS} = 34 A, V_{DD} = 64 V, V_{GS} = 10 V. 100% tested

ORDERING INFORMATION

Device	Package	Shipping†
NTTFS5D6N08XLTAG	WDFN8 (μ8FL)	1500 / 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.

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THERMAL CHARACTERISTICS

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction−to−Case	$R_{\theta JC}$	1.8	°C/W
Thermal Resistance, Junction−to−Ambient (Notes 4, 5)	$R_{\theta JA}$	46	

4. Surface−mounted on FR4 board using a 1 in^2, 1 oz. Cu pad.
5. $R_{\theta JA}$ is determined by the user's board design.

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain−to−Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 1 mA	80			V
Drain−to−Source Breakdown Voltage Temperature Coefficient	$\Delta V_{(BR)DSS}/\Delta T_J$	I_D = 1 mA. Referenced to 25°C		31		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 80 V			1	μA
		V_{DS} = 80 V, T_J = 125°C			250	
Gate−to−Source Leakage Current	I_{GSS}	V_{GS} = 20 V, V_{DS} = 0 V			100	nA
ON CHARACTERISTICS						
Drain−to−Source On Resistance	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 17 A		4.3	5.3	mΩ
		V_{GS} = 4.5 V, I_D = 14 A		5.7	7.7	
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_D = 85 μA	1.5		2.1	V
Gate Threshold Voltage Temperature Coefficient	$\Delta V_{GS(TH)}/\Delta T_J$	V_{GS} = V_{DS}, I_D = 85 μA		−6.4		mV/°C
Forward Transconductance	g_{FS}	V_{DS} = 5 V, I_D = 17 A		113		S
CHARGES, CAPACITANCES & GATE RESISTANCE						
Input Capacitance	C_{ISS}	V_{GS} = 0 V, V_{DS} = 40 V, f = 1 MHz		1800		pF
Output Capacitance	C_{OSS}			450		
Reverse Transfer Capacitance	C_{RSS}			14		
Output Charge	Q_{OSS}			33		nC
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = 4.5 V, V_{DD} = 40 V; I_D = 17 A		14		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = 10 V, V_{DD} = 40 V; I_D = 17 A		28		
Threshold Gate Charge	$Q_{G(TH)}$			3		
Gate−to−Source Charge	Q_{GS}			5		
Gate−to−Drain Charge	Q_{GD}			4		
Gate Plateau Voltage	V_{GP}			2.7		V
Gate Resistance	R_G	f = 1 MHz		0.6		Ω
SWITCHING CHARACTERISTICS						
Turn−On Delay Time	$t_{d(ON)}$	Resistive Load, V_{GS} = 0/10 V, V_{DD} = 40 V, I_D = 17 A, R_G = 2.5 Ω		10		ns
Rise Time	t_r			3		
Turn−Off Delay Time	$t_{d(OFF)}$			24		
Fall Time	t_f			3		
SOURCE−TO−DRAIN DIODE CHARACTERISTICS						
Forward Diode Voltage	V_{SD}	V_{GS} = 0 V, I_S = 17 A		0.8	1.2	V
		V_{GS} = 0 V, I_S = 17 A, T_J = 125°C		0.7		
Reverse Recovery Time	t_{RR}	V_{GS} = 0 V, dI/dt = 1000 A/μs, I_S = 17 A, V_{DD} = 40 V		19		ns
Charge Time	t_a			11		
Discharge Time	t_b			8		
Reverse Recovery Charge	Q_{RR}			96		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.

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TYPICAL CHARACTERISTICS

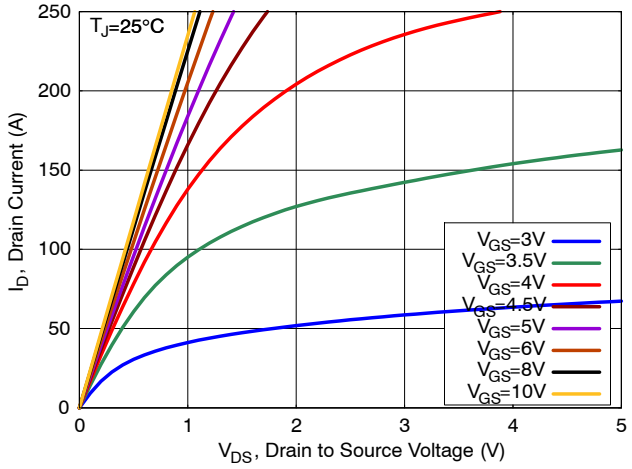

Figure 1. On−Region Characteristics

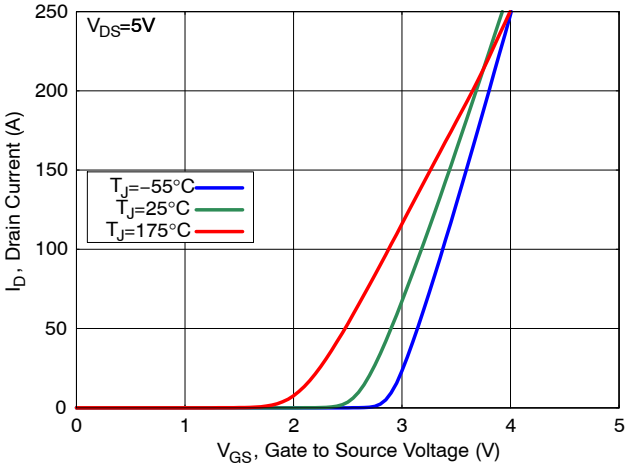

Figure 2. Transfer Characteristics

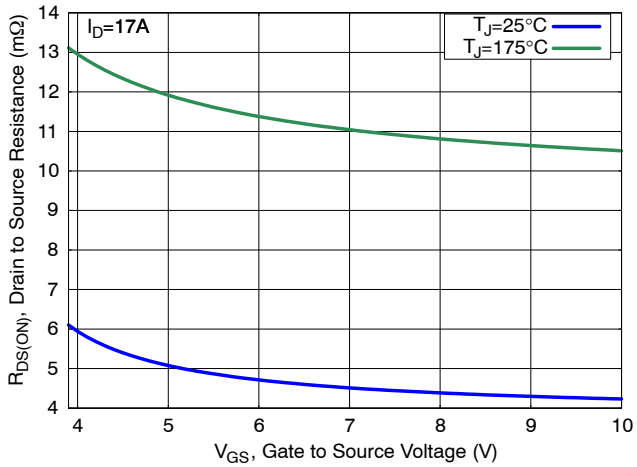

Figure 3. On−Resistance vs. Gate Voltage

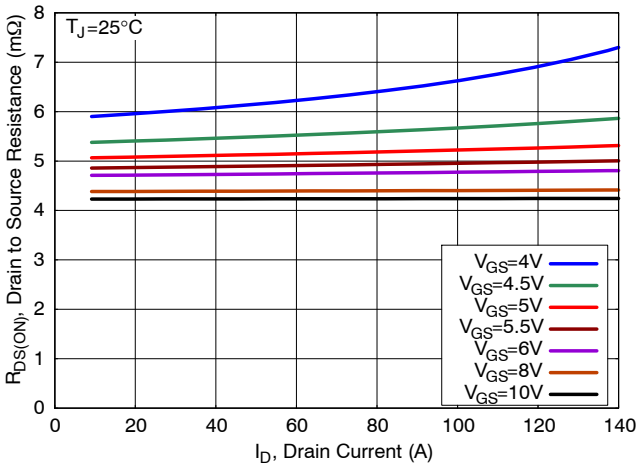

Figure 4. On−Resistance vs. Drain Current

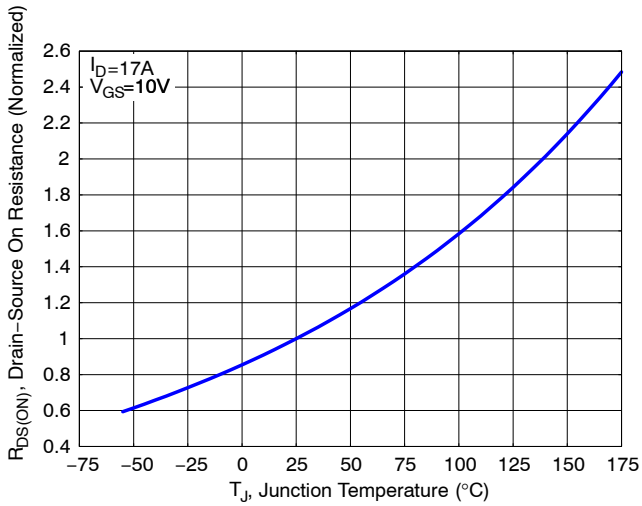

Figure 5. Normalized ON Resistance vs. Junction Temperature

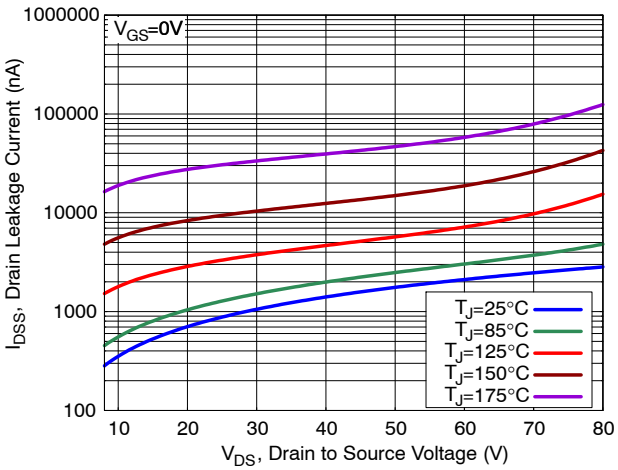

Figure 6. Drain Leakage Current vs. Drain Voltage

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TYPICAL CHARACTERISTICS

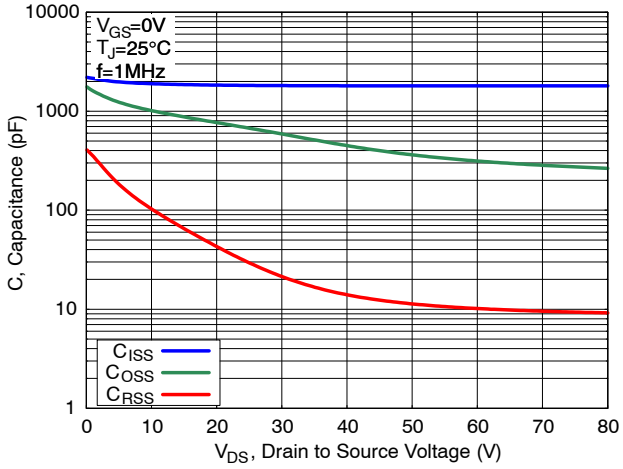

Figure 7. Capacitance Characteristics

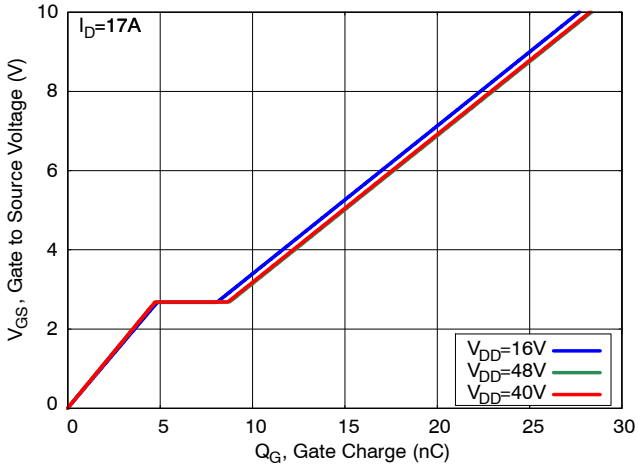

Figure 8. Gate Charge Characteristics

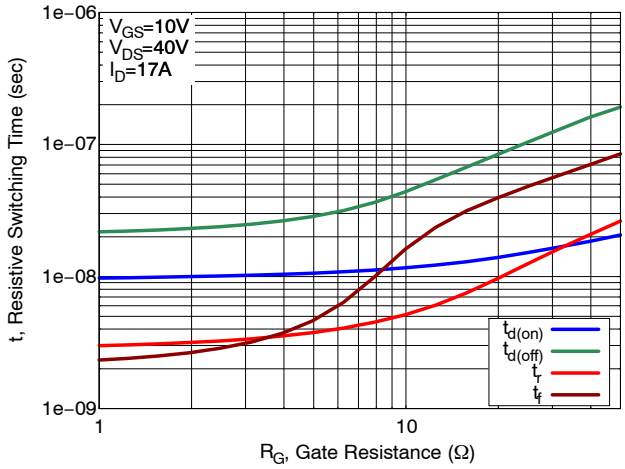

Figure 9. Resistive Switching Time Variation vs. Gate Resistance

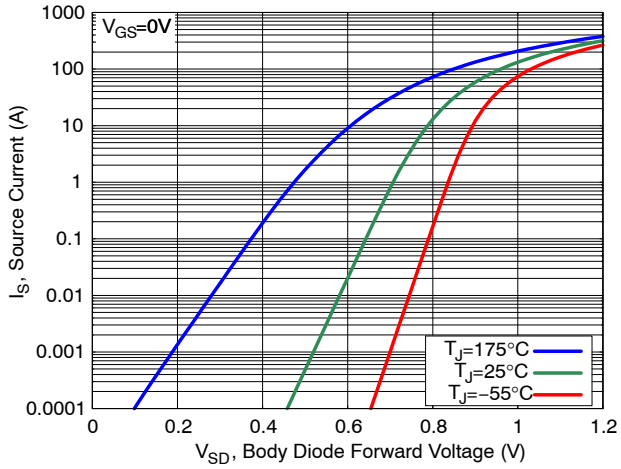

Figure 10. Diode Forward Characteristics

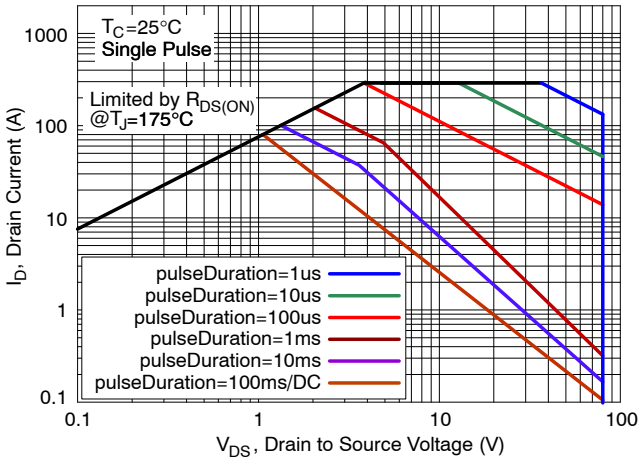

Figure 11. Safe Operating Area (SOA)

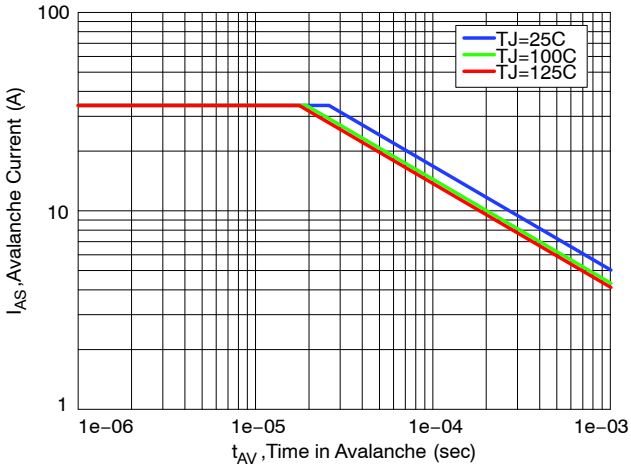

Figure 12. Avalanche Current vs. Pulse Time (UIS)

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TYPICAL CHARACTERISTICS

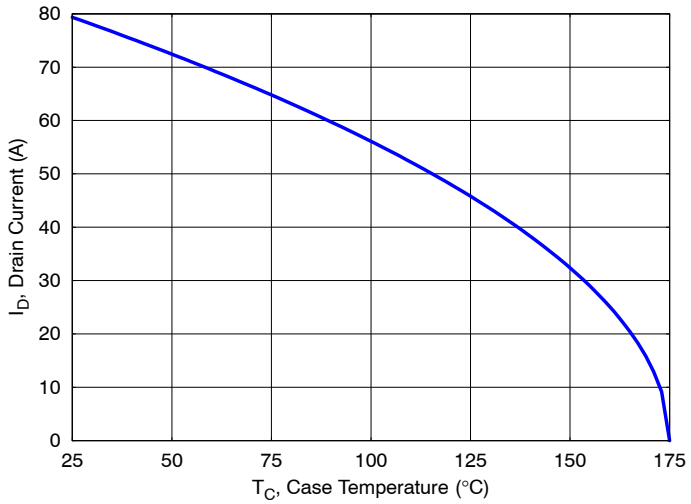

Figure 13. Maximum Current vs. Case Temperature

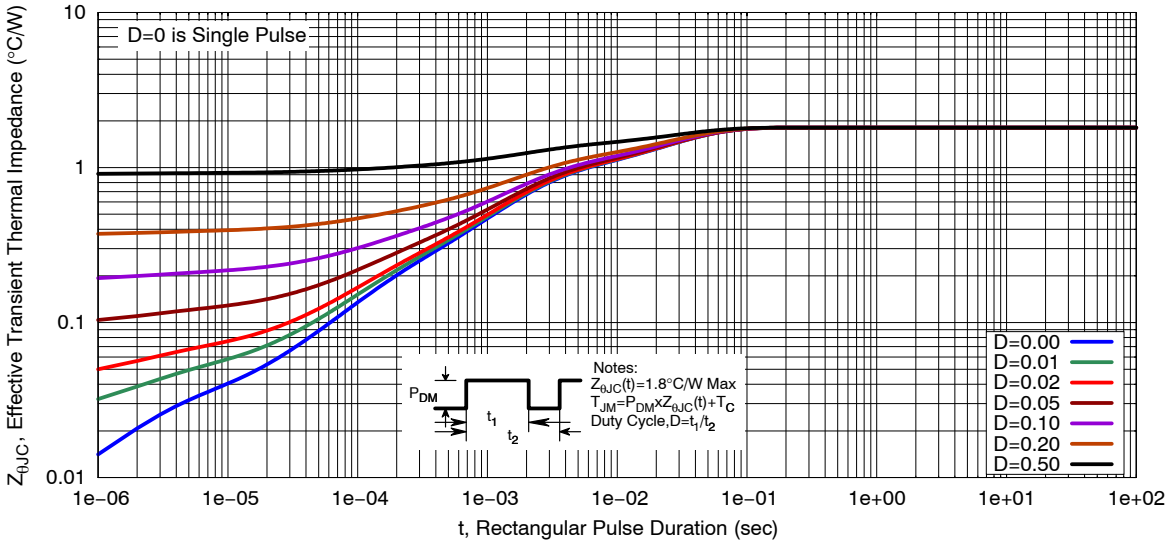

Figure 14. Transient Thermal Response

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CASE 511DY
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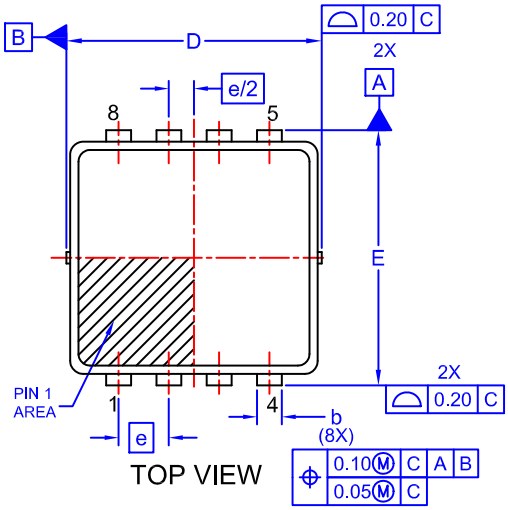
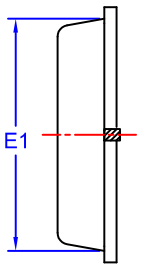
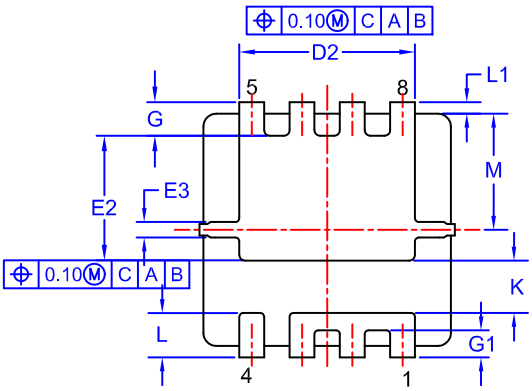


TOP VIEW

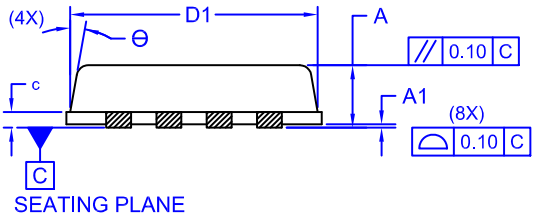


SIDE VIEW

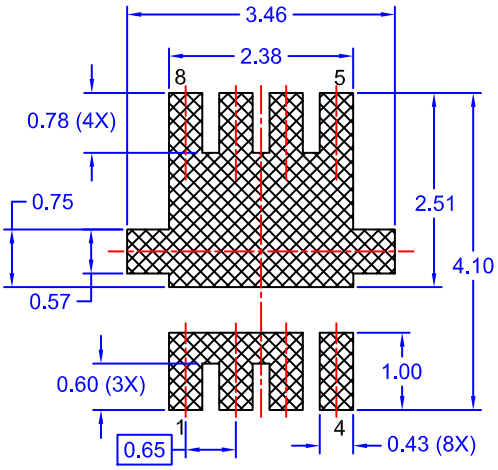


BOTTOM VIEW

NOTES:
1. CONTROLLING DIMENSION: MILLIMETERS
2. DIMENSIONS D1 & E1 DO NOT INCLUDE MOLD FLASH PROTRUSIONS NOR GATE BURRS.



END VIEW



RECOMMENDED LAND PATTERN

GENERIC MARKING DIAGRAM*

XXXX = Specific Device Code
A = Assembly Location
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.

DIM	MILLIMETERS		
	MIN	NOM	MAX
A	0.70	0.75	0.80
A1	0.00	-	0.05
b	0.23	0.33	0.43
c	0.15	0.20	0.25
D	3.20	3.30	3.40
D1	2.95	3.13	3.30
D2	1.98	2.20	2.40
E	3.20	3.30	3.40
E1	2.80	3.00	3.15
E2	1.40	1.60	1.80
E3	0.15	0.25	0.40
e	0.65 BSC		
G	0.30	0.43	0.55
G1	0.25	0.35	0.45
K	0.55	0.75	0.95
L	0.35	0.52	0.65
L1	0.06	0.15	0.30
M	1.35	1.50	1.60
Θ	0	-	12

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