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MOSFET - Power, Single N-Channel, μ 8FL 100 V, 30 m Ω , 35 A

NTTFS030N10G

Features

- Wide SOA for Linear Mode Operation
- Low $R_{DS(on)}$ to Minimize Conduction Losses
- High Peak UIS Current Capability for Ruggedness
- Small Footprint (3.3 x 3.3 mm) for Compact Design
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

Typical Applications

- 48 V Hot Swap System, Load Switch, Soft-Start, E-Fuse

MAXIMUM RATINGS ($T_J = 25^\circ\text{C}$ unless otherwise noted)

Parameter			Symbol	Value	Unit
Drain-to-Source Voltage			V_{DSS}	100	V
Gate-to-Source Voltage			V_{GS}	± 20	V
Continuous Drain Current $R_{\theta JC}$ (Note 2)	Steady State	$T_C = 25^{\circ}\text{C}$	I_D	35	A
		$T_C = 100^{\circ}\text{C}$		24	
Power Dissipation $R_{\theta JC}$ (Note 2)		$T_C = 25^{\circ}\text{C}$	P_D	74	W
		$T_C = 100^{\circ}\text{C}$		37	
Continuous Drain Current $R_{\theta JA}$ (Notes 1, 2)	Steady State	$T_A = 25^{\circ}\text{C}$	I_D	6	A
		$T_A = 100^{\circ}\text{C}$		4	
Power Dissipation $R_{\theta JA}$ (Notes 1, 2)		$T_A = 25^{\circ}\text{C}$	P_D	2.5	W
		$T_A = 100^{\circ}\text{C}$		1.2	
Pulsed Drain Current	$T_A = 25^{\circ}\text{C}$, $t_p = 10\text{ }\mu\text{s}$		I_{DM}	306	A
Operating Junction and Storage Temperature Range			T_J , T_{stg}	-55 to +175	$^{\circ}\text{C}$
Source Current (Body Diode)			I_S	61	A
Single Pulse Drain-to-Source Avalanche Energy ($I_{L(pk)} = 13\text{ A}$, $L = 1\text{ mH}$)			E_{AS}	84	mJ
Lead Temperature Soldering Reflow for Soldering Purposes (1/8" from case for 10 s)			T_L	260	$^{\circ}\text{C}$

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 a 1 in², 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.

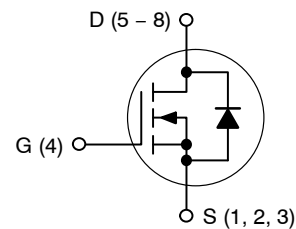


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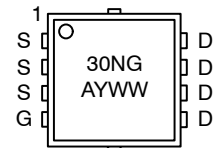
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$V_{(BR)DSS}$	$R_{DS(on)} \text{ MAX}$	$I_D \text{ MAX}$
100 V	30 m Ω @ 10 V	35 A

N-Channel



MARKING DIAGRAM



30NG = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week

ORDERING INFORMATION

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

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Value	Unit
Junction-to-Case – Steady State (Note 2)	$R_{\theta JC}$	2.0	°C/W
Junction-to-Ambient – Steady State (Note 2)	$R_{\theta JA}$	60	

ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	100			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$	$I_D = 250\text{ }\mu\text{A}$, referenced to 25°C		90.8		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS} = 0\text{ V}, V_{DS} = 80\text{ V}$	$T_J = 25^\circ\text{C}$		1	μA
			$T_J = 150^\circ\text{C}$		100	
Gate-to-Source Leakage Current	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 100	nA

ON CHARACTERISTICS (Note 3)

Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 61\text{ }\mu\text{A}$	2.0		4.0	V
Negative Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$	$I_D = 61\text{ }\mu\text{A}$, referenced to 25°C		-9.5		mV/°C
Drain-to-Source On Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 12\text{ A}$		23	30	m Ω
Forward Transconductance	g_{FS}	$V_{DS} = 5\text{ V}, I_D = 12\text{ A}$		3.8		S
Gate-Resistance	R_G	$T_A = 25^\circ\text{C}$		0.7		Ω

CHARGES AND CAPACITANCES

Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}, f = 1\text{ MHz}, V_{DS} = 50\text{ V}$		1366		pF
Output Capacitance	C_{oss}			161		
Reverse Transfer Capacitance	C_{rss}			21.5		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 10\text{ V}, V_{DS} = 50\text{ V}, I_D = 12\text{ A}$		21.5		nC
Threshold Gate Charge	$Q_{G(TH)}$			4		
Gate-to-Source Charge	Q_{GS}			8.4		
Gate-to-Drain Charge	Q_{GD}			4.7		
Output Charge	Q_{OSS}	$V_{GS} = 10\text{ V}, V_{DS} = 50\text{ V}$		15.6		

SWITCHING CHARACTERISTICS (Note 4)

Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 50\text{ V}, I_D = 12\text{ A}, R_G = 4.7\text{ }\Omega$		13.4		ns
Rise Time	t_r			5.1		
Turn-Off Delay Time	$t_{d(off)}$			19		
Fall Time	t_f			4.3		

DRAIN-SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	V_{SD}	$V_{GS} = 0\text{ V}, I_S = 12\text{ A}$	$T_J = 25^\circ\text{C}$		0.84	1.2	V
			$T_J = 125^\circ\text{C}$		0.71		
Reverse Recovery Time	t_{RR}	$V_{GS} = 0\text{ V}, di_S/dt = 300\text{ A}/\mu\text{s}, I_S = 6\text{ A}$		25.7			ns
Reverse Recovery Charge	Q_{RR}			80.8			nC
Reverse Recovery Time	t_{RR}	$V_{GS} = 0\text{ V}, di_S/dt = 1000\text{ A}/\mu\text{s}, I_S = 6\text{ A}$		22.2			ns
Reverse Recovery Charge	Q_{RR}			156			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. Pulse Test: Pulse Width $\leq 300\text{ }\mu\text{s}$, Duty Cycle $\leq 2\%$.

4. Switching characteristics are independent of operating junction temperatures.

TYPICAL CHARACTERISTICS

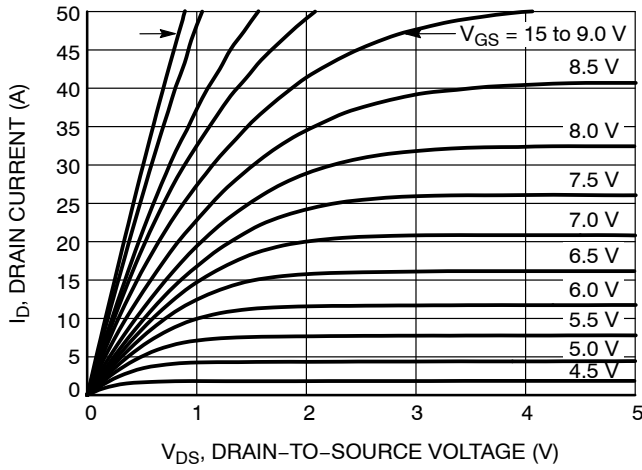


Figure 1. On-Region Characteristics

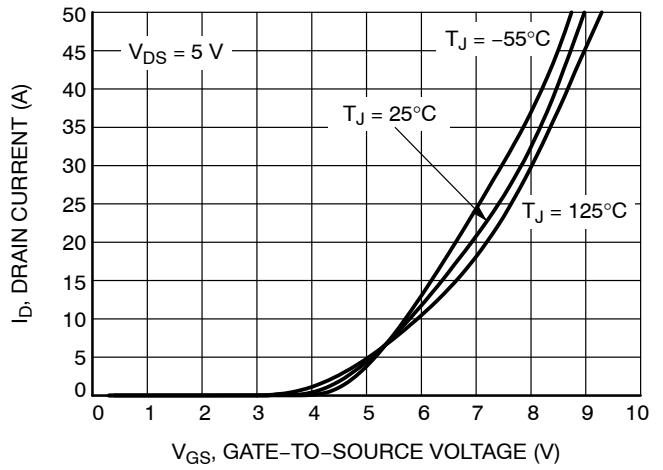


Figure 2. Transfer Characteristics

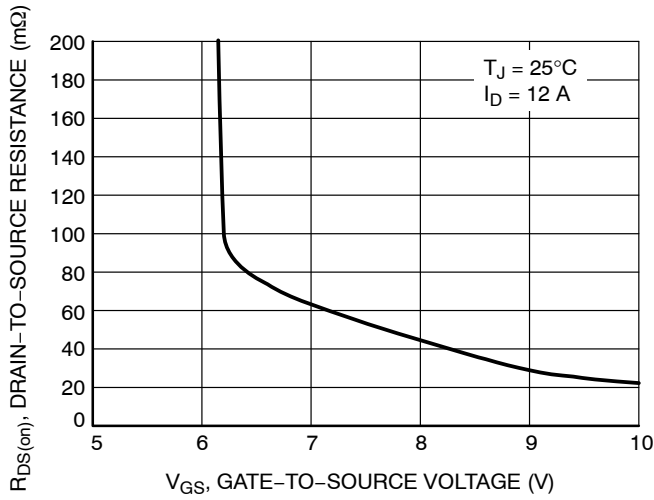


Figure 3. On-Resistance vs. Gate-to-Source Voltage

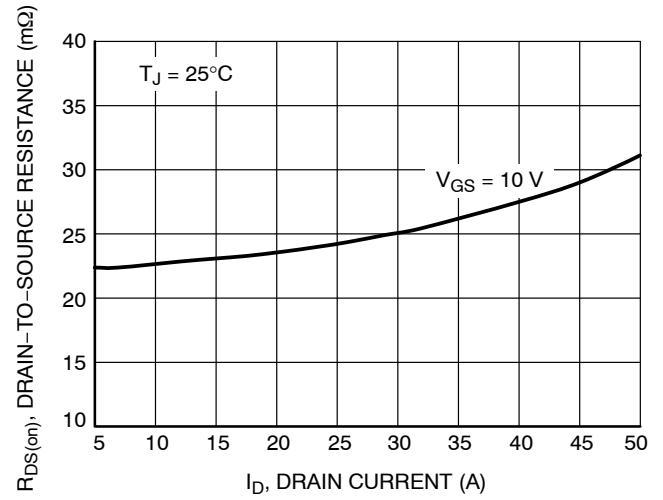


Figure 4. On-Resistance vs. Drain Current

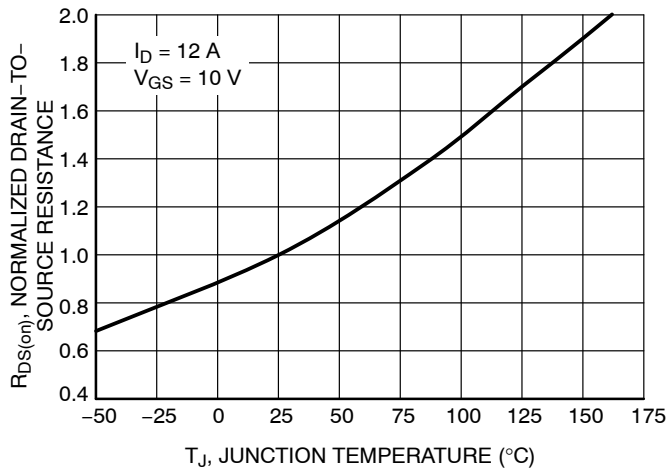


Figure 5. On-Resistance Variation with Temperature

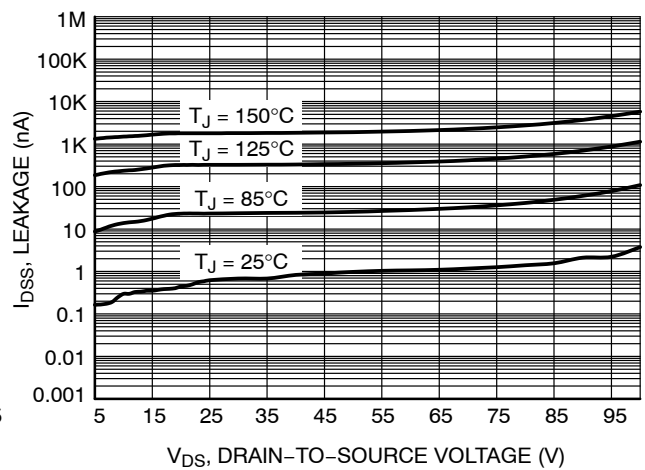


Figure 6. Drain-to-Source Leakage Current vs. Voltage

TYPICAL CHARACTERISTICS

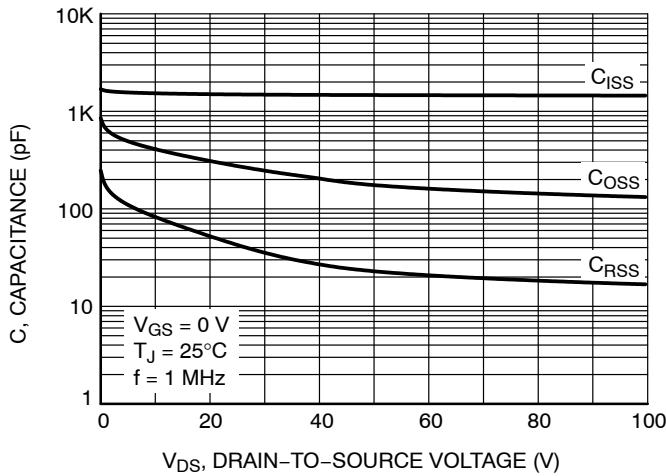


Figure 7. Capacitance Variation

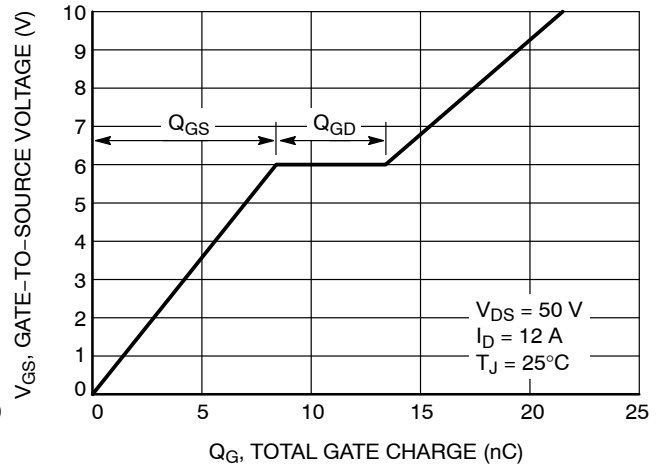


Figure 8. Gate-to-Source Voltage vs. Total Charge

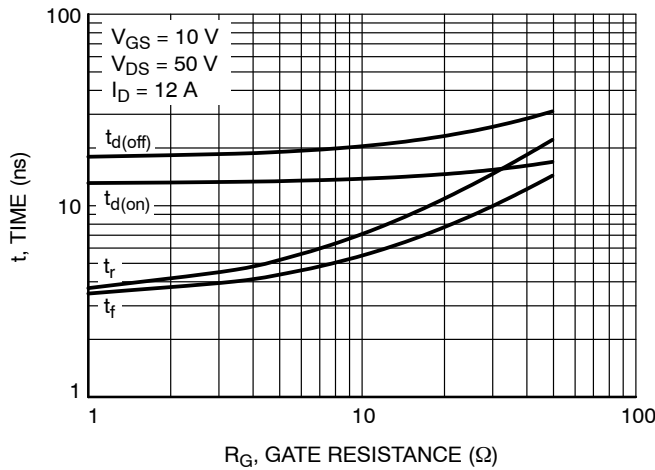


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

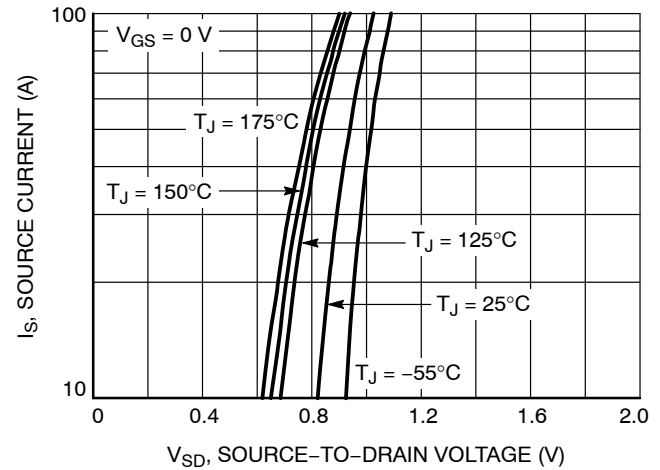


Figure 10. Diode Forward Voltage vs. Current

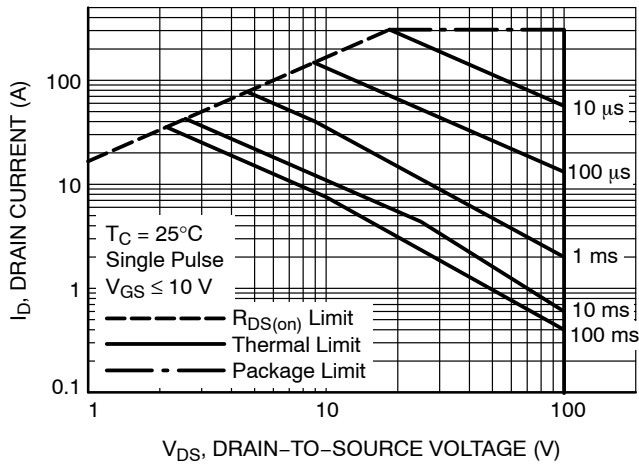


Figure 11. Maximum Rated Forward Biased Safe Operating Area

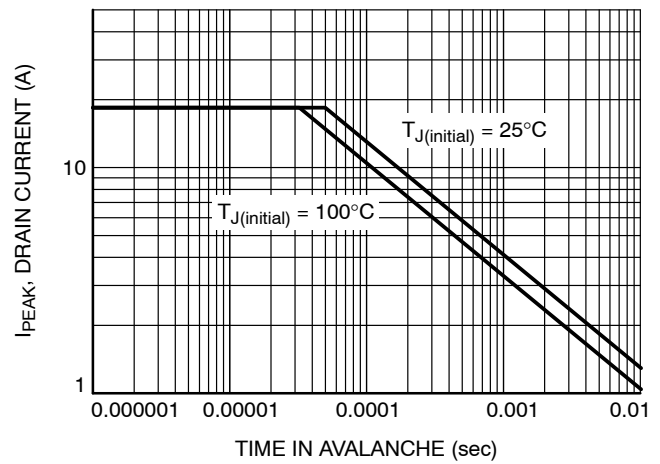


Figure 12. Maximum Drain Current vs. Time in Avalanche

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TYPICAL CHARACTERISTICS

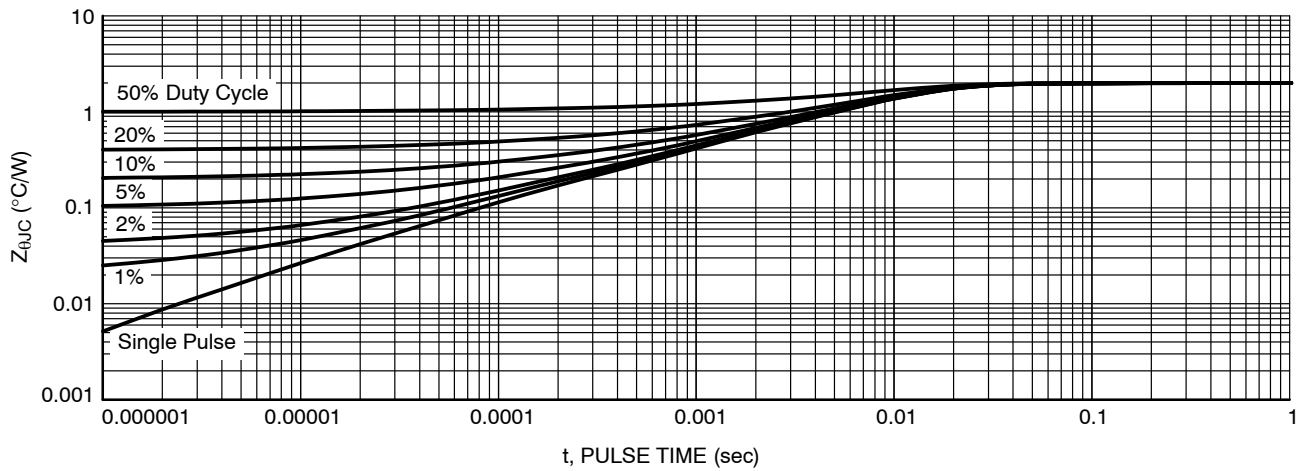


Figure 13. Junction-to-Ambient Transient Thermal Response

DEVICE ORDERING INFORMATION

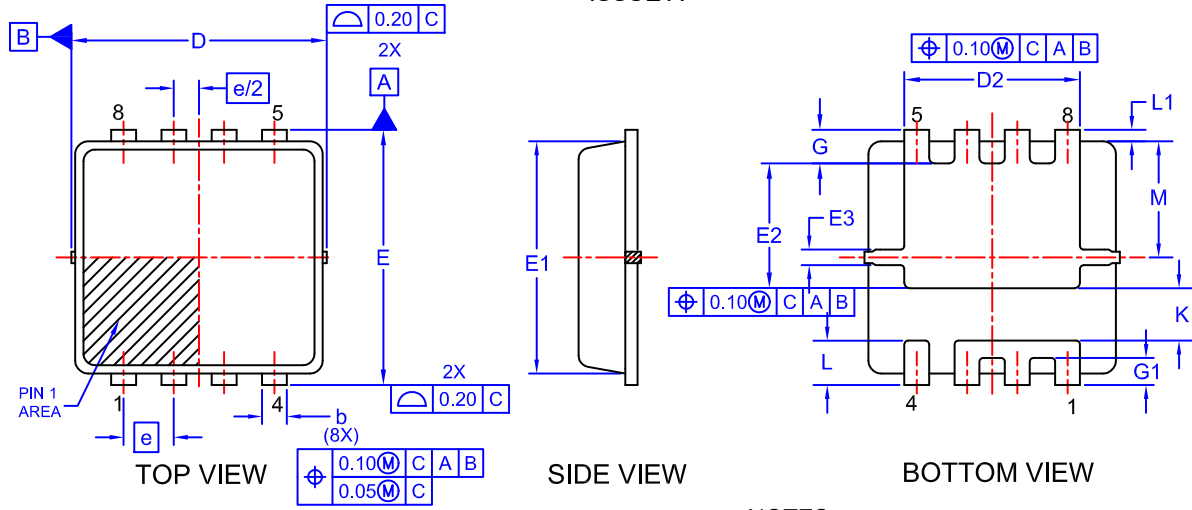
Device	Marking	Package	Shipping [†]
NTTFS030N10G	30NG	μ8FL (Pb-Free)	1500 / Tape & Reel

[†]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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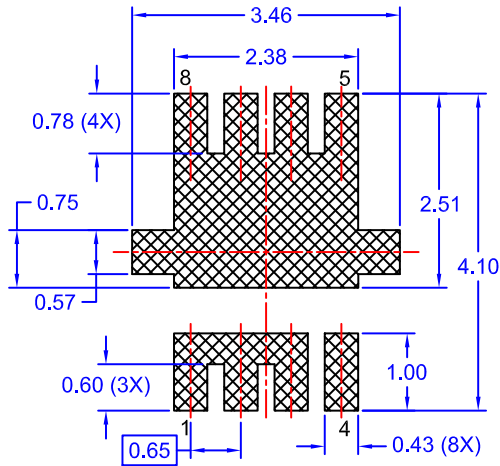
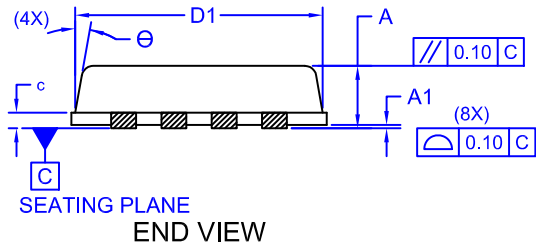
PACKAGE DIMENSIONS

WDFN8 3.3x3.3, 0.65P
CASE 511DY
ISSUE A




NOTES:

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



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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