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# MOSFET - Power, Single N-Channel, $\mu$ 8FL

## 100 V, 30 m $\Omega$ , 35 A



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## 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

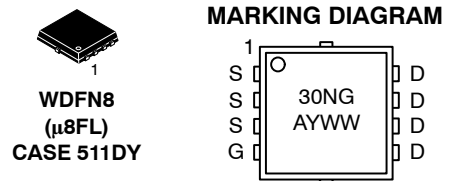
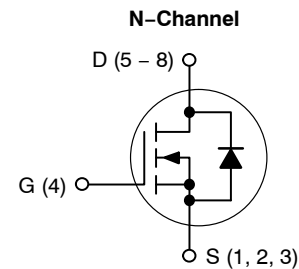
### MAXIMUM RATINGS ( $T_J = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit	
Drain-to-Source Voltage	$V_{DSS}$	100	V	
Gate-to-Source Voltage	$V_{GS}$	$\pm 20$	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)	Steady State	$T_C = 25^\circ\text{C}$	$P_D$ 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)	Steady State	$T_A = 25^\circ\text{C}$	$P_D$ 2.5	W
		$T_A = 100^\circ\text{C}$	1.2	
Pulsed Drain Current	$T_A = 25^\circ\text{C}, t_p = 10 \mu\text{s}$	$I_{DM}$ 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 in<sup>2</sup>, 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.

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



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.

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

### ON CHARACTERISTICS (Note 3)

Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 61\ \mu\text{A}$	2.0		4.0	V
Negative Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$	$I_D = 61\ \mu\text{A}$ , referenced to $25^\circ\text{C}$		-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 $\Omega$
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		$\Omega$

### 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	$t_{d(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 50\text{ V}, I_D = 12\text{ A}, R_G = 4.7\ \Omega$		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  $\leq 300\ \mu\text{s}$ , Duty Cycle  $\leq 2\%$ .

4. Switching characteristics are independent of operating junction temperatures.

TYPICAL CHARACTERISTICS

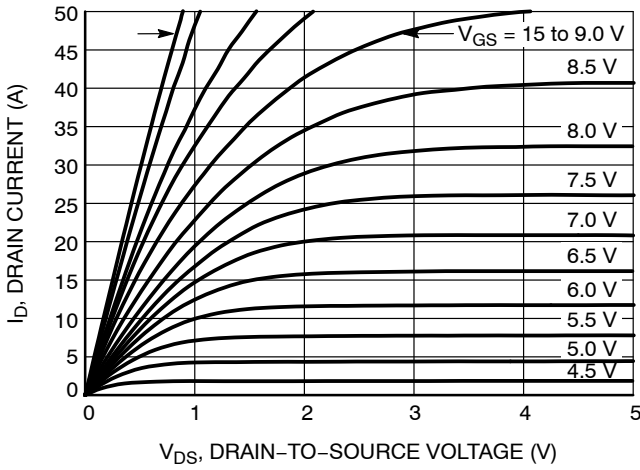


Figure 1. On-Region Characteristics

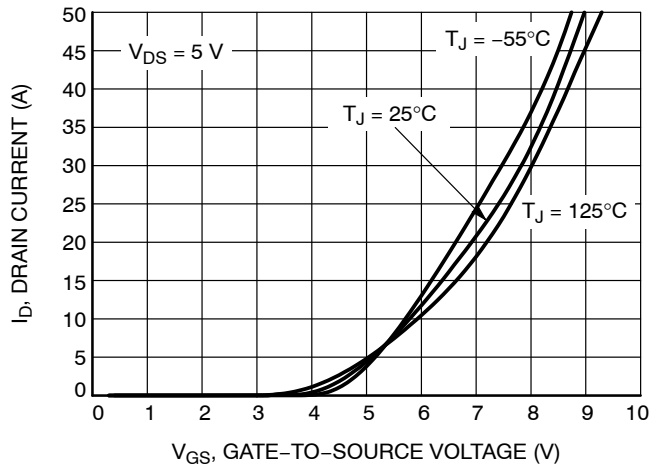


Figure 2. Transfer Characteristics

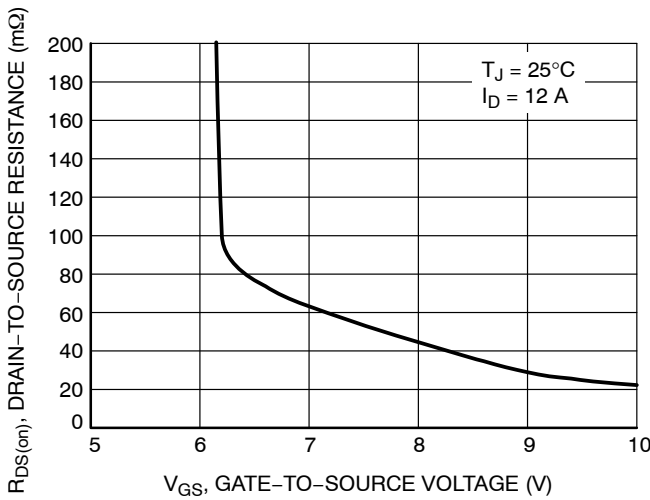


Figure 3. On-Resistance vs. Gate-to-Source Voltage

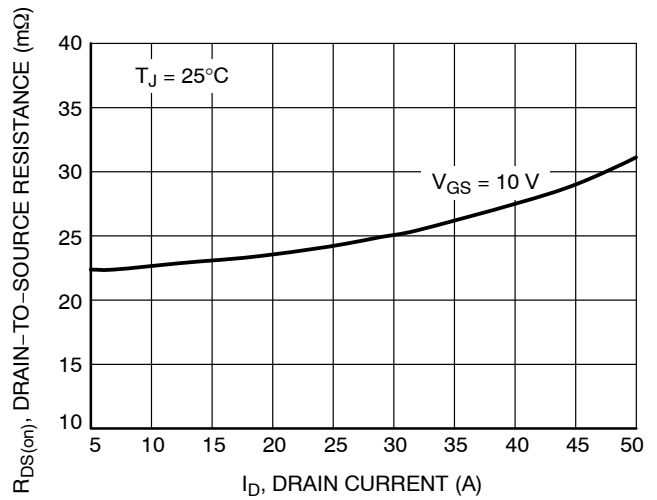


Figure 4. On-Resistance vs. Drain Current

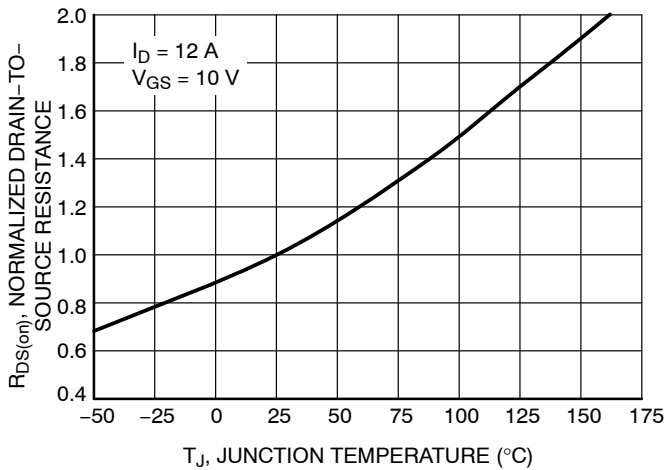


Figure 5. On-Resistance Variation with Temperature

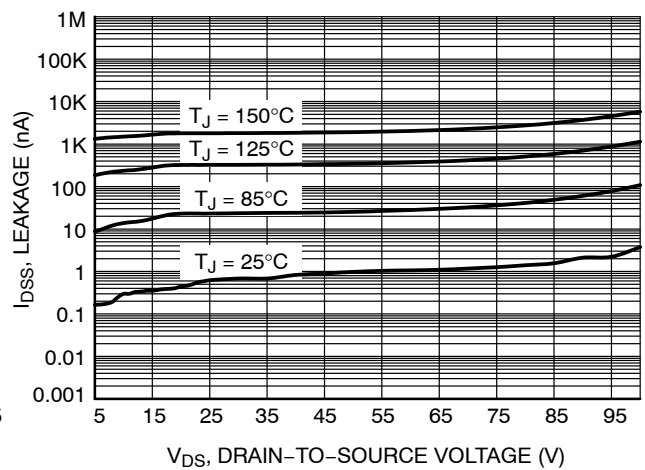
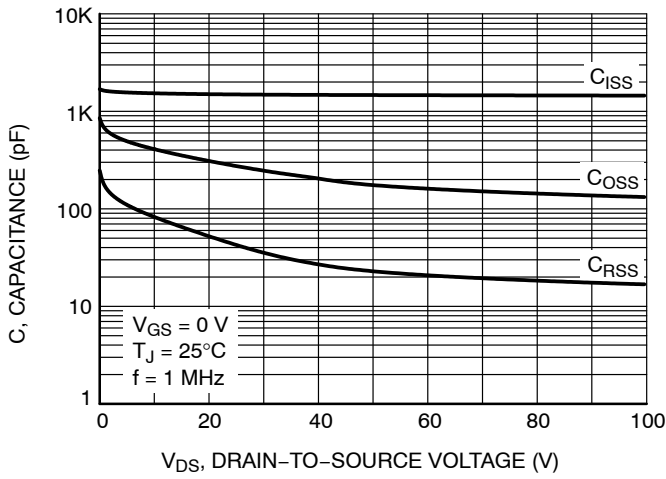


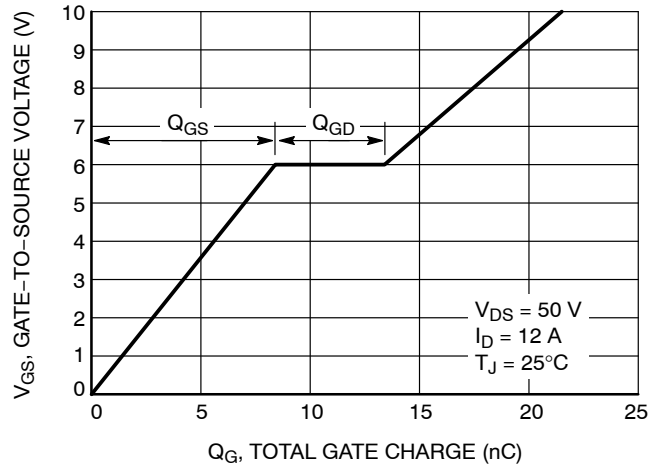
Figure 6. Drain-to-Source Leakage Current vs. Voltage

# NTTFS030N10G

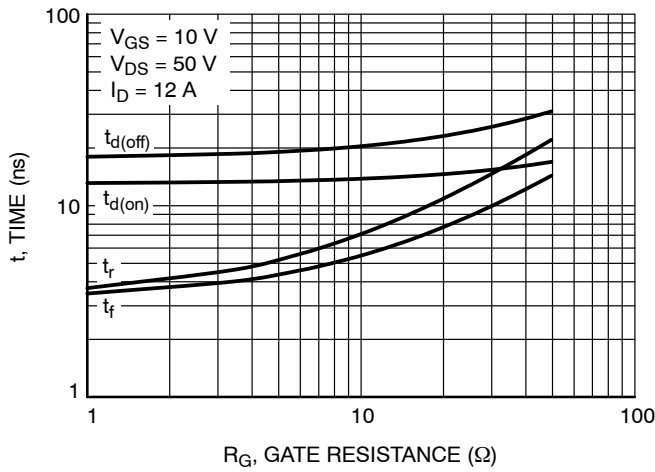
## TYPICAL CHARACTERISTICS



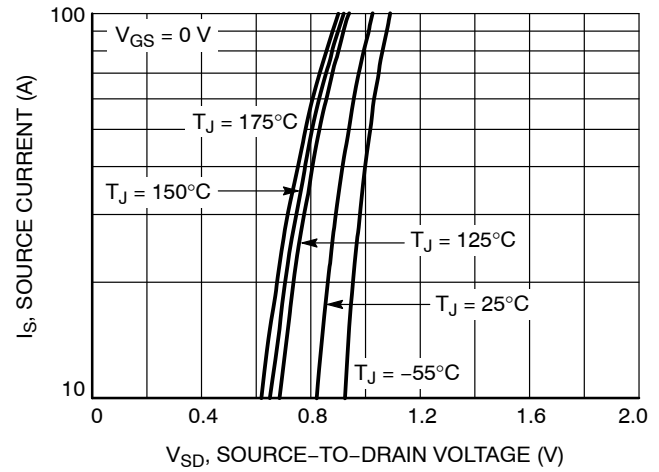
**Figure 7. Capacitance Variation**



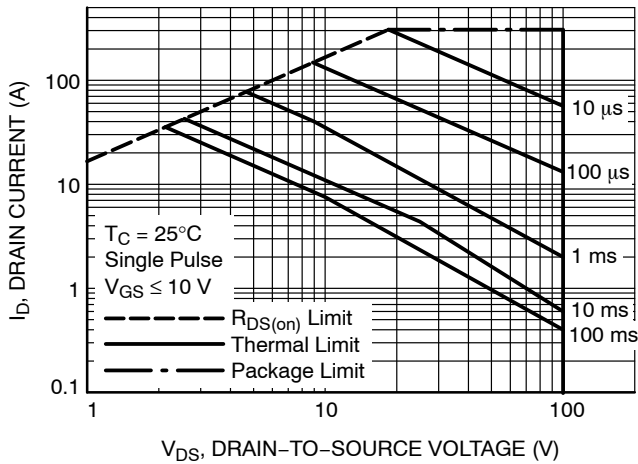
**Figure 8. Gate-to-Source Voltage vs. Total Charge**



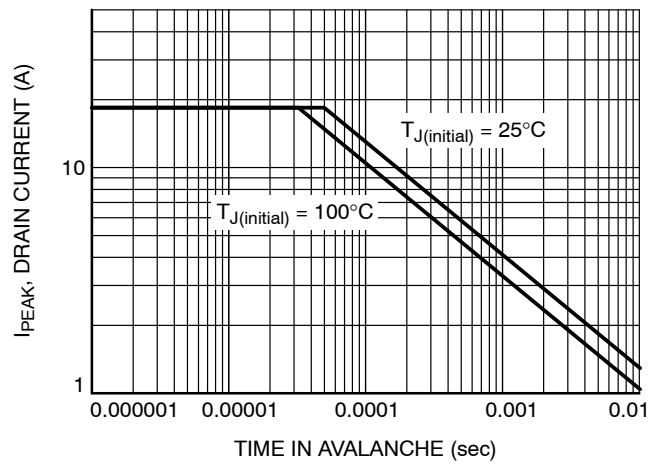
**Figure 9. Resistive Switching Time Variation vs. Gate Resistance**



**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**

# NTTFS030N10G

## TYPICAL CHARACTERISTICS

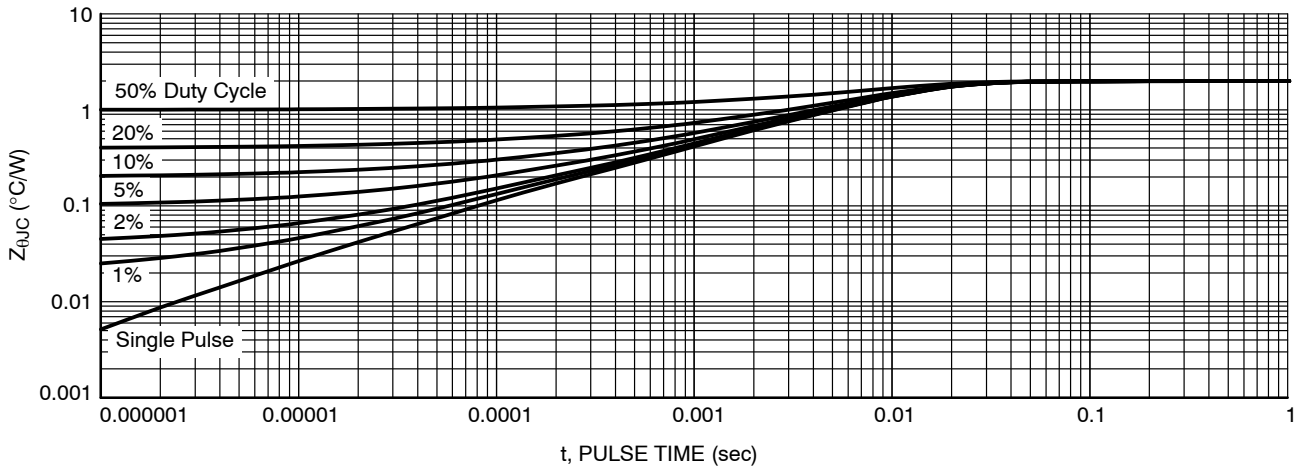


Figure 13. Junction-to-Ambient Transient Thermal Response

### DEVICE ORDERING INFORMATION

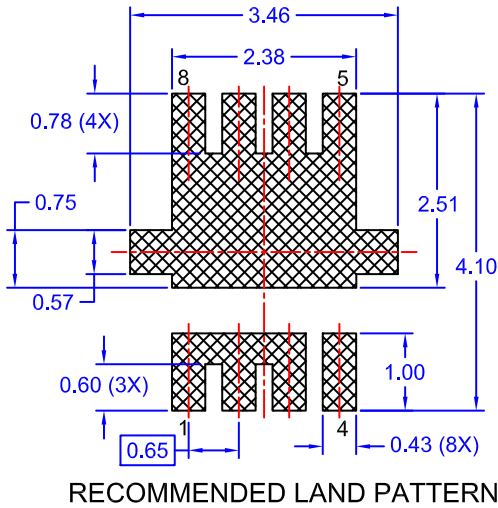
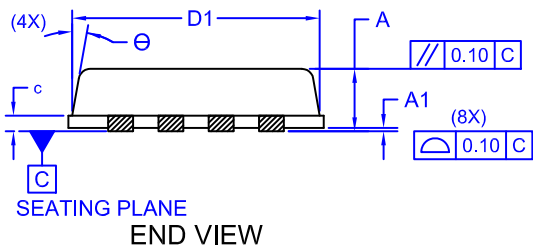
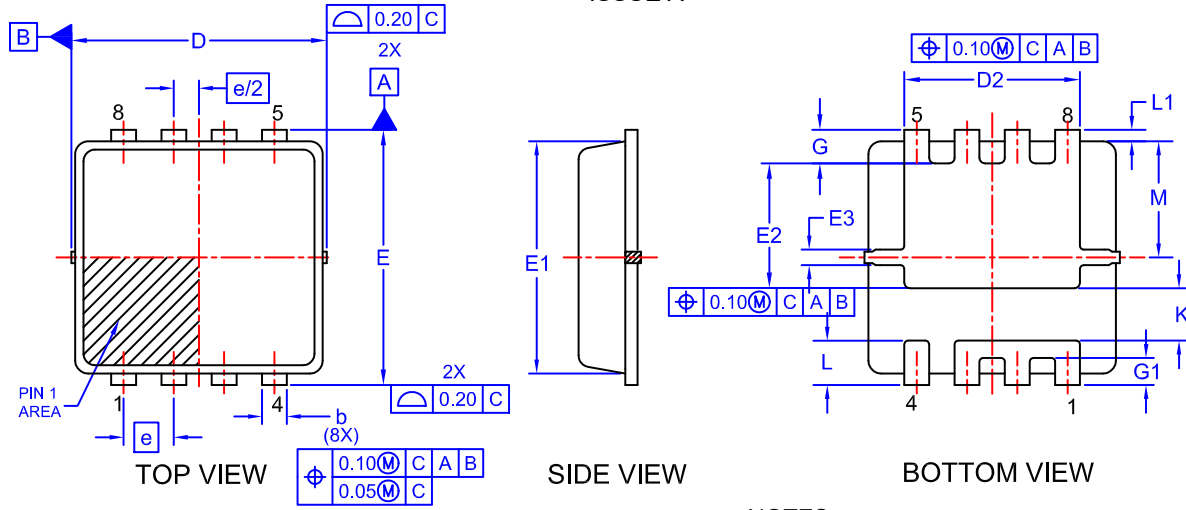
Device	Marking	Package	Shipping <sup>†</sup>
NTTFS030N10G	30NG	$\mu$ 8FL (Pb-Free)	1500 / Tape & Reel

<sup>†</sup>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.

# NTTFS030N10G

## 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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