

MOSFET - Power, Single N-Channel, Logic Level, μ 8FL

80 V, 5.3 m Ω , 79 A

NTTFS5D6N08XL

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

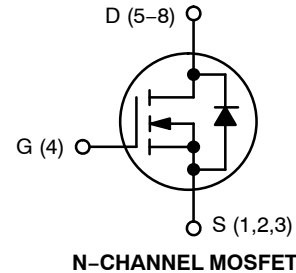
MAXIMUM RATINGS ($T_J = 25^\circ\text{C}$ unless otherwise stated)

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)	$T_C = 25^{\circ}\text{C}$	I_D	79	A
	$T_C = 100^{\circ}\text{C}$		56	
Power Dissipation (Note 1)	$T_C = 25^{\circ}\text{C}$	P_D	82	W
	$T_C = 100^{\circ}\text{C}$		41	
Pulsed Drain Current	$T_C = 25^{\circ}\text{C}$, $t_p = 100\text{ }\mu\text{s}$	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	$^{\circ}\text{C}$
Source Current (Body Diode)		I_S	118	A
Single Pulse Avalanche Energy ($I_{PK} = 34\text{ A}$) (Note 3)		E_{AS}	57	mJ
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)		T_L	260	$^{\circ}\text{C}$

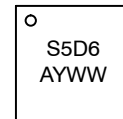
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. 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 $T_J = 25^\circ\text{C}$; $L = 0.1 \text{ mH}$, $I_{AS} = 34 \text{ A}$, $V_{DD} = 64 \text{ V}$, $V_{GS} = 10 \text{ V}$. 100% tested

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



MARKING DIAGRAM



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

ORDERING INFORMATION

Device	Package	Shipping [†]
NTTFS5D6N08XLTAG	WDFN8 (μ 8FL)	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.

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 in², 1 oz. Cu pad.

5. $R_{\theta JA}$ is determined by the user's board design.

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 1\text{ mA}$	80			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	$\Delta V_{(BR)DSS} / \Delta T_J$	$I_D = 1\text{ mA}$. Referenced to 25°C		31		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 80\text{ V}$			1	μA
		$V_{DS} = 80\text{ V}, T_J = 125^\circ\text{C}$			250	
Gate-to-Source Leakage Current	I_{GSS}	$V_{GS} = 20\text{ V}, V_{DS} = 0\text{ V}$			100	nA

ON CHARACTERISTICS

Drain-to-Source On Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 17\text{ A}$		4.3	5.3	m Ω
		$V_{GS} = 4.5\text{ V}, I_D = 14\text{ A}$		5.7	7.7	
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 85\text{ }\mu\text{A}$	1.5		2.1	V
Gate Threshold Voltage Temperature Coefficient	$\Delta V_{GS(TH)} / \Delta T_J$	$V_{GS} = V_{DS}, I_D = 85\text{ }\mu\text{A}$		-6.4		mV/°C
Forward Transconductance	g_{FS}	$V_{DS} = 5\text{ V}, I_D = 17\text{ A}$		113		S

CHARGES, CAPACITANCES & GATE RESISTANCE

Input Capacitance	C_{ISS}	$V_{GS} = 0\text{ V}, V_{DS} = 40\text{ V}, f = 1\text{ MHz}$		1800		pF
Output Capacitance	C_{OSS}			450		
Reverse Transfer Capacitance	C_{RSS}			14		
Output Charge	Q_{OSS}			33		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 4.5\text{ V}, V_{DD} = 40\text{ V}; I_D = 17\text{ A}$		14		nC
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 10\text{ V}, V_{DD} = 40\text{ V}; I_D = 17\text{ A}$		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	$f = 1\text{ MHz}$		0.6		Ω

SWITCHING CHARACTERISTICS

Turn-On Delay Time	$t_{d(ON)}$	Resistive Load, $V_{GS} = 0/10\text{ V}, V_{DD} = 40\text{ V},$ $I_D = 17\text{ A}, R_G = 2.5\text{ }\Omega$		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}	$V_{GS} = 0\text{ V}, I_S = 17\text{ A}$		0.8	1.2	V
		$V_{GS} = 0\text{ V}, I_S = 17\text{ A}, T_J = 125^\circ\text{C}$		0.7		
Reverse Recovery Time	t_{RR}	$V_{GS} = 0\text{ V}, dI/dt = 1000\text{ A}/\mu\text{s},$ $I_S = 17\text{ A}, V_{DD} = 40\text{ V}$		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.

TYPICAL CHARACTERISTICS

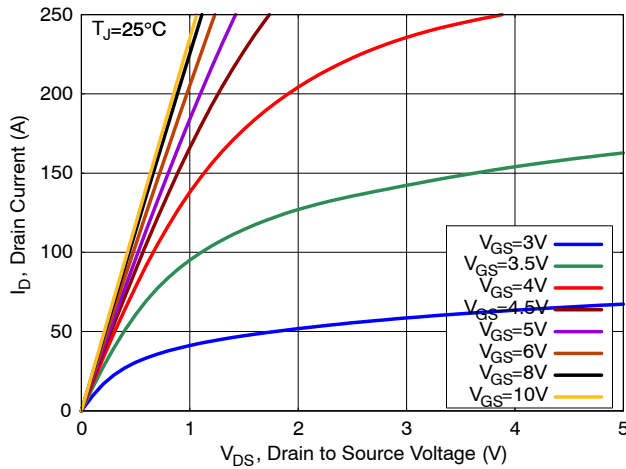


Figure 1. On-Region Characteristics

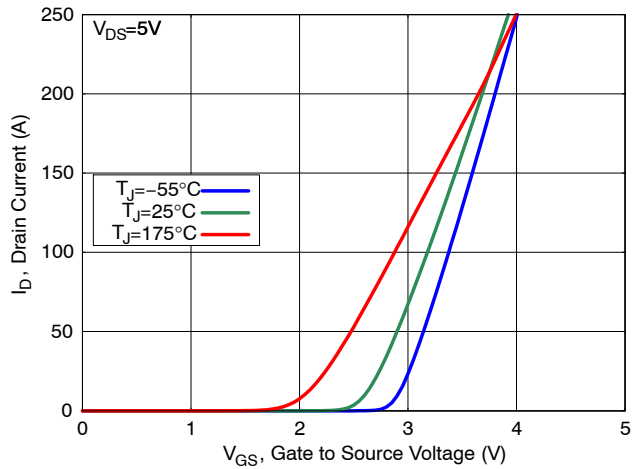


Figure 2. Transfer Characteristics

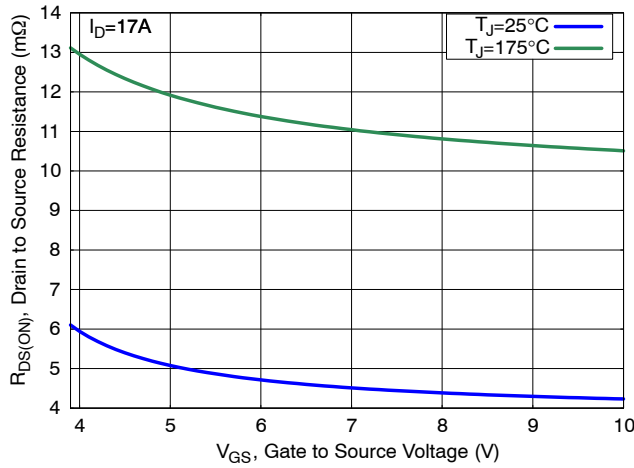


Figure 3. On-Resistance vs. Gate Voltage

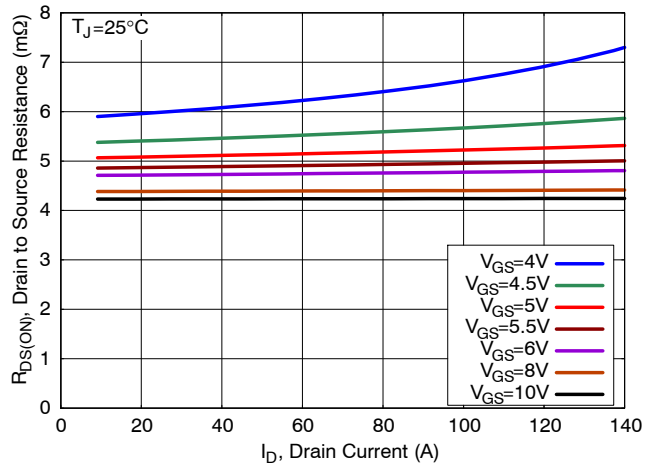


Figure 4. On-Resistance vs. Drain Current

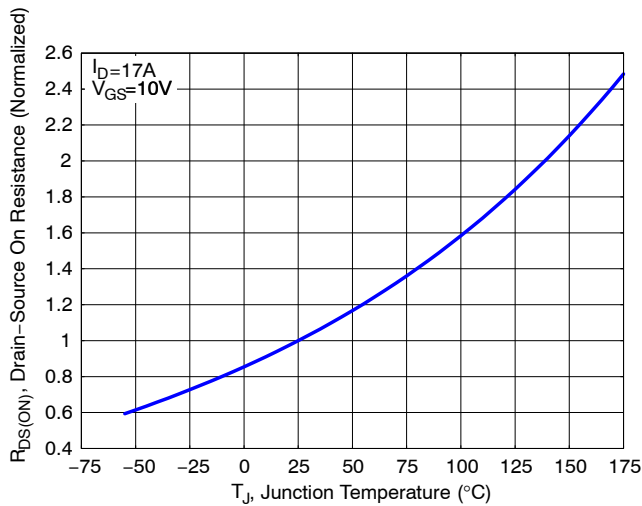


Figure 5. Normalized ON Resistance vs. Junction Temperature

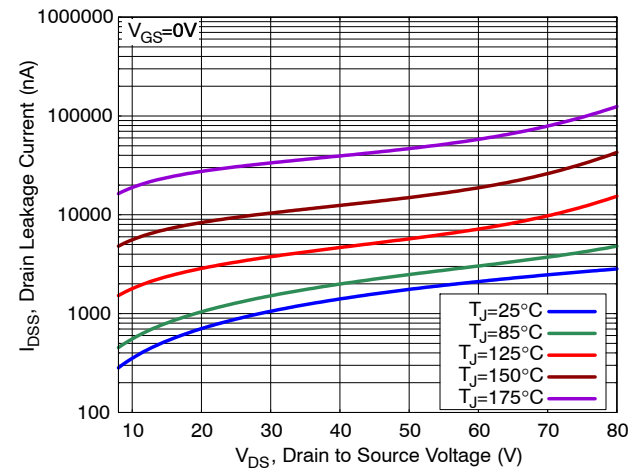


Figure 6. Drain Leakage Current vs. Drain Voltage

TYPICAL CHARACTERISTICS

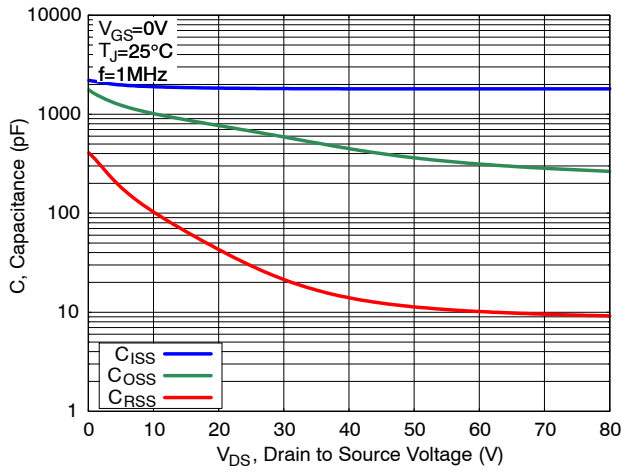


Figure 7. Capacitance Characteristics

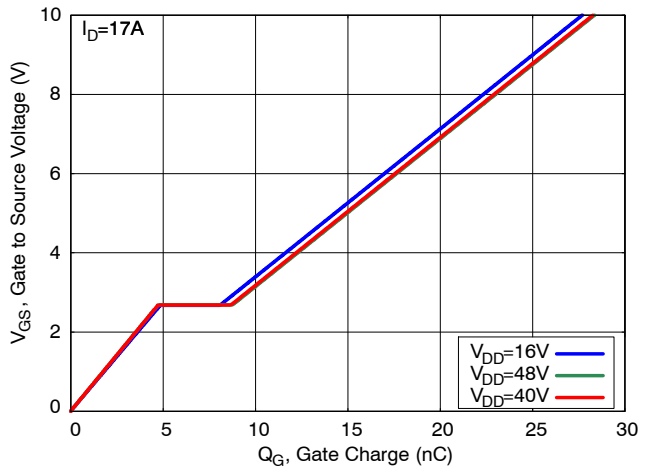


Figure 8. Gate Charge Characteristics

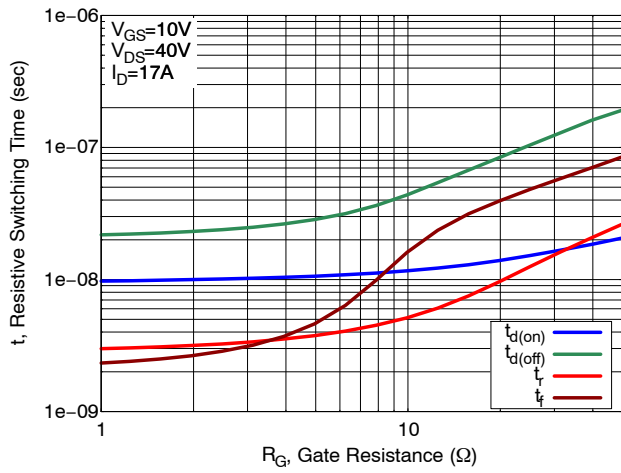


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

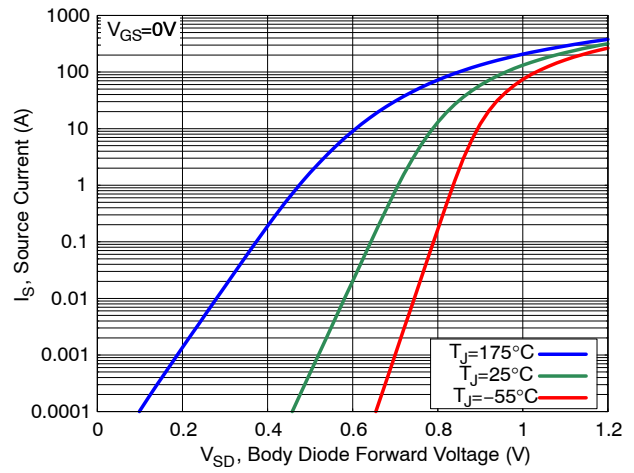


Figure 10. Diode Forward Characteristics

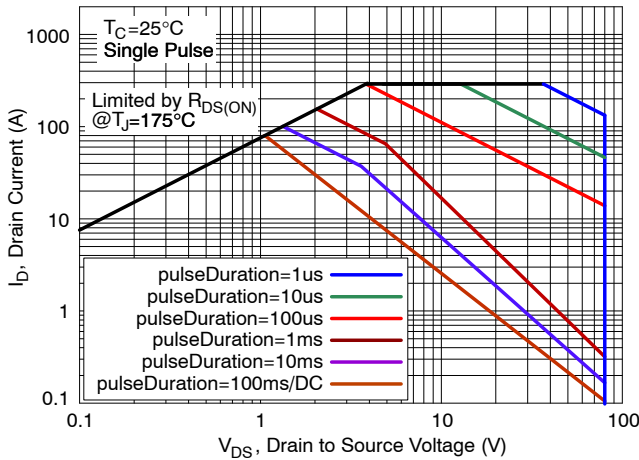


Figure 11. Safe Operating Area (SOA)

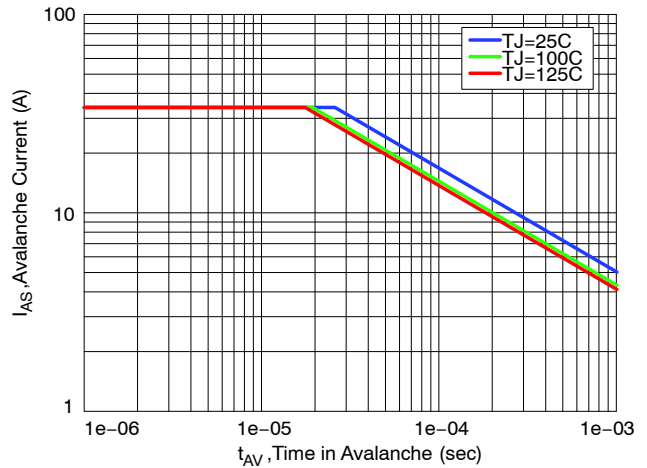


Figure 12. Avalanche Current vs. Pulse Time (UIS)

NTTFS5D6N08XL

TYPICAL CHARACTERISTICS

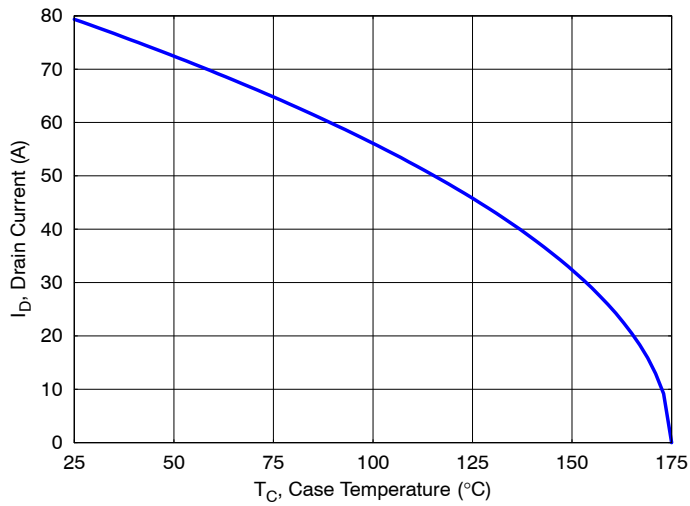


Figure 13. Maximum Current vs. Case Temperature

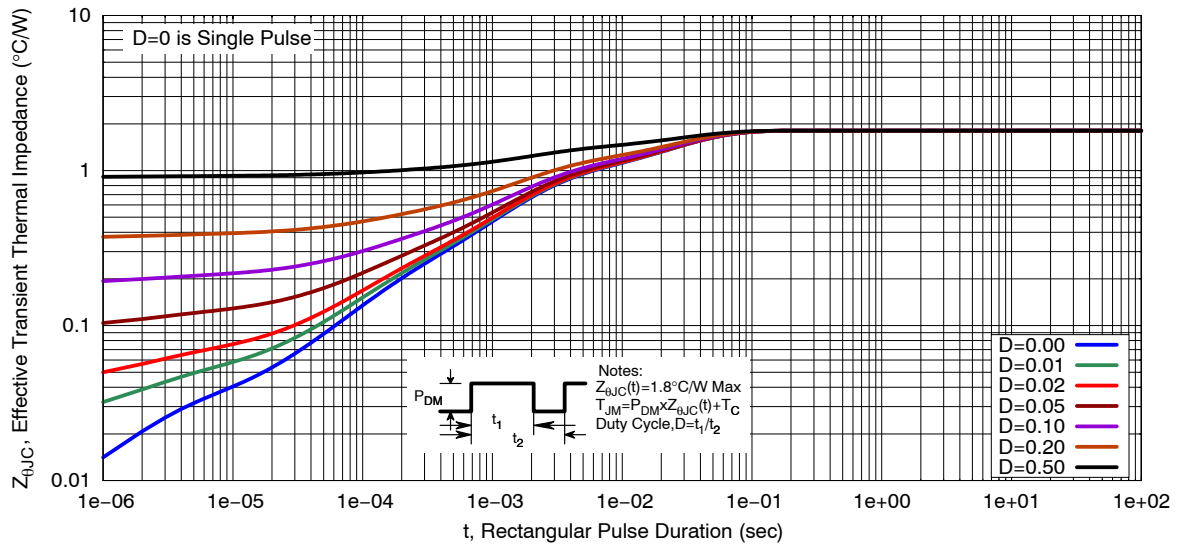
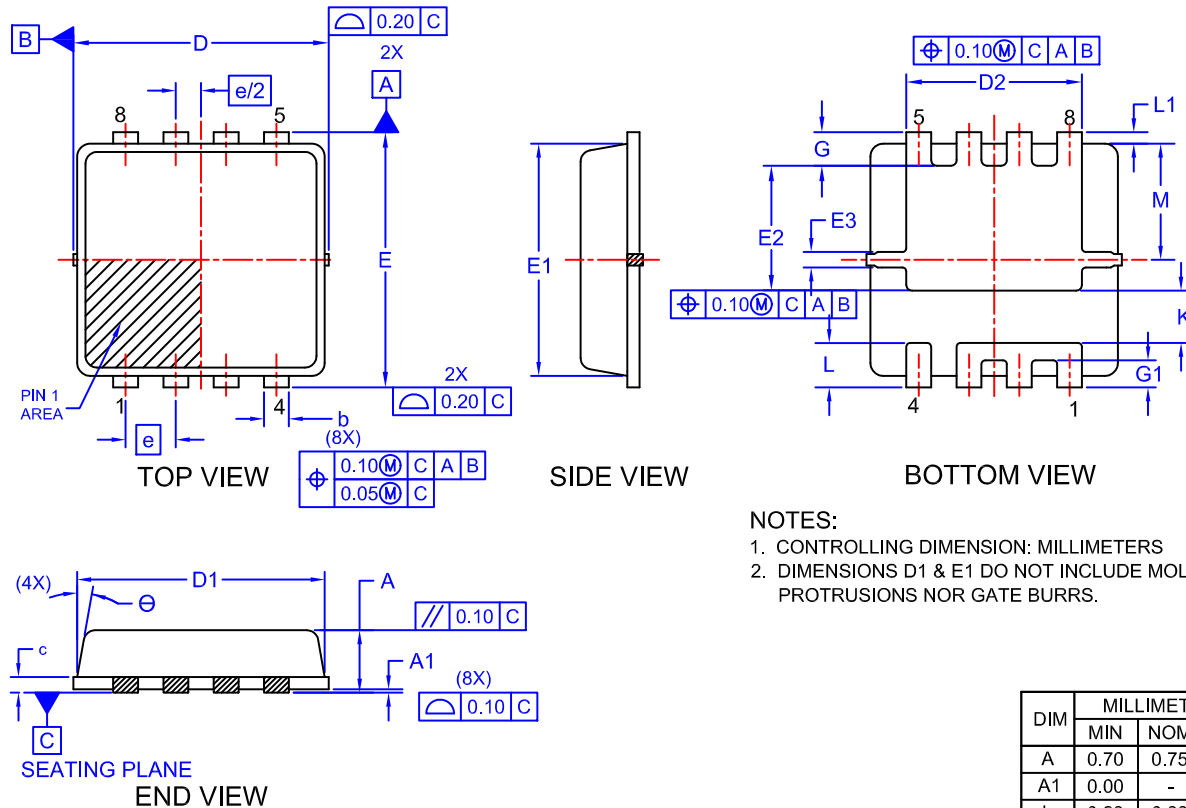


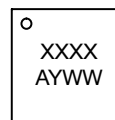
Figure 14. Transient Thermal Response

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

DATE 21 AUG 2018


NOTES:

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

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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