

MOSFET - Power, Single N-Channel

80 V, 13.4 mΩ, 41 A

NVTFS6H854NL

Features

- Small Footprint (3.3 x 3.3 mm) for Compact Design
- Low $R_{DS(on)}$ to Minimize Conduction Losses
- Low Capacitance to Minimize Driver Losses
- NVTFS6H854NLWF – Wettable Flanks Product
- AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free and are RoHS Compliant

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

Parameter			Symbol	Value	Unit
Drain-to-Source Voltage			V _{DSS}	80	V
Gate-to-Source Voltage			V _{GS}	±20	V
Continuous Drain Current R _{θJC} (Notes 1, 2, 3, 4)	Steady State	T _C = 25 °C	I _D	41	A
		T _C = 100 °C		29	
Power Dissipation R _{θJC} (Notes 1, 2, 3)		T _C = 25 °C	P _D	54	W
		T _C = 100 °C		27	
Continuous Drain Current R _{θJA} (Notes 1, 3, 4)	Steady State	T _A = 25 °C	I _D	10	A
		T _A = 100 °C		7	
Power Dissipation R _{θJA} (Notes 1, 3)		T _A = 25 °C	P _D	3.2	W
		T _A = 100 °C		1.6	
Pulsed Drain Current	T _A = 25 °C, t _p = 10 μs		I _{DM}	182	A
Operating Junction and Storage Temperature Range			T _J , T _{stg}	-55 to +175	°C
Source Current (Body Diode)			I _S	45	A
Single Pulse Drain-to-Source Avalanche Energy (I _{L(pk)} = 2.2 A)			E _{AS}	168	mJ
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)			T _L	260	°C

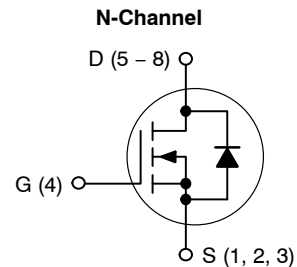
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

THERMAL RESISTANCE MAXIMUM RATINGS (Note 1)

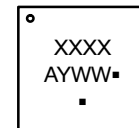
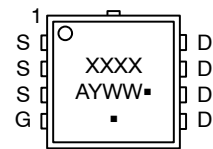
Parameter	Symbol	Value	Unit
Junction-to-Case – Steady State (Note 3)	$R_{\theta JC}$	2.8	$^\circ\text{C}/\text{W}$
Junction-to-Ambient – Steady State (Note 3)	$R_{\theta JA}$	47	

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. Psi (Ψ) is used as required per JESD51-12 for packages in which substantially less than 100% of the heat flows to single case surface.
3. Surface-mounted on FR4 board using a 650 mm², 2 oz. Cu pad.
4. Continuous DC current rating. Maximum current for pulses as long as 1 second is higher but is dependent on pulse duration and duty cycle.

$V_{(BR)DSS}$	$R_{DS(ON)} \text{ MAX}$	$I_D \text{ MAX}$
80 V	13.4 mΩ @ 10 V	41 A
	17.3 mΩ @ 4.5 V	



MARKING DIAGRAMS



XXXX = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week
▪ = Pb-Free Package
(Note: Microdot may be in either location)

ORDERING INFORMATION

See detailed ordering, marking and shipping information on page 5 of this data sheet.

NVTFS6H854NL

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

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	80			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS} = 0\text{ V}, V_{DS} = 80\text{ V}$	$T_J = 25\text{ }^{\circ}\text{C}$		10	μA
			$T_J = 125\text{ }^{\circ}\text{C}$		100	
Gate-to-Source Leakage Current	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = 20\text{ V}$			100	nA

ON CHARACTERISTICS (Note 5)

Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 45\text{ }\mu\text{A}$	1.2		2.0	V
Drain-to-Source On Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 10\text{ A}$		11.1	13.4	$\text{m}\Omega$
		$V_{GS} = 4.5\text{ V}, I_D = 10\text{ A}$		13.8	17.3	
Forward Transconductance	g_{FS}	$V_{DS} = 15\text{ V}, I_D = 20\text{ A}$		56		S

CHARGES AND CAPACITANCES

Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}, f = 1\text{ MHz}, V_{DS} = 40\text{ V}$		902		pF
Output Capacitance	C_{oss}			118		
Reverse Transfer Capacitance	C_{rss}			7		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 10\text{ V}, V_{DS} = 40\text{ V}, I_D = 20\text{ A}$		17		nC
Threshold Gate Charge	$Q_{G(TH)}$	$V_{GS} = 4.5\text{ V}, V_{DS} = 40\text{ V}, I_D = 20\text{ A}$		2		
Gate-to-Source Charge	Q_{GS}			3.0		
Gate-to-Drain Charge	Q_{GD}			2.9		
Plateau Voltage	V_{GP}			3.0		V
Total Gate Charge	$Q_{G(TOT)}$			8		nC

SWITCHING CHARACTERISTICS (Note 6)

Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = 4.5\text{ V}, V_{DS} = 64\text{ V}, I_D = 20\text{ A}, R_G = 2.5\text{ }\Omega$		10		ns
Rise Time	t_r			36		
Turn-Off Delay Time	$t_{d(off)}$			17		
Fall Time	t_f			6		

DRAIN-SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	V _{SD}	V _{GS} = 0 V, I _S = 10 A	T _J = 25 °C		0.82	1.2	V
			T _J = 125 °C		0.68		
Reverse Recovery Time	t _{RR}	V _{GS} = 0 V, dI _S /dt = 100 A/μs, I _S = 20 A			32		ns
Charge Time	t _a				20		
Discharge Time	t _b				12		
Reverse Recovery Charge	Q _{RR}				25		

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.

5. Pulse Test: Pulse Width $\leq 300\text{ }\mu\text{s}$, Duty Cycle $\leq 2\%$.

6. Switching characteristics are independent of operating junction temperatures.



TYPICAL CHARACTERISTICS

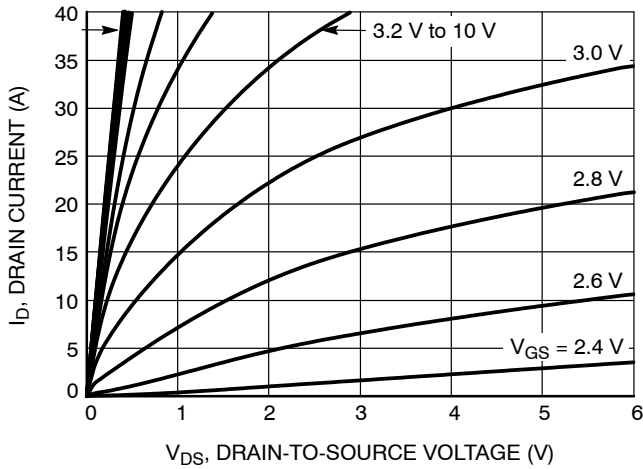


Figure 1. On-Region Characteristics

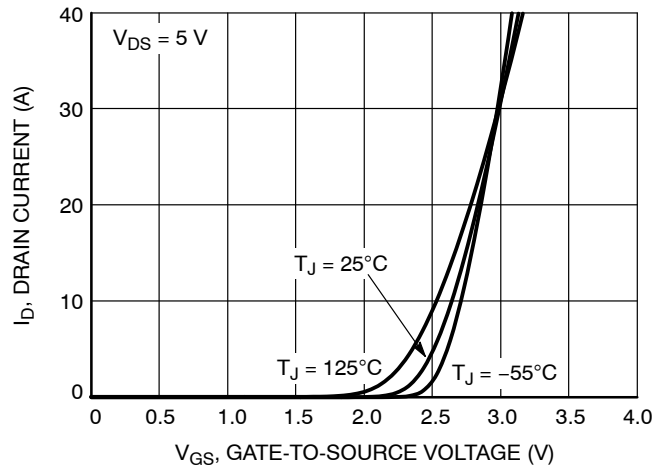


Figure 2. Transfer Characteristics

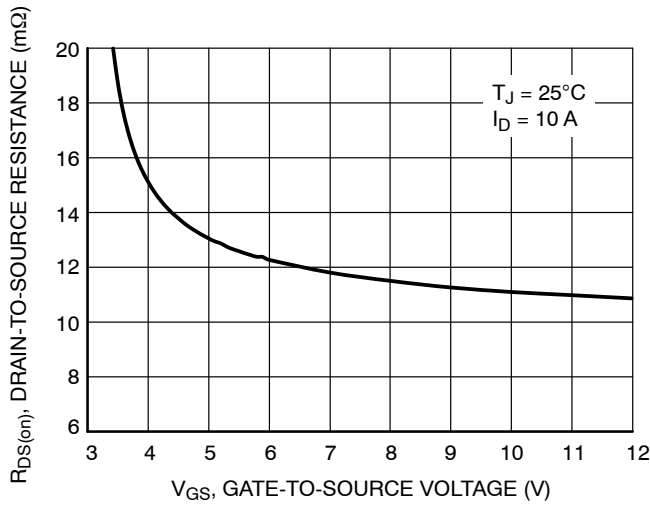


Figure 3. On-Resistance vs. Gate-to-Source Voltage

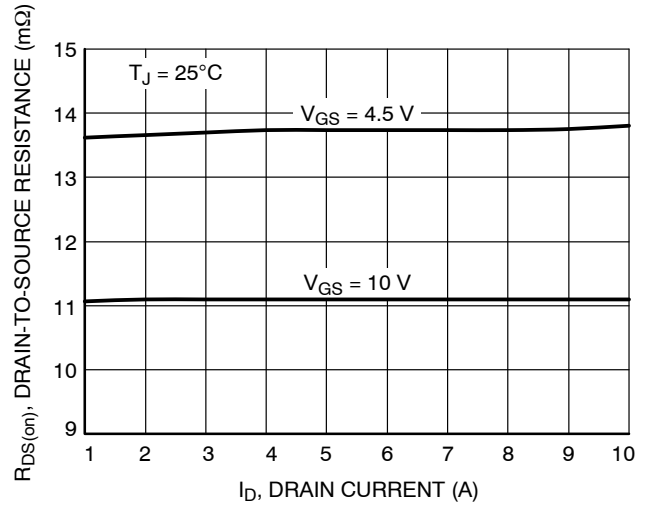


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

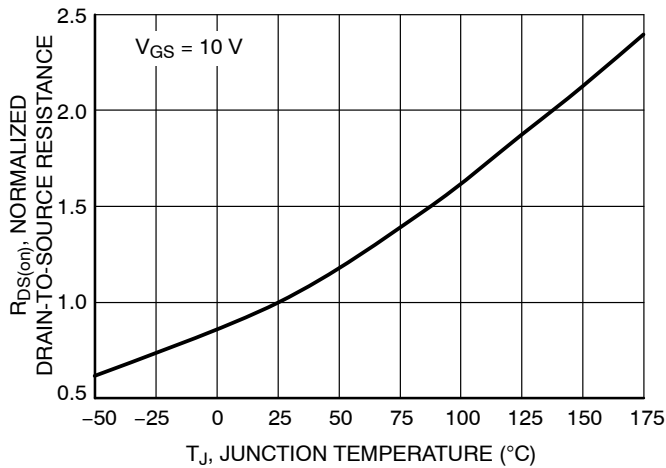


Figure 5. On-Resistance Variation with Temperature

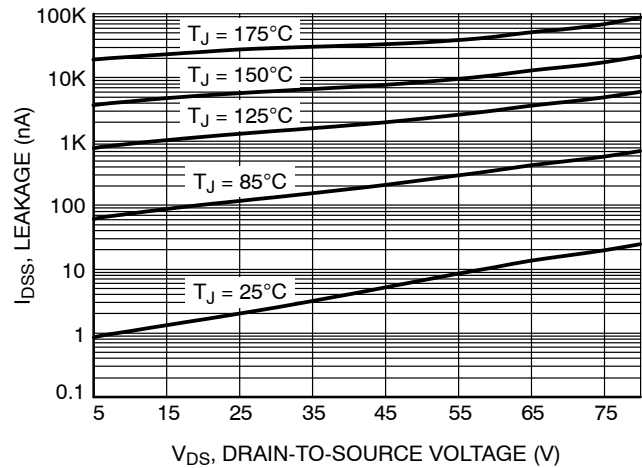


Figure 6. Drain-to-Source Leakage Current vs. Voltage

TYPICAL CHARACTERISTICS

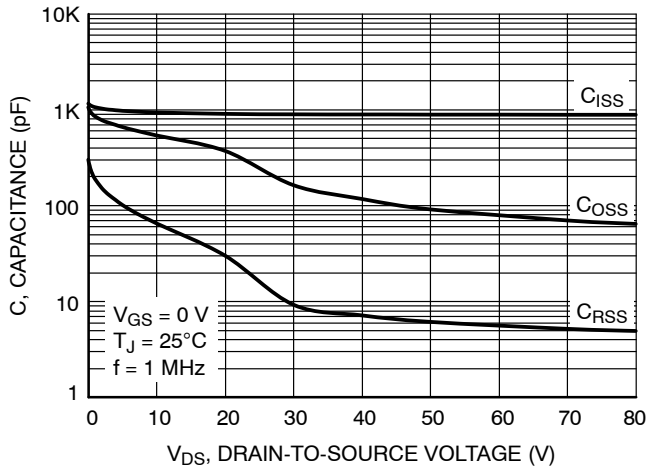


Figure 7. Capacitance Variation

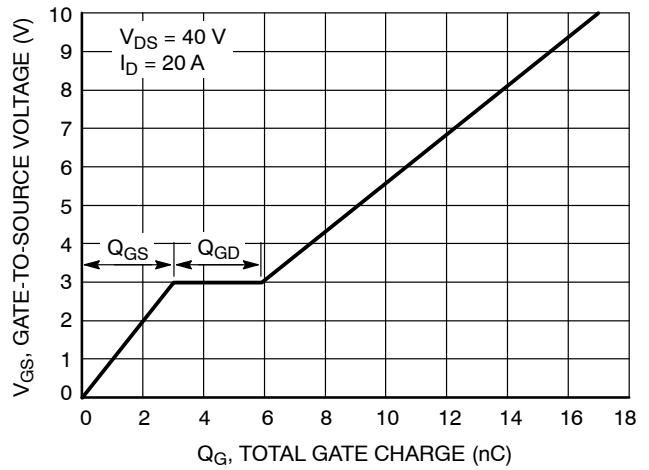


Figure 8. Gate-to-Source vs. Total Charge

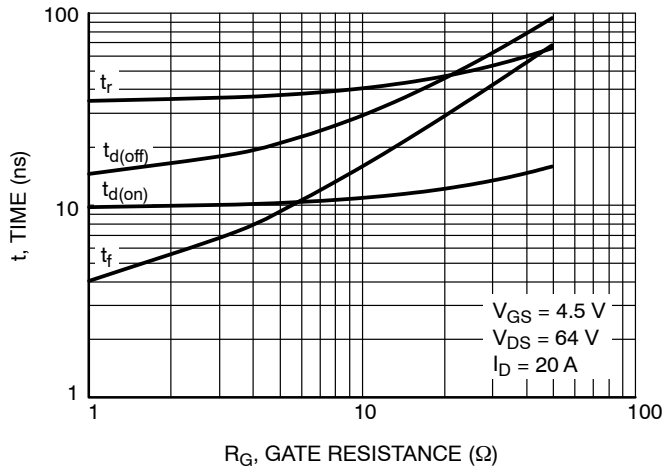


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

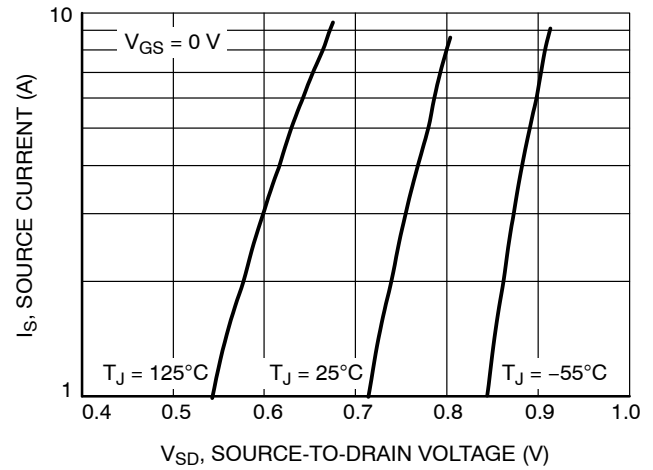


Figure 10. Diode Forward Voltage vs. Current

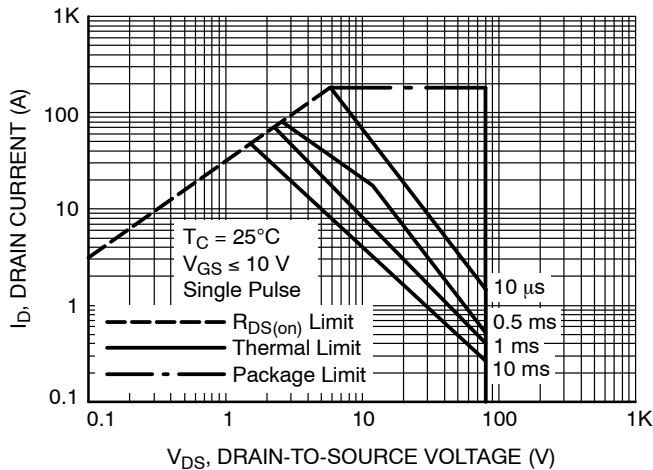


Figure 11. Maximum Rated Forward Biased Safe Operating Area

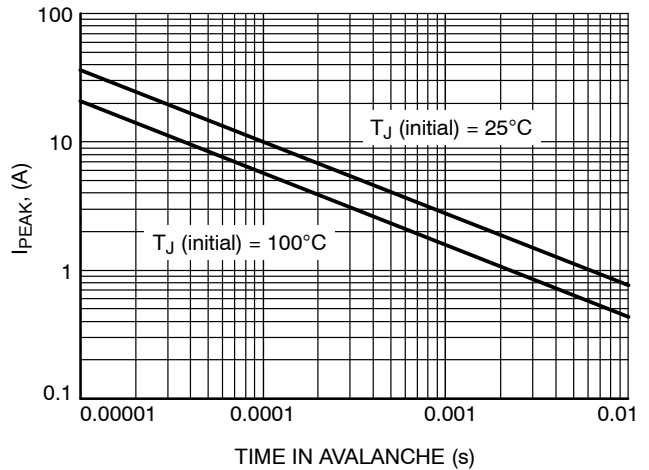


Figure 12. Maximum Drain Current vs. Time in Avalanche

NVTFS6H854NL

TYPICAL CHARACTERISTICS

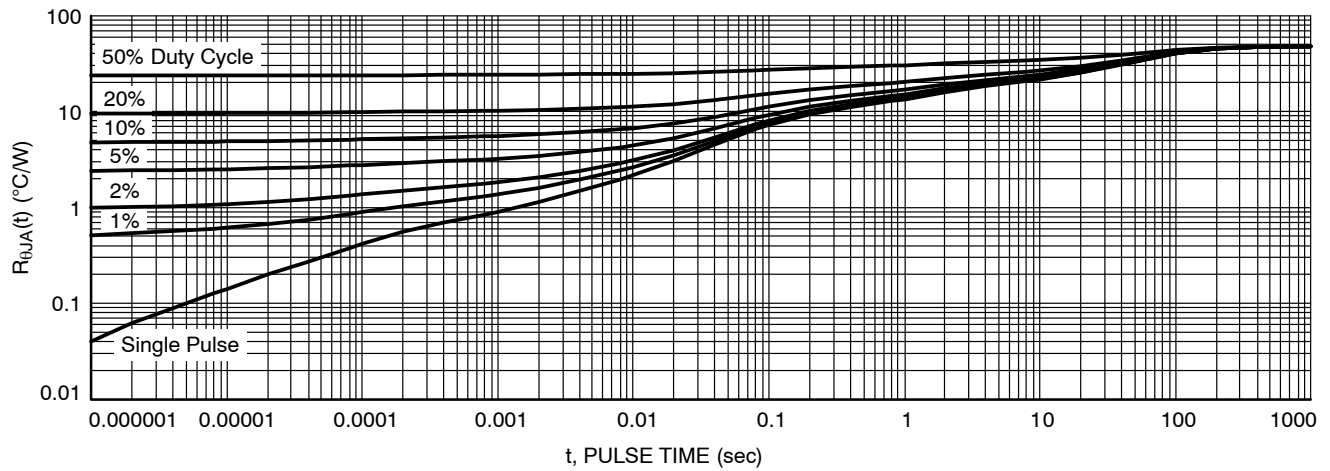


Figure 13. Thermal Response

DEVICE ORDERING INFORMATION

Device	Marking	Package	Shipping [†]
NVTFS6H854NLTAG	854L	WDFN8 (Pb-Free)	1500 / Tape & Reel
NVTFS6H854NLWFTAG	54LW	WDFN8 (Pb-Free, Wettable Flanks)	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](#).



NVTFS6H854NL

REVISION HISTORY

Revision	Description of Changes	Date
4	Rebranded the Data Sheet to onsemi format.	10/02/2025

This document has undergone updates prior to the inclusion of this revision history table. The changes tracked here only reflect updates made on the noted approval dates.

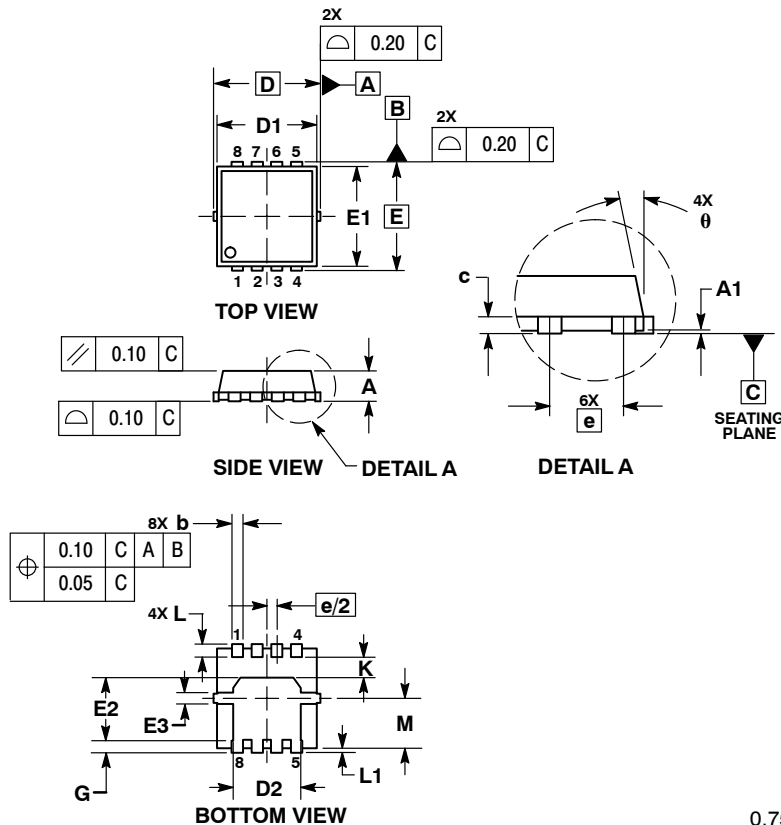
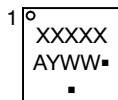




SCALE 2:1

WDFN8 3.3x3.3, 0.65P
CASE 511AB
ISSUE D

DATE 23 APR 2012

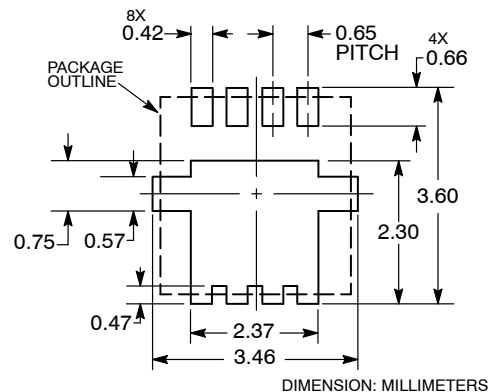

**GENERIC
MARKING DIAGRAM***

XXXXX = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week
▪ = Pb-Free Package

*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.

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION D1 AND E1 DO NOT INCLUDE MOLD FLASH PROTRUSIONS OR GATE BURRS.

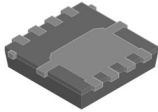
DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.70	0.75	0.80	0.028	0.030	0.031
A1	0.00	---	0.05	0.000	---	0.002
b	0.23	0.30	0.40	0.009	0.012	0.016
c	0.15	0.20	0.25	0.006	0.008	0.010
D	3.30 BSC			0.130 BSC		
D1	2.95	3.05	3.15	0.116	0.120	0.124
D2	1.98	2.11	2.24	0.078	0.083	0.088
E	3.30 BSC			0.130 BSC		
E1	2.95	3.05	3.15	0.116	0.120	0.124
E2	1.47	1.60	1.73	0.058	0.063	0.068
E3	0.23	0.30	0.40	0.009	0.012	0.016
e	0.65 BSC			0.026 BSC		
G	0.30	0.41	0.51	0.012	0.016	0.020
K	0.65	0.80	0.95	0.026	0.032	0.037
L	0.30	0.43	0.56	0.012	0.017	0.022
L1	0.06	0.13	0.20	0.002	0.005	0.008
M	1.40	1.50	1.60	0.055	0.059	0.063
θ	0 °	---	12 °	0 °	---	12 °

SOLDERING FOOTPRINT*


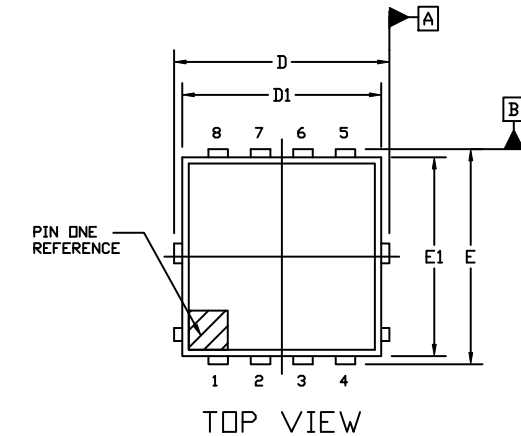
*For additional information on our Pb-Free strategy and soldering details, please download the onsemi Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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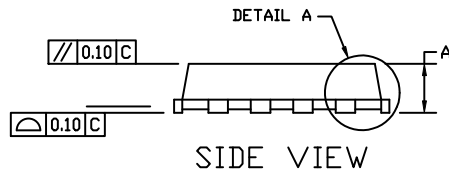
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WDFNW8 3.3x3.3, 0.65P (Full-Cut μ8FL WF)
CASE 515AN
ISSUE O

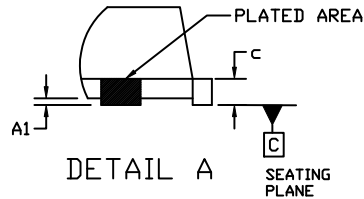
DATE 25 AUG 2020



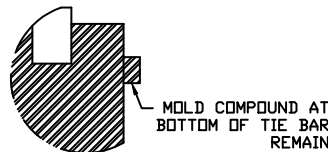
TOP VIEW



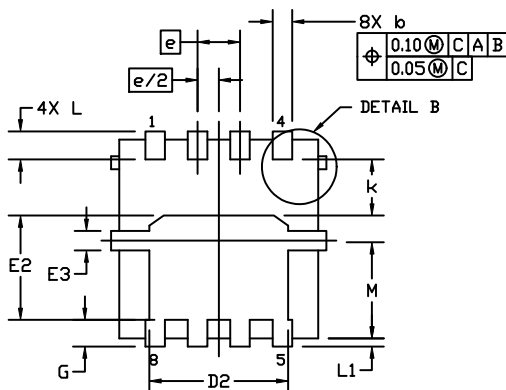
SIDE VIEW



DETAIL A

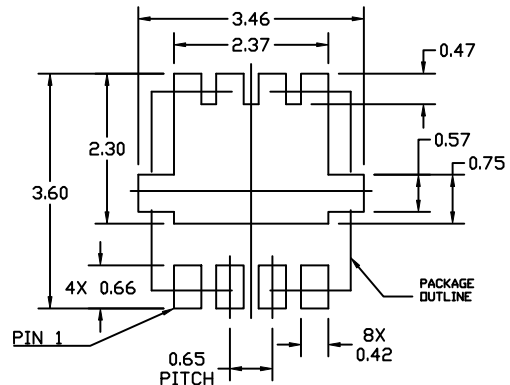


DETAIL B

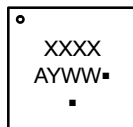


BOTTOM VIEW

DIM	MILLIMETERS		
	MIN.	NDM.	MAX.
A	0.70	0.75	0.80
A1	0.00	----	0.05
b	0.23	0.30	0.40
c	0.15	0.20	0.25
D	3.05	3.30	3.55
D1	2.95	3.05	3.15
D2	1.98	2.11	2.24
E	3.05	3.30	3.55
E1	2.95	3.05	3.15
E2	1.47	1.60	1.73
E3	0.23	0.30	0.40
e	0.65 BSC		
G	0.30	0.41	0.51
K	0.65	0.80	0.95
L	0.30	0.43	0.59
L1	0.06	0.13	0.20
M	1.40	1.50	1.60


RECOMMENDED
MOUNTING FOOTPRINT

* For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERM/D.

**GENERIC
MARKING DIAGRAM***


XXXX = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week
▪ = Pb-Free Package

(Note: Microdot may be in either location)

*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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