

NTMFS5834NL, NVMFS5834NL

Power MOSFET

40 V, 75 A, 9.3 mΩ, Single N-Channel

Features

- Low $R_{DS(on)}$
- Low Capacitance
- Optimized Gate Charge
- NVMFS5834NLWF – Wettable Flanks Product
- NVMFS Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; 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 stated)

Parameter			Symbol	Value	Unit
Drain-to-Source Voltage			V _{DSS}	40	V
Gate-to-Source Voltage			V _{GS}	±20	V
Continuous Drain Current R _{θJA} (Note 1)	Steady State	T _A = 25°C	I _D	14	A
		T _A = 100°C		12	
Power Dissipation R _{θJA} (Note 1)		T _A = 25°C	P _D	3.6	W
		T _A = 100°C		2.5	
Continuous Drain Current R _{θJC} (Note 1)		T _C = 25°C	I _D	75	A
		T _C = 100°C		63	
Power Dissipation R _{θJC} (Note 1)		T _C = 25°C	P _D	107	W
		T _C = 100°C		75	
Pulsed Drain Current	t _p = 10 μs		I _{DM}	276	A
Operating Junction and Storage Temperature			T _J , T _{STG}	-55 to +175	°C
Source Current (Body Diode)			I _S	75	A
Single Pulse Drain-to-Source Avalanche Energy (L = 0.1 mH)			EAS	48	mJ
			IAS	31	A
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

Parameter	Symbol	Value	Unit
Junction-to-Case (Bottom) (Note 1)	$R_{\theta JC}$	1.4	$^\circ\text{C/W}$
Junction-to-Case (Top) (Note 1)	$R_{\theta JC}$	4.5	
Junction-to-Ambient Steady State (Note 1)	$R_{\theta JA}$	41	
Junction-to-Ambient Steady State (Note 2)	$R_{\theta JA}$	75	

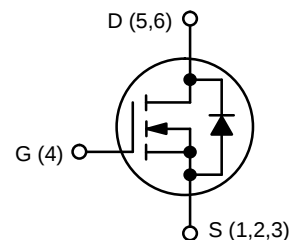
1. Surface-mounted on FR4 board using 1 sq-in pad (Cu area = 1.127 in sq [2 oz] including traces).
2. Surface-mounted on FR4 board using 0.155 in sq (100mm²) pad size.



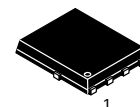
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<http://onsemi.com>

$V_{(BR)DS}$	$R_{DS(ON)} \text{ MAX}$	$I_D \text{ MAX}$
40 V	9.3 mΩ @ 10 V	75 A
	13.6 mΩ @ 4.5 V	

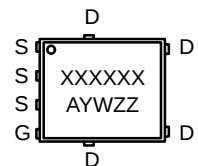


N-CHANNEL MOSFET



DFN5
(SO-8FL)
CASE 488AA
STYLE 1

MARKING DIAGRAM



A = Assembly Location
Y = Year
W = Work Week
ZZ = Lot Traceability

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

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	40			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$			34.7		mV/ $^\circ\text{C}$
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS} = 0\text{ V}, V_{DS} = 40\text{ V}$	$T_J = 25\text{ }^\circ\text{C}$		1.0	μA
			$T_J = 125^\circ\text{C}$		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	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 250\text{ }\mu\text{A}$	1.0		3.0	V
Negative Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$			5.7		mV/ $^\circ\text{C}$
Drain-to-Source On Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 20\text{ A}$		7.1	9.3	$\text{m}\Omega$
		$V_{GS} = 4.5\text{ V}, I_D = 20\text{ A}$		11.3	13.6	
Forward Transconductance	g_{FS}	$V_{DS} = 5\text{ V}, I_D = 20\text{ A}$		29		S

CHARGES, CAPACITANCES & GATE RESISTANCE

Input Capacitance	C_{ISS}	$V_{GS} = 0\text{ V}, f = 1\text{ MHz}, V_{DS} = 20\text{ V}$		1231		pF
Output Capacitance	C_{OSS}			198		
Reverse Transfer Capacitance	C_{RSS}			141		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 10\text{ V}, V_{DS} = 20\text{ V}; I_D = 20\text{ A}$		24		nC
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 4.5\text{ V}, V_{DS} = 20\text{ V}; I_D = 20\text{ A}$		12		
Threshold Gate Charge	$Q_{G(TH)}$			1.0		
Gate-to-Source Charge	Q_{GS}			4.2		
Gate-to-Drain Charge	Q_{GD}			6.3		
Plateau Voltage	V_{GP}			3.4		V
Gate Resistance	R_G			0.7		Ω

SWITCHING CHARACTERISTICS (Note 4)

Turn-On Delay Time	$t_{d(ON)}$	$V_{GS} = 4.5\text{ V}, V_{DS} = 20\text{ V}, I_D = 20\text{ A}, R_G = 2.5\text{ }\Omega$		10		ns
Rise Time	t_r			56.4		
Turn-Off Delay Time	$t_{d(OFF)}$			17.4		
Fall Time	t_f			6.6		

DRAIN-SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	V_{SD}	$V_{GS} = 0\text{ V},$ $I_S = 20\text{ A}$	$T_J = 25^{\circ}\text{C}$		0.84	1.2	V
			$T_J = 125^{\circ}\text{C}$		0.72		
Reverse Recovery Time	t_{RR}	$V_{GS} = 0\text{ V}, dI_S/dt = 100\text{ A}/\mu\text{s},$ $I_S = 20\text{ A}$			18		ns
Charge Time	t_a				10		
Discharge Time	t_b				8.0		
Reverse Recovery Charge	Q_{RR}				11		nC

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

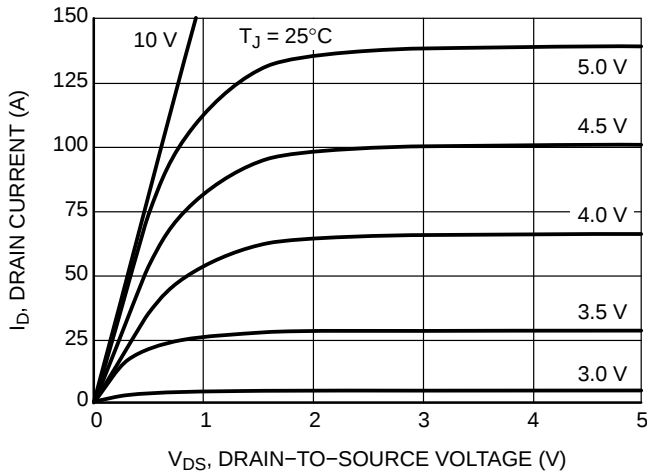


Figure 1. On-Region Characteristics

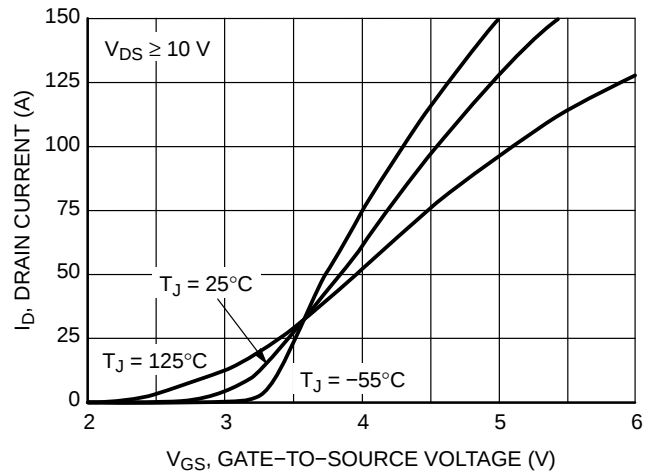


Figure 2. Transfer Characteristics

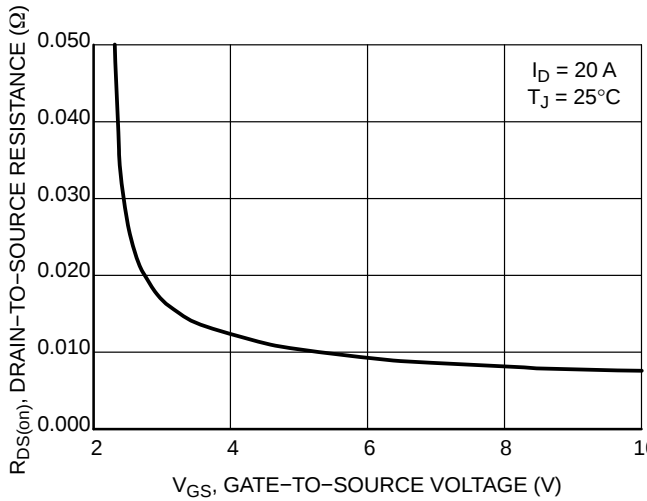


Figure 3. On-Resistance vs. Gate-to-Source Voltage

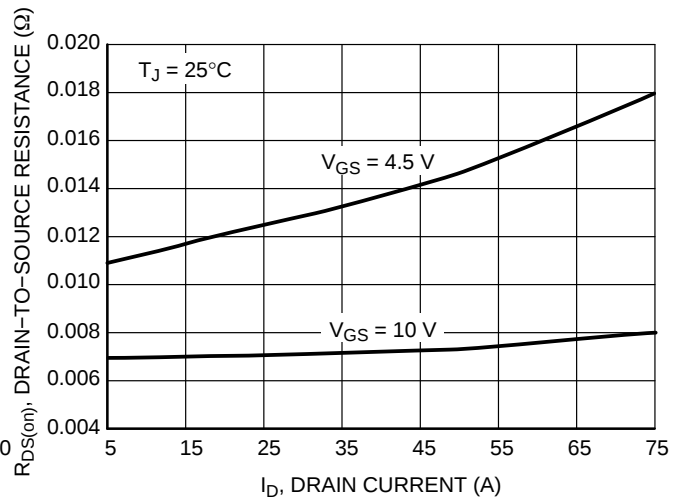


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

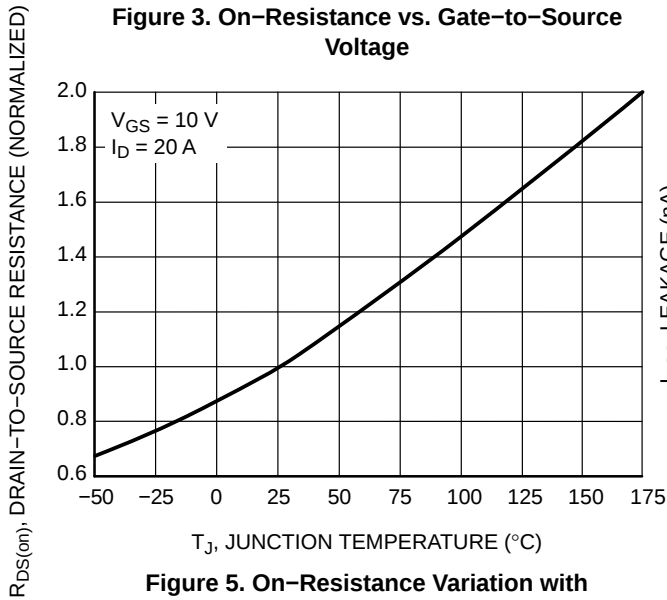


Figure 5. On-Resistance Variation with Temperature

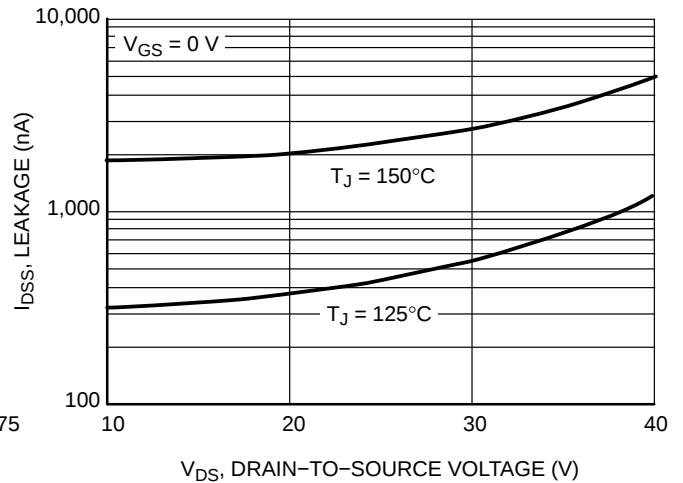


Figure 6. Drain-to-Source Leakage Current vs. Voltage

TYPICAL CHARACTERISTICS

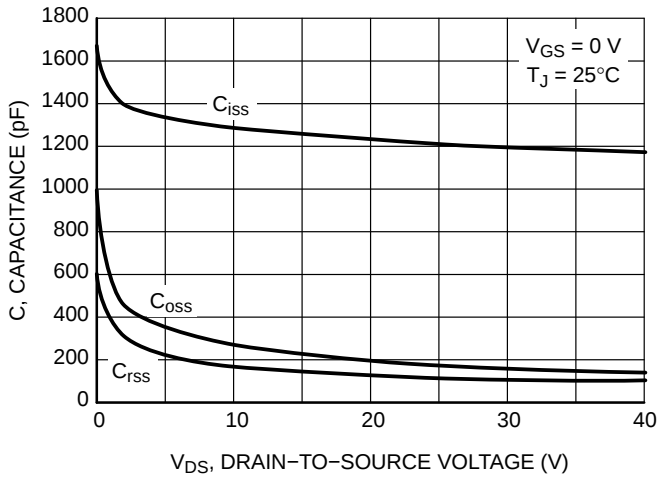


Figure 7. Capacitance Variation

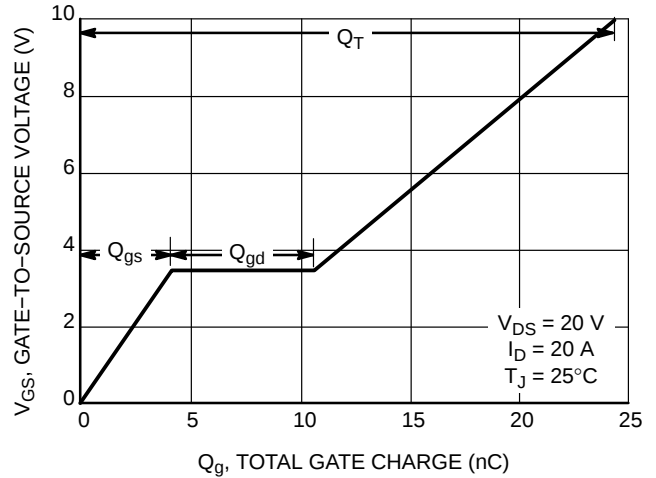


Figure 8. Gate-to-Source Voltage vs. Total Charge

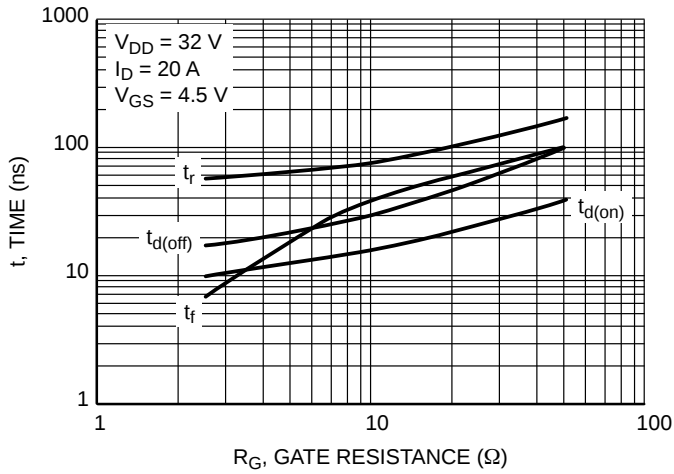


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

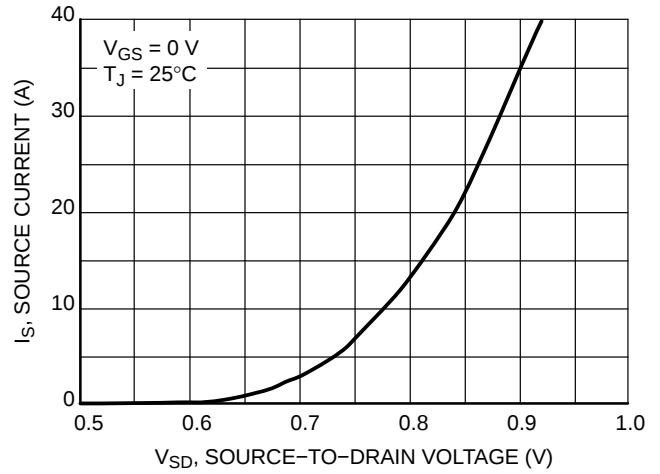


Figure 10. Diode Forward Voltage vs. Current

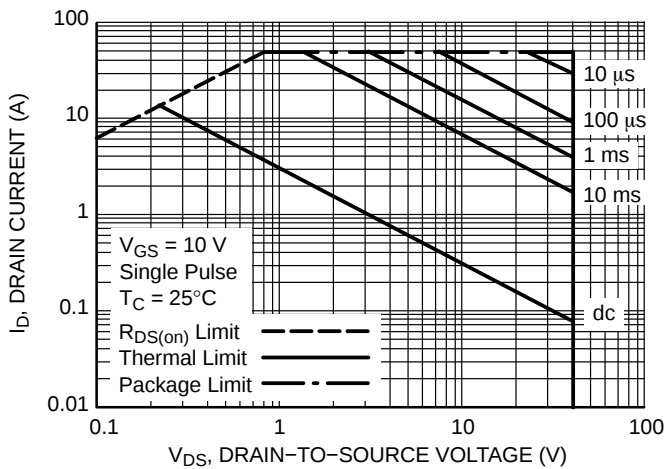


Figure 11. Maximum Rated Forward Biased Safe Operating Area

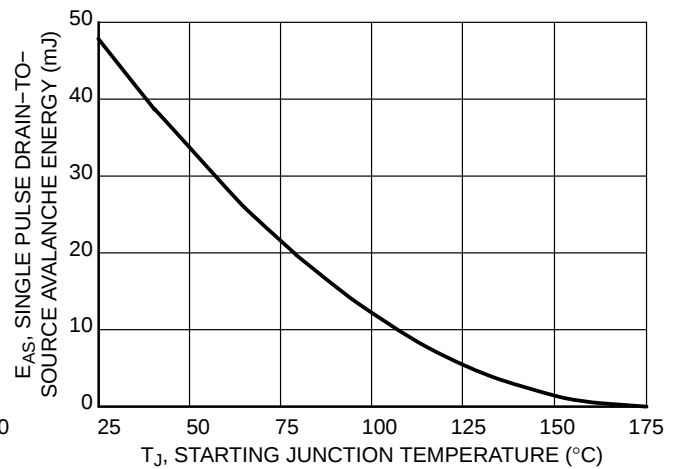


Figure 12. Maximum Avalanche Energy vs. Starting Junction Temperature

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TYPICAL CHARACTERISTICS

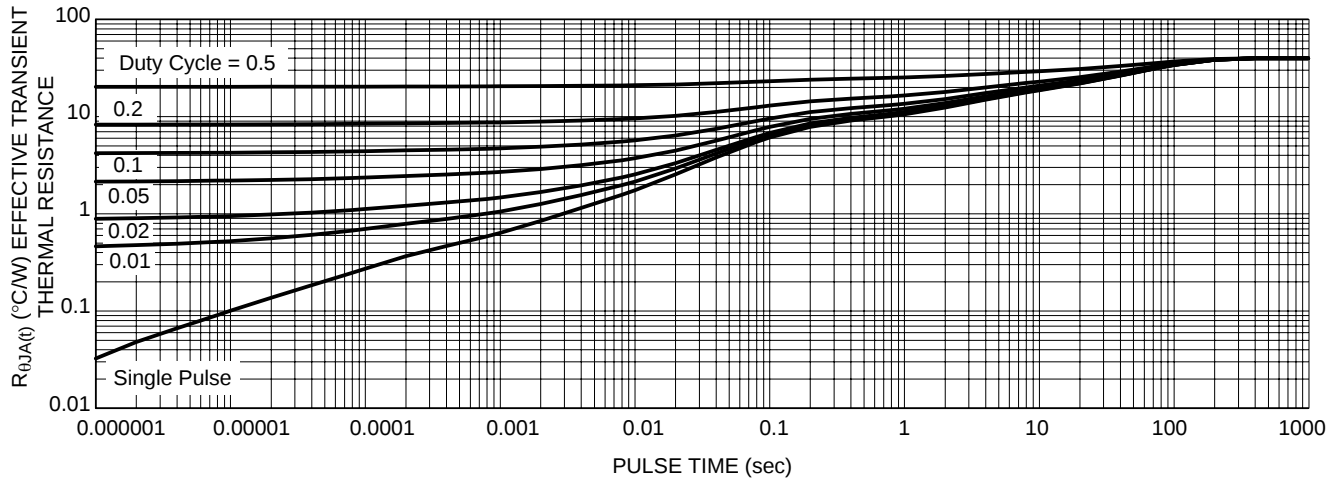


Figure 13. Thermal Response

DEVICE ORDERING INFORMATION

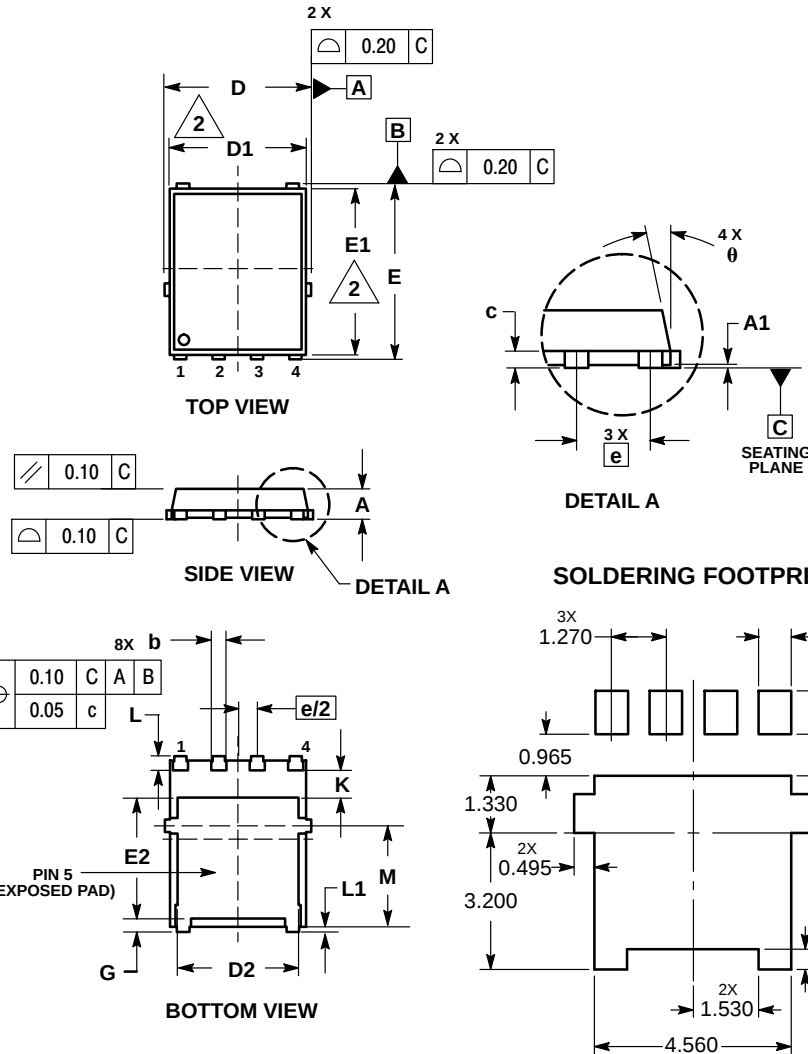
Device	Marking	Package	Shipping [†]
NTMFS5834NLT1G	5834L	DFN5 (Pb-Free)	1500 / Tape & Reel
NVMFS5834NLT1G	V5834L	DFN5 (Pb-Free)	1500 / Tape & Reel
NVMFS5834NLWFT1G	5834LW	DFN5 (Pb-Free)	1500 / Tape & Reel
NVMFS5834NLT3G	V5834L	DFN5 (Pb-Free)	5000 / Tape & Reel
NVMFS5834NLWFT3G	5834LW	DFN5 (Pb-Free)	5000 / 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.

NTMFS5834NL, NVMFS5834NL

PACKAGE DIMENSIONS

DFN5 5x6, 1.27P
(SO-8FL)
CASE 488AA
ISSUE K



NOTES:

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

DIM	MILLIMETERS		
	MIN	NOM	MAX
A	0.90	1.00	1.10
A1	0.00	---	0.05
b	0.33	0.41	0.51
c	0.23	0.28	0.33
D	5.00	5.15	5.30
D1	4.70	4.90	5.10
D2	3.80	4.00	4.20
E	6.00	6.15	6.30
E1	5.70	5.90	6.10
E2	3.45	3.65	3.85
e	1.27 BSC		
G	0.51	0.61	0.71
K	1.20	1.35	1.50
L	0.51	0.61	0.71
L1	0.125 REF		
M	3.00	3.40	3.80
θ	0°	---	12°

STYLE 1:

1. SOURCE
2. SOURCE
3. SOURCE
4. GATE
5. DRAIN

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

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NTMFS5834NL/D



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