

NVMFD5852NL

Power MOSFET

40 V, 6.9 mΩ, 44 A, Dual N-Channel Logic Level, Dual SO-8FL

Features

- Small Footprint (5x6 mm) for Compact Designs
- Low $R_{DS(on)}$ to Minimize Conduction Losses
- Low Capacitance to Minimize Driver Losses
- NVMFD5852NLWF – Wettable Flanks Option for Enhanced Optical Inspection
- AEC-Q101 Qualified and PPAP Capable
- This is a Pb-Free Device

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

Parameter			Symbol	Value	Unit	
Drain-to-Source Voltage			V_{DSS}	40	V	
Gate-to-Source Voltage			V_{GS}	± 20	V	
Continuous Drain Current $R_{\Psi J-mb}$ (Notes 1, 2, 3, 4)	Steady State	$T_{mb} = 25^{\circ}\text{C}$	I_D	44	A	
		$T_{mb} = 100^{\circ}\text{C}$		31		
		Power Dissipation $R_{\Psi J-mb}$ (Notes 1, 2, 3)	$T_{mb} = 25^{\circ}\text{C}$	P_D	27	W
			$T_{mb} = 100^{\circ}\text{C}$		13	
Continuous Drain Current $R_{\theta JA}$ (Notes 1, 3 & 4)	Steady State	$T_A = 25^{\circ}\text{C}$	I_D	15	A	
		$T_A = 100^{\circ}\text{C}$		10.6		
		Power Dissipation $R_{\theta JA}$ (Notes 1 & 3)	$T_A = 25^{\circ}\text{C}$	P_D	3.2	W
			$T_A = 100^{\circ}\text{C}$		1.6	
Pulsed Drain Current	$T_A = 25^{\circ}\text{C}$, $t_p = 10\text{ }\mu\text{s}$		I_{DM}	329	A	
Operating Junction and Storage Temperature			T_J , T_{stg}	-55 to 175	$^{\circ}\text{C}$	
Source Current (Body Diode)			I_S	40	A	
Single Pulse Drain-to-Source Avalanche Energy ($T_J = 25^{\circ}\text{C}$, $V_{GS} = 10\text{ V}$, $I_{L(pk)} = 40\text{ A}$, $L = 0.1\text{ mH}$, $R_G = 25\text{ }\Omega$)			E_{AS}	80	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.

THERMAL RESISTANCE MAXIMUM RATINGS (Note 1)

Parameter	Symbol	Value	Unit
Junction-to-Mounting Board (top) – Steady State (Notes 2, 3)	$R_{\Psi J-mb}$	5.6	$^\circ\text{C/W}$
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. Maximum current for pulses as long as 1 second are higher but are dependent on pulse duration and duty cycle.

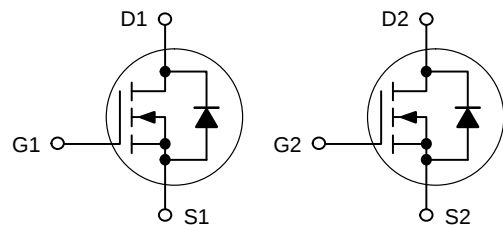


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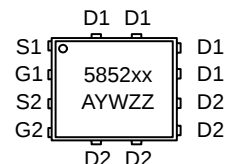
$V_{(BR)DSS}$	$R_{DS(on)} \text{ MAX}$	$I_D \text{ MAX}$
40 V	6.9 mΩ @ 10 V	44 A
	12.0 mΩ @ 4.5 V	

Dual N-Channel



MARKING DIAGRAM

DFN8 5x6
(SO8FL)
CASE 506BT



5852NL = Specific Device Code for NVMFD5852NL

5852LW = Specific Device Code for NVMFD5852NLWF

A = Assembly Location

Y = Year

W = Work Week

ZZ = Lot Traceability

ORDERING INFORMATION

Device	Package	Shipping†
NVMFD5852NLT1G	DFN8 (Pb-Free)	1500 / Tape & Reel
NVMFD5852NLWFT1G	DFN8 (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 Specification Brochure, BRD8011/D.

NVMFD5852NL

ELECTRICAL CHARACTERISTICS (T_J = 25°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 V, I _D = 250 μA	40			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	V _{(BR)DSS} /T _J			37.3		mV/°C
Zero Gate Voltage Drain Current	I _{DSS}	V _{GS} = 0 V, V _{DS} = 40 V	T _J = 25°C		1.0	μA
			T _J = 125°C		100	
Gate-to-Source Leakage Current	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±20 V			±100	nA

ON CHARACTERISTICS (Note 5)

Gate Threshold Voltage	V _{GS(TH)}	V _{GS} = V _{DS} , I _D = 250 μA	1.4		2.4	V
Negative Threshold Temperature Coefficient	V _{GS(TH)} /T _J			6.3		mV/°C
Drain-to-Source On Resistance	R _{DS(on)}	V _{GS} = 10 V, I _D = 20 A		5.3	6.9	mΩ
		V _{GS} = 4.5 V, I _D = 20 A		8.7	12	
Forward Transconductance	g _{FS}	V _{DS} = 5 V, I _D = 5 A		24		S

CHARGES AND CAPACITANCES

Input Capacitance	C _{iss}	V _{GS} = 0 V, f = 1.0 MHz, V _{DS} = 25 V		1800		pF
Output Capacitance	C _{oss}			240		
Reverse Transfer Capacitance	C _{rss}			180		
Total Gate Charge	Q _{G(TOT)}	V _{GS} = 4.5 V, V _{DS} = 32 V, I _D = 20 A		20		nC
Threshold Gate Charge	Q _{G(TH)}			1.5		
Gate-to-Source Charge	Q _{GS}			5.5		
Gate-to-Drain Charge	Q _{GD}			10.9		
Total Gate Charge	Q _{G(TOT)}	V _{GS} = 10 V, V _{DS} = 32V, I _D = 20 A		36		nC

SWITCHING CHARACTERISTICS (Note 6)

Turn-On Delay Time	t _{d(on)}	V _{GS} = 4.5 V, V _{DS} = 32 V, I _D = 20 A, R _G = 2.5 Ω		12		ns
Rise Time	t _r			52		
Turn-Off Delay Time	t _{d(off)}			21		
Fall Time	t _f			13		
Turn-On Delay Time	t _{d(on)}	V _{GS} = 10 V, V _{DS} = 32 V, I _D = 20 A, R _G = 2.5 Ω		12		ns
Rise Time	t _r			8.0		
Turn-Off Delay Time	t _{d(off)}			27		
Fall Time	t _f			5.0		

DRAIN-SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	V _{SD}	V _{GS} = 0 V, I _S = 20 A	T _J = 25°C		0.84	1.1	V
			T _J = 125°C		0.69		
Reverse Recovery Time	t _{RR}	V _{GS} = 0 V, dI _S /dI = 100 A/μs, I _S = 20 A		22.3		ns	
Charge Time	t _a			12.8			
Discharge Time	t _b			9.4			
Reverse Recovery Charge	Q _{RR}			15.2		nC	

5. Pulse Test: pulse width = 300 μs, duty cycle ≤ 2%.

6. Switching characteristics are independent of operating junction temperatures.

TYPICAL CHARACTERISTICS

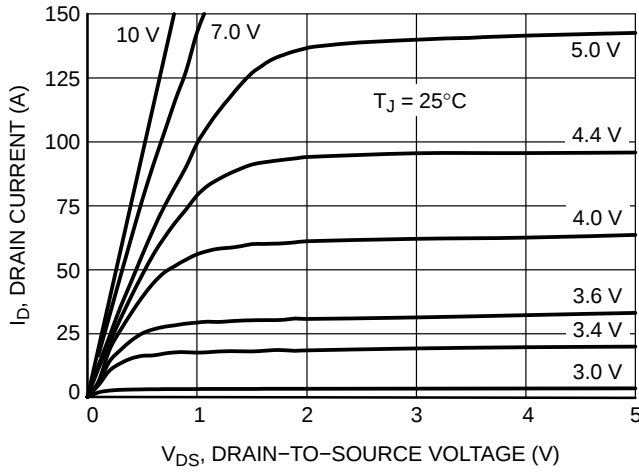


Figure 1. On-Region Characteristics

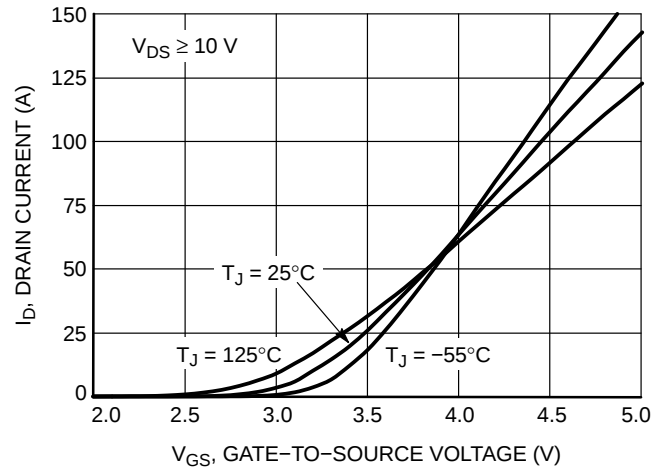


Figure 2. Transfer Characteristics

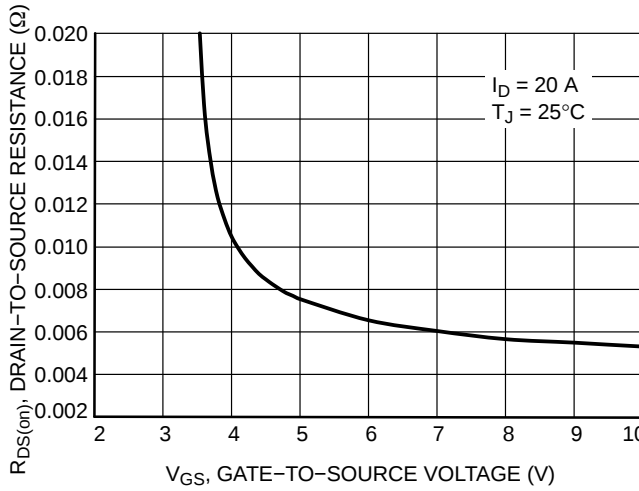


Figure 3. On-Resistance vs. V_{GS}

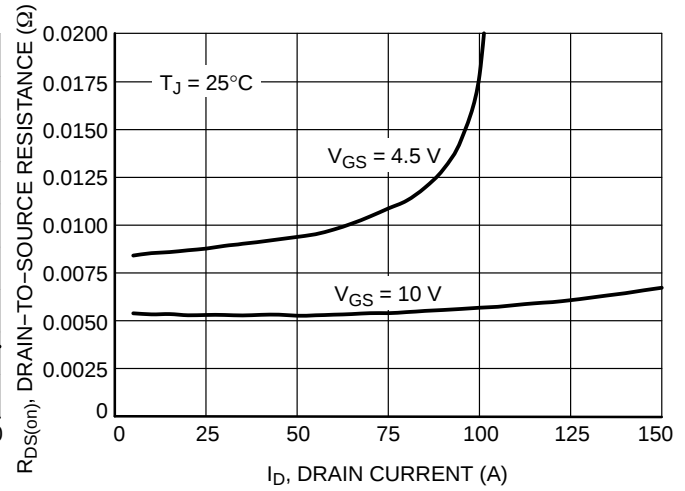


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

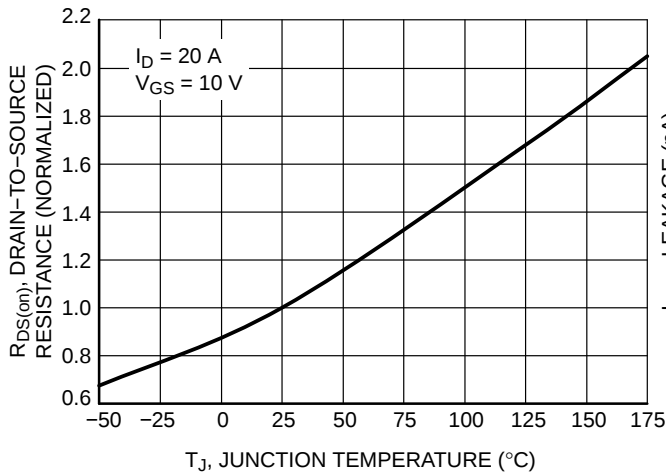


Figure 5. On-Resistance Variation with Temperature

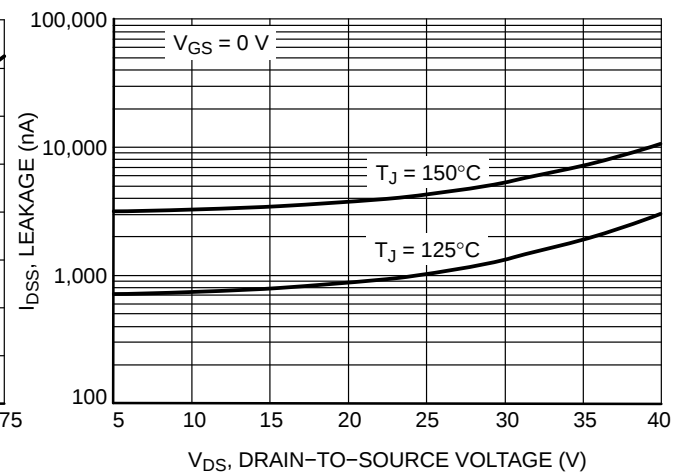


Figure 6. Drain-to-Source Leakage Current vs. Voltage

TYPICAL CHARACTERISTICS

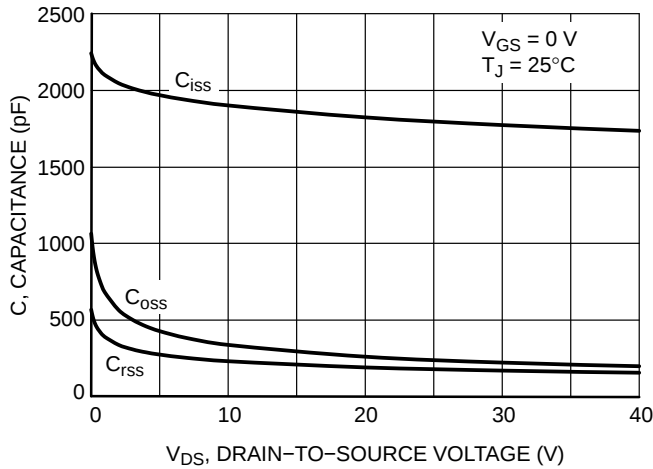


Figure 7. Capacitance Variation

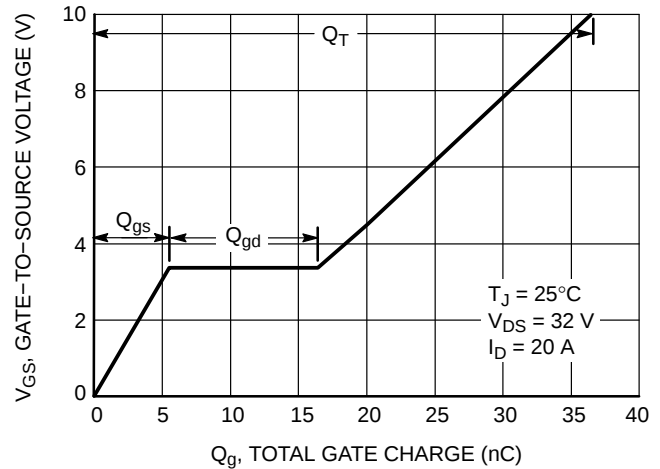


Figure 8. Gate-to-Source and Drain-to-Source Voltage vs. Total Charge

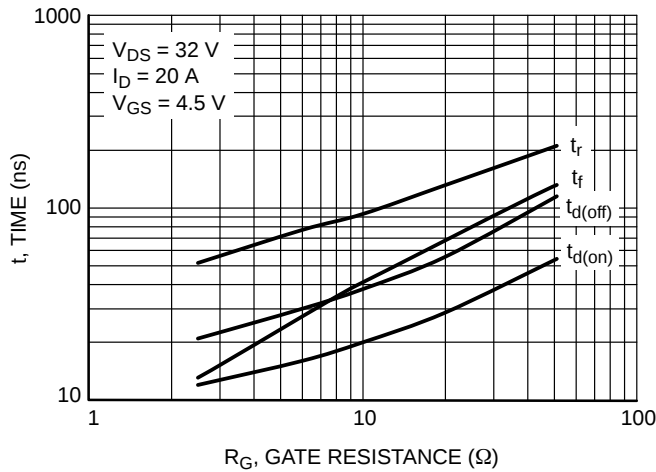


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

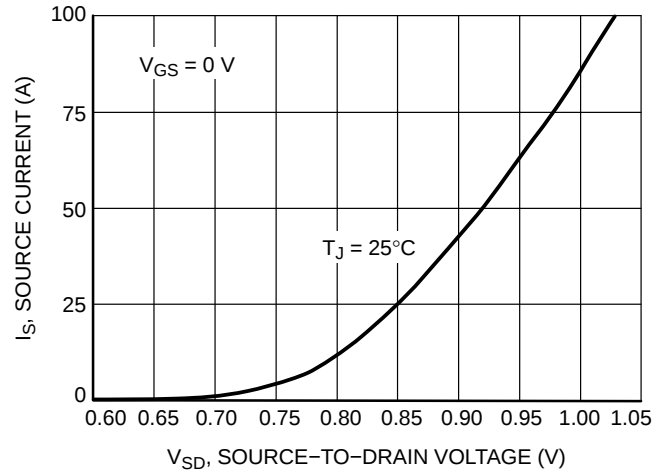


Figure 10. Diode Forward Voltage vs. Current

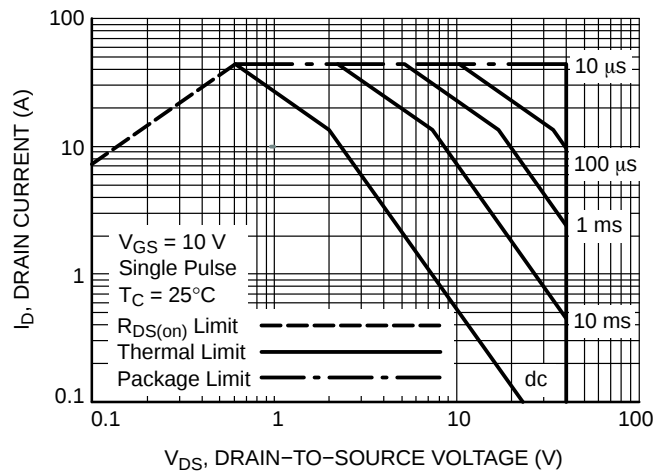


Figure 11. Maximum Rated Forward Biased Safe Operating Area

TYPICAL CHARACTERISTICS

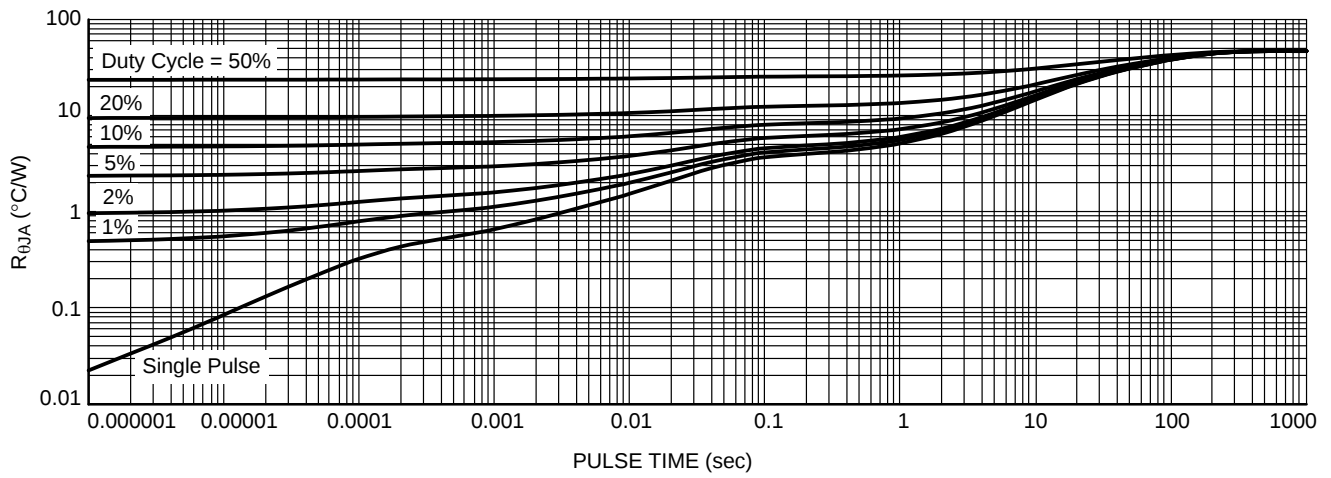


Figure 12. Thermal Response

