NVMFD6H852NL

Power MOSFET
80 V, 25.5 mΩ, 25 A, Dual N−Channel

Features

- Small Footprint (5x6 mm) for Compact Design
- Low $R_{DS(on)}$ to Minimize Conduction Losses
- Low Q_G and Capacitance to Minimize Driver Losses
- NVMFD6H852NLWF − Wettable Flank Option for Enhanced Optical Inspection
- AEC−Q101 Qualified and PPAP Capable
- These Devices are Pb−Free and are RoHS Compliant

MAXIMUM RATINGS (T_J = 25°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 $R_{\theta JC}$ (Notes 1, 2, 3)	Steady State	T_C = 25°C	I_D	25	A
		T_C = 100°C		18	
Power Dissipation $R_{\theta JC}$ (Notes 1, 2)		T_C = 25°C	P_D	38	W
		T_C = 100°C		19	
Continuous Drain Current $R_{\theta JA}$ (Notes 1, 2, 3)	Steady State	T_A = 25°C	I_D	7	A
		T_A = 100°C		5	
Power Dissipation $R_{\theta JA}$ (Notes 1, 2)		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}	98	A
Operating Junction and Storage Temperature Range			T_J, T_{stg}	−55 to +175	°C
Source Current (Body Diode)			I_S	32	A
Single Pulse Drain−to−Source Avalanche Energy (T_J = 25°C, $I_{L(pk)}$ = 1.3 A)			E_{AS}	86	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

Parameter	Symbol	Value	Unit
Junction−to−Case − Steady State	$R_{\theta JC}$	3.95	°C/W
Junction−to−Ambient − Steady State (Note 2)	$R_{\theta JA}$	47.3	

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. Surface−mounted on FR4 board using a 650 mm², 2 oz. Cu pad.
3. Maximum current for pulses as long as 1 second is higher but is dependent on pulse duration and duty cycle.
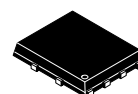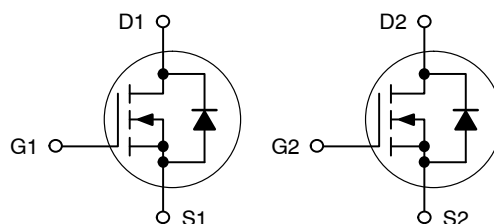
ON Semiconductor®

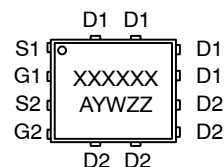| $V_{(BR)DSS}$	$R_{DS(ON)}$ MAX	I_D MAX
80 V	25.5 mΩ @ 10 V	25 A
	31.5 mΩ @ 4.5 V	

Dual N−Channel

DFN8 5x6 (SO8FL) CASE 506BT

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.

NVMFD6H852NL

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		80			V
Drain−to−Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$				47.5		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS} = 0 V, V_{DS} = 80 V	T_J = 25 °C			10	μA
			T_J = 125°C			250	
Gate−to−Source Leakage Current	I_{GSS}	V_{DS} = 0 V, V_{GS} = 20 V				100	nA
ON CHARACTERISTICS (Note 4)							
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_D = 26 μA		1.2		2.0	V
Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$				−5.0		mV/°C
Drain−to−Source On Resistance	$R_{DS(on)}$	V_{GS} = 10 V	I_D = 10 A		21	25.5	mΩ
		V_{GS} = 4.5 V	I_D = 10 A		25	31.5	
Forward Transconductance	g_{FS}	V_{DS} = 5 V, I_D = 10 A			138		S
CHARGES, CAPACITANCES & GATE RESISTANCE							
Input Capacitance	C_{ISS}	V_{GS} = 0 V, f = 1 MHz, V_{DS} = 40 V			521		pF
Output Capacitance	C_{OSS}				69		
Reverse Transfer Capacitance	C_{RSS}				4		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = 10 V, V_{DS} = 40 V; I_D = 10 A			10		nC
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = 4.5 V, V_{DS} = 40 V; I_D = 10 A			5		
Threshold Gate Charge	$Q_{G(TH)}$				1.1		
Gate−to−Source Charge	Q_{GS}				1.9		
Gate−to−Drain Charge	Q_{GD}				1.7		
Plateau Voltage	V_{GP}				3.1		V
SWITCHING CHARACTERISTICS (Note 5)							
Turn−On Delay Time	$t_{d(ON)}$	V_{GS} = 4.5 V, V_{DS} = 64 V, I_D = 10 A, R_G = 2.5 Ω			7		ns
Rise Time	t_r				23		
Turn−Off Delay Time	$t_{d(OFF)}$				19		
Fall Time	t_f				16		
DRAIN−SOURCE DIODE CHARACTERISTICS							
Forward Diode Voltage	V_{SD}	V_{GS} = 0 V, I_S = 10 A	T_J = 25°C		0.8	1.2	V
			T_J = 125°C		0.7		
Reverse Recovery Time	t_{RR}	V_{GS} = 0 V, dIS/dt = 100 A/μs, I_S = 10 A			25		ns
Charge Time	t_a				18		
Discharge Time	t_b				7		
Reverse Recovery Charge	Q_{RR}				20		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.
4. Pulse Test: pulse width ≤ 300 μs, duty cycle ≤ 2%.
5. Switching characteristics are independent of operating junction temperatures.

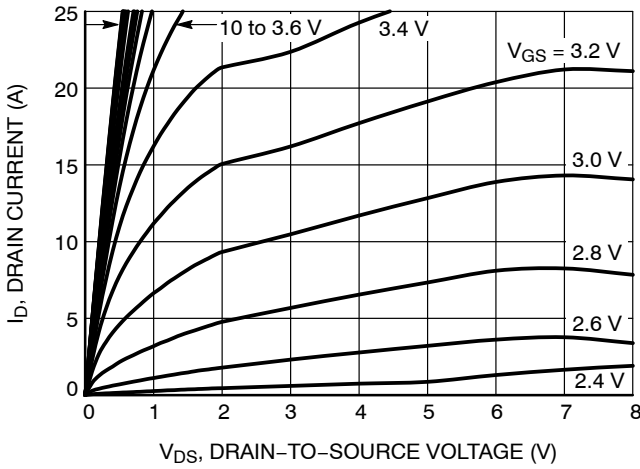# NVMFD6H852NL

TYPICAL CHARACTERISTICS
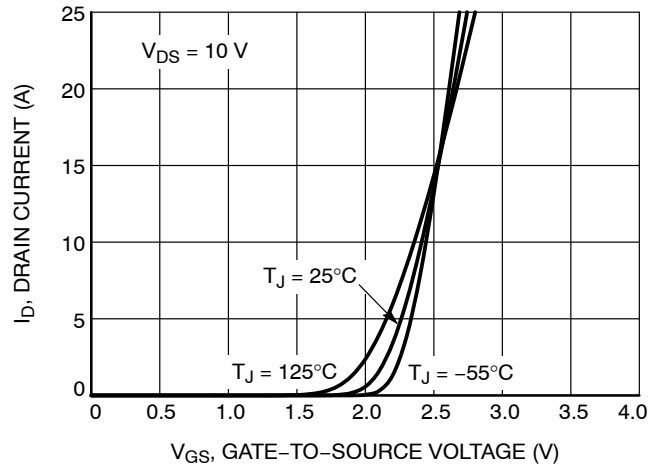

Figure 1. On−Region Characteristics

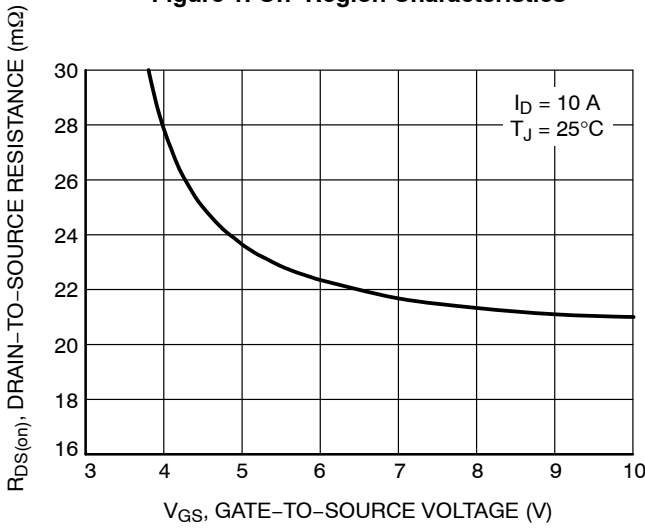Figure 2. Transfer Characteristics

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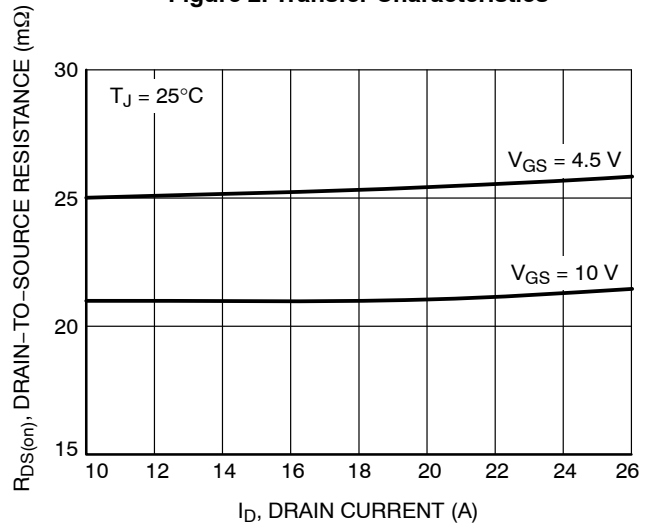

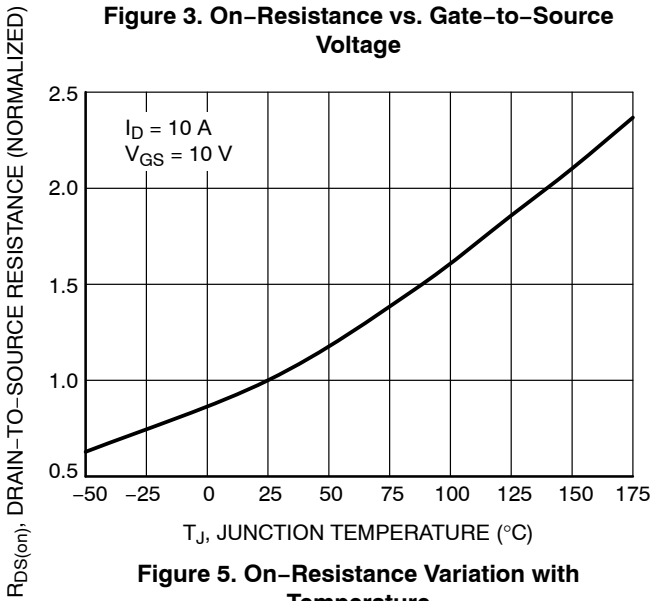
Figure 4. On−Resistance vs. Drain Current and Gate Voltage

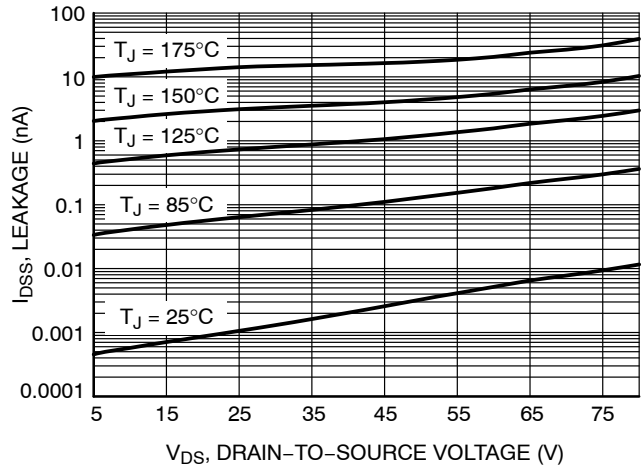Figure 5. On−Resistance Variation with Temperature

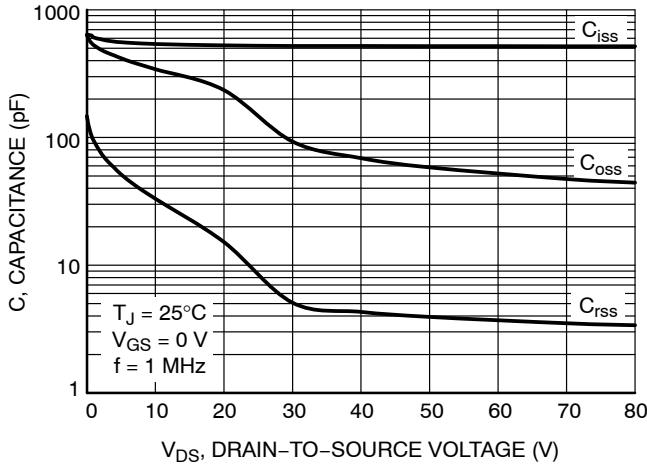Figure 6. Drain−to−Source Leakage Current vs. Voltage

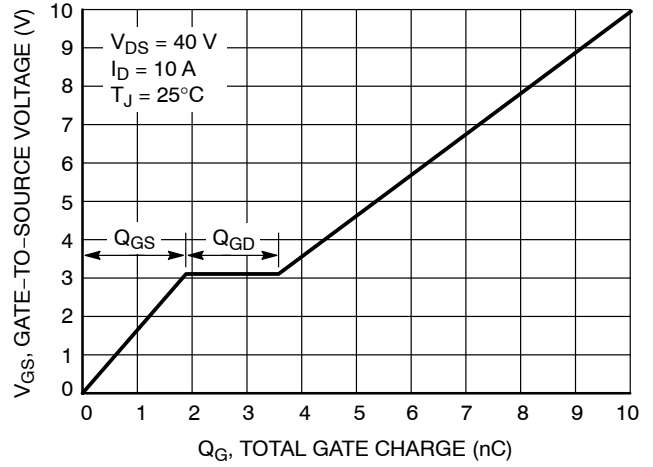## TYPICAL CHARACTERISTICS

Figure 7. Capacitance Variation
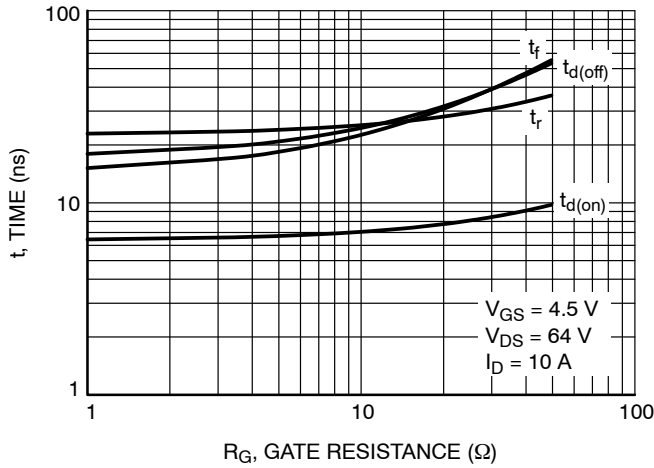
Figure 8. Gate−to−Source vs. Total Charge

Figure 9. Resistive Switching Time Variation vs. Gate Resistance
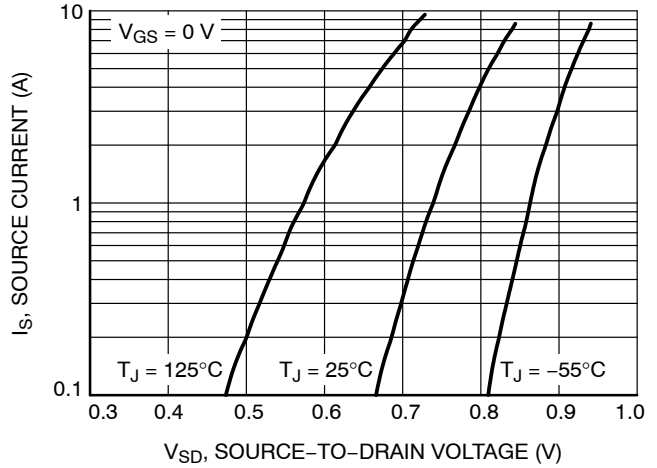
Figure 10. Diode Forward Voltage vs. Current
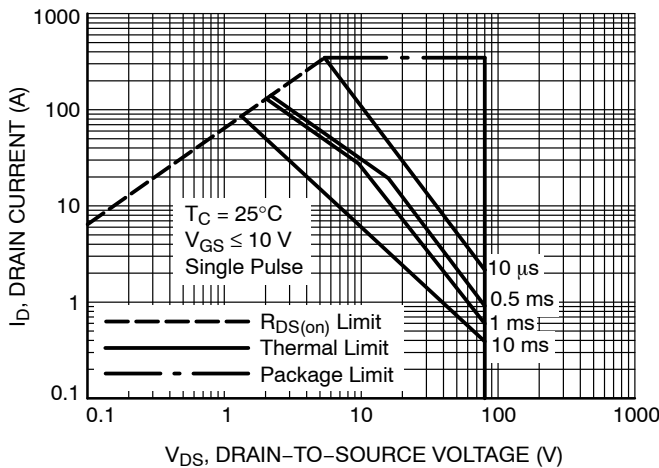
Figure 11. Maximum Rated Forward Biased Safe Operating Area
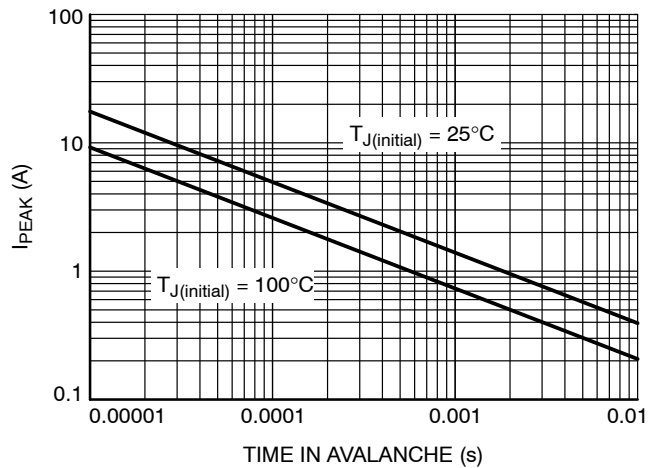
Figure 12. Maximum Drain Current vs. Time in Avalanche

TYPICAL CHARACTERISTICS

Figure 13. Thermal Response

DEVICE ORDERING INFORMATION

Device	Marking	Package	Shipping[†]
NVMFD6H852NLT1G	6H852L	DFN8 (Pb−Free)	1500 / Tape & Reel
NVMFD6H852NLWFT1G	852LWF	DFN8 (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.

DFN8 5x6, 1.27P Dual Flag (SO8FL–Dual)
CASE 506BT
ISSUE F

DATE 23 NOV 2021

SCALE 2:1

NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.30 MM FROM THE TERMINAL TIP.
4. PROFILE TOLERANCE APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.
5. DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.
6. SEATING PLANE IS DEFINED BY THE TERMINALS. A1 IS DEFINED AS THE DISTANCE FROM THE SEATING PLANE TO THE LOWEST POINT ON THE PACKAGE BODY.
7. A VISUAL INDICATOR FOR PIN 1 MUST BE LOCATED IN THIS AREA.

TOP VIEW

PIN ONE IDENTIFIER NOTE 7

SIDE VIEW

NOTE 4

DETAIL A

SEATING PLANE NOTE 6

DETAIL A

DETAIL B
ALTERNATE CONSTRUCTION

BOTTOM VIEW

DETAIL B

NOTE 3

DIM	MILLIMETERS		
	MIN	NOM	MAX
A	0.90	---	1.10
A1	---	---	0.05
b	0.33	0.42	0.51
b1	0.33	0.42	0.51
c	0.20	---	0.33
D	5.15 BSC		
D1	4.70	4.90	5.10
D2	3.90	4.10	4.30
D3	1.50	1.70	1.90
E	6.15 BSC		
E1	5.70	5.90	6.10
E2	3.90	4.15	4.40
e	1.27 BSC		
G	0.45	0.55	0.65
h	---	---	12 °
K	0.51	---	---
K1	0.56	---	---
L	0.48	0.61	0.71
M	3.25	3.50	3.75
N	1.80	2.00	2.20

GENERIC MARKING DIAGRAM*

XXXXXX
AYWZZ

XXXXXX = Specific Device Code
A   = Assembly Location
Y   = Year
W   = Work Week
ZZ   = Lot Traceability

*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.

SOLDERING FOOTPRINT*

DIMENSION: MILLIMETERS

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

DOCUMENT NUMBER:	98AON50417E	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.	
DESCRIPTION:	DFN8 5X6, 1.27P DUAL FLAG (SO8FL−DUAL)		PAGE 1 OF 1

PUBLICATION ORDERING INFORMATION

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