Power MOSFET

40 V, 85 A, Single N-Channel, DPAK

Features

- Low R_{DS(on)}
- High Current Capability
- Avalanche Energy Specified
- AEC-Q101 Qualified
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS

Applications

- DC Motor Drive
- Reverse Battery Protection
- Glow Plug

MAXIMUM RATINGS (T_J = 25°C unless otherwise noted)

Parameter			Symbol	Value	Unit
Drain-to-Source Voltage			V_{DSS}	40	V
Gate-to-Source Voltage - Continuous			V _{GS}	±20	V
Continuous Drain		T _C = 25°C	I _D	85	Α
Current (R _{θJC}) (Note 1)	Steady State	T _C = 100°C		61	
Power Dissipation (R _{θJC}) (Note 1)	Siale	T _C = 25°C	P _D	83	W
Pulsed Drain Current	t _p = 10 μs		I _{DM}	228	Α
Operating Junction and Storage Temperature			T _J , T _{stg}	-55 to 175	°C
Source Current (Body Diode)			Is	85	Α
Single Pulse Drain–to–Source Avalanche Energy (V _{DD} = 50 V, V _{GS} = 10 V, R _G = 25 Ω , I _{L(pk)} = 40 A, L = 0.3 mH)			E _{AS}	240	mJ
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)			TL	260	°C

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

THERMAL RESISTANCE MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Junction-to-Case (Drain)	$R_{\theta JC}$	1.8	°C/W
Junction-to-Ambient - Steady State (Note 1)	$R_{\theta JA}$	42	

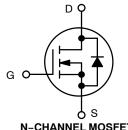
1. Surface-mounted on FR4 board using 1 in sq pad size (Cu area = 1.127 in sq [1 oz] including traces.



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V _{(BR)DSS}	R _{DS(on)} MAX	I _D MAX
40 V	5.7 m Ω @ 10 V	85 A

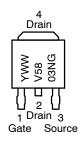


N-CHANNEL MOSFET



DPAK CASE 369AA (Surface Mount) STYLE 2

MARKING DIAGRAM **& PIN ASSIGNMENT**



= Year WW = Work Week 5803N = Device Code = Pb-Free Package

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 2 of this data sheet.

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise noted)

Parameter	Symbol	Test Condition		Min	Тур	Max	Unit
OFF CHARACTERISTICS			•		-	-	-
Drain-to-Source Breakdown Voltage	V _{(BR)DSS}	$V_{GS} = 0 \text{ V}, I_D = 250 \mu\text{A}$		40			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	V _{(BR)DSS} /T _J				40		mV/°C
Zero Gate Voltage Drain Current	I _{DSS}	V _{GS} = 0 V,	$T_J = 25^{\circ}C$			1.0	μΑ
		$V_{DS} = 40 \text{ V}$	T _J = 150°C			100	1
Gate-to-Source Leakage Current	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±20 V				±100	nA
ON CHARACTERISTICS (Note 2)							
Gate Threshold Voltage	V _{GS(TH)}	$V_{GS} = V_{DS}, I_D$	= 250 μΑ	1.5		3.5	V
Negative Threshold Temperature Coefficient	V _{GS(TH)} /T _J				-7.4		mV/°C
Drain-to-Source On Resistance	R _{DS(on)}	V _{GS} = 10 V, I _E	₎ = 50 A		4.9	5.7	mΩ
		V _{GS} = 5.0 V, I _D = 30 A			6.7		
Forward Transconductance	9FS	V _{DS} = 15 V, I _D = 15 A			13.6		S
CHARGES, CAPACITANCES AND GAT	TE RESISTANCE	S	•		•	•	
Input Capacitance	C _{iss}				3220		pF
Output Capacitance	C _{oss}	$V_{GS} = 0 \text{ V, } f = 1.0 \text{ MHz,}$ $V_{DS} = 25 \text{ V}$			390		1
Reverse Transfer Capacitance	C _{rss}				270		
Total Gate Charge	Q _{G(TOT)}	V_{GS} = 10 V, V_{DS} = 20 V, I_{D} = 50 A			51		nC
Threshold Gate Charge	Q _{G(TH)}				3.8		
Gate-to-Source Charge	Q_{GS}				12.7		
Gate-to-Drain Charge	Q_{GD}				12.7		
SWITCHING CHARACTERISTICS (Not	e 3)		•				•
Turn-On Delay Time	t _{d(on)}				12.6		ns
Rise Time	t _r	$V_{GS} = 10 \text{ V}, V_{D}$	n = 32 V.		21.4		
Turn-Off Delay Time	t _{d(off)}	$I_D = 50 \text{ A}, R_G$	= 2.0 Ω		28.3		
Fall Time	t _f				6.6		1
DRAIN-SOURCE DIODE CHARACTEF	RISTICS		•		•	•	•
Forward Diode Voltage	V_{SD}	V _{GS} = 0 V,	$T_J = 25^{\circ}C$		0.88	1.2	V
		I _S = 30 A	T _J = 150°C		0.73		1
Reverse Recovery Time	t _{RR}	V _{GS} = 0 V, dls/dt = 100 A/μs, I _S = 30 A			27.2		ns
Charge Time	ta				14	1	
Discharge Time	tb				13.2	1	
Reverse Recovery Charge	Q _{RR}				17		nC

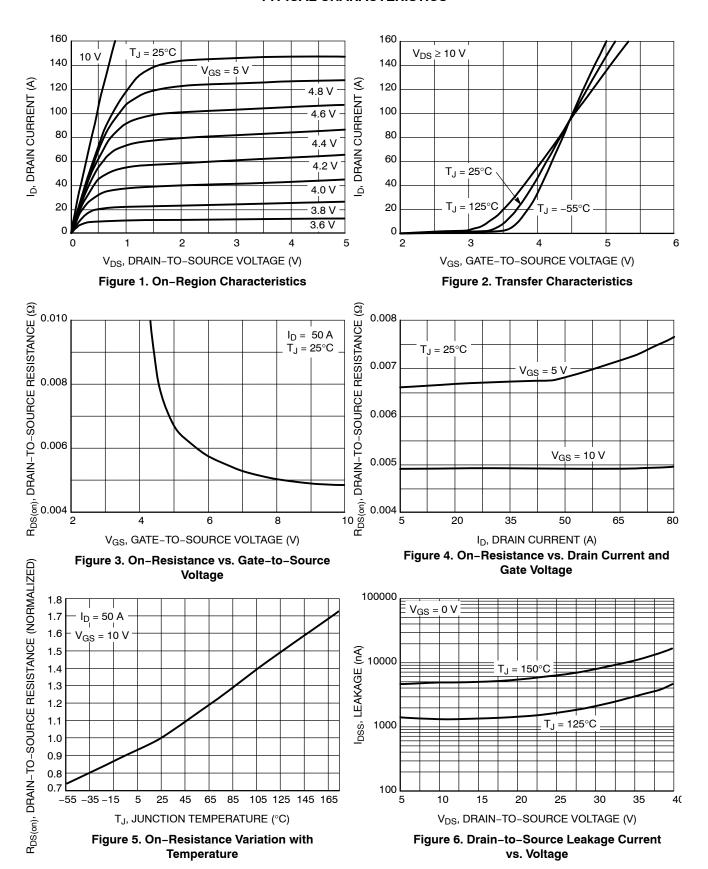
ORDERING INFORMATION

Order Number	Package	Shipping [†]
NVD5803NT4G	DPAK (Pb-Free)	2500 / 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.

Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.
 Switching characteristics are independent of operating junction temperatures.

TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS

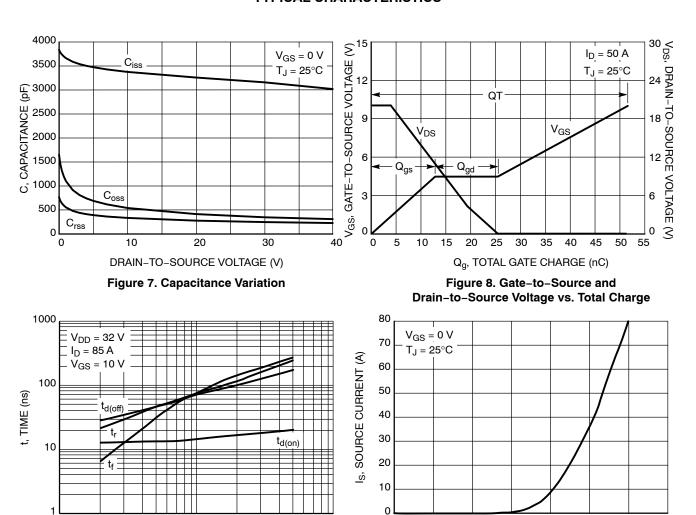


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

 R_G , GATE RESISTANCE (Ω)

10

V_{SD}, SOURCE-TO-DRAIN VOLTAGE (V)

Figure 10. Diode Forward Voltage vs. Current

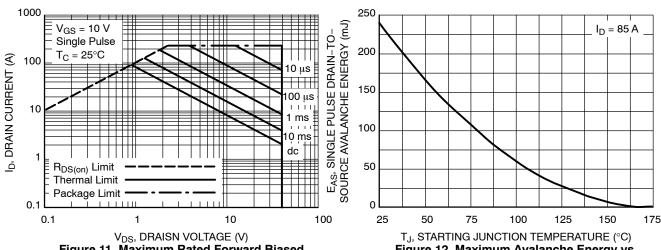
8.0

0.9

1.0

1.1

0.7



100

0.4

0.5

0.6

Figure 11. Maximum Rated Forward Biased Safe Operating Area

Figure 12. Maximum Avalanche Energy vs. **Starting Junction Temperature**

TYPICAL CHARACTERISTICS

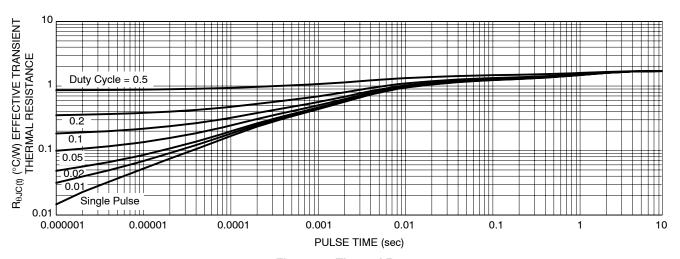
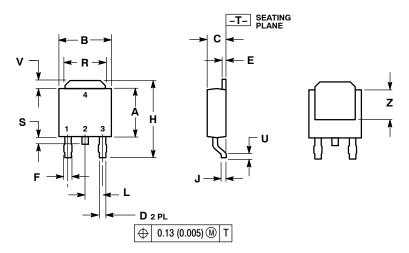


Figure 13. Thermal Response

PACKAGE DIMENSIONS

DPAK (SINGLE GUAGE)

CASE 369AA-01 **ISSUE A**



NOTES

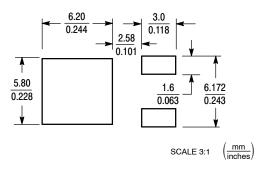
- 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982. 2. CONTROLLING DIMENSION: INCH.

	INCHES		MILLIN	IETERS		
DIM	MIN	MAX	MIN	MAX		
Α	0.235	0.245	5.97	6.22		
В	0.250	0.265	6.35	6.73		
С	0.086	0.094	2.19	2.38		
D	0.025	0.035	0.63	0.89		
Е	0.018	0.024	0.46	0.61		
F	0.030	0.045	0.77	1.14		
Н	0.386	0.410	9.80	10.40		
J	0.018	0.023	0.46	0.58		
L	0.090 BSC		2.29	BSC		
R	0.180	0.215	4.57	5.45		
S	0.024	0.040	0.60	1.01		
U	0.020		0.51			
٧	0.035	0.050	0.89	1.27		
Z	0.155		3.93			

STYLE 2: PIN 1. GATE

- 2. DRAIN
- 3. SOURCE
- DRAIN

SOLDERING FOOTPRINT*



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

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