

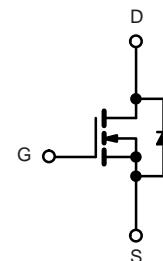
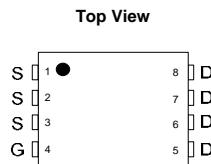
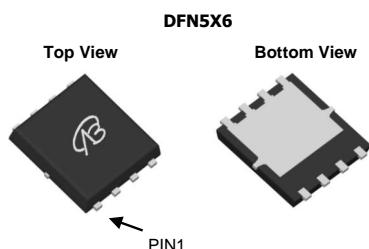
# NVMFS5C404NT1G-VB Datasheet

## N-Channel 40V (D-S) MOSFET

PRODUCT SUMMARY		
$V_{DS}$ (V)	$R_{DS(on)}$ ( $\Omega$ )	$I_D$ (A) <sup>a</sup>
40	0.0008 at $V_{GS} = 10$ V	250
	0.0009 at $V_{GS} = 7.5$ V	235

### FEATURES

- 175 °C Junction Temperature
- SGT technology Power MOSFET
- Material categorization:



N-Channel MOSFET

### ABSOLUTE MAXIMUM RATINGS ( $T_C = 25$ °C, unless otherwise noted)

Parameter	Symbol	Limit	Unit
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current ( $T_J = 175$ °C) <sup>b</sup>	$I_D$	250	A
		150 <sup>a</sup>	
Pulsed Drain Current	$I_{DM}$	750	
Continuous Source Current (Diode Conduction)	$I_S$	250 <sup>a</sup>	
Avalanche Current	$I_{AS}$	125	
Single Avalanche Energy (Duty Cycle $\leq 1$ %)	$E_{AS}$	134	mJ
Maximum Power Dissipation	$P_D$	136	W
		3 <sup>b</sup> , 8.3 <sup>b, c</sup>	
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	- 55 to 175	°C

### THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>a</sup>	$R_{thJA}$	15	18	°C/W
		40	50	
Maximum Junction-to-Case	$R_{thJC}$	0.85	1.1	

Notes:

- a. Package limited.
- b. Surface mounted on 1" x 1" FR4 board.
- c.  $t \leq 10$  s.

**SPECIFICATIONS** ( $T_J = 25^\circ\text{C}$ , unless otherwise noted)

Parameter	Symbol	Test Conditions	Min.	Typ. <sup>a</sup>	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0 \text{ V}$ , $I_D = 250 \mu\text{A}$	40			V
Gate Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}$ , $I_D = 250 \mu\text{A}$		2.5		
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0 \text{ V}$ , $V_{GS} = \pm 20 \text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 30 \text{ V}$ , $V_{GS} = 0 \text{ V}$		1		
		$V_{DS} = 30 \text{ V}$ , $V_{GS} = 0 \text{ V}$ , $T_J = 125^\circ\text{C}$		50		$\mu\text{A}$
		$V_{DS} = 30 \text{ V}$ , $V_{GS} = 0 \text{ V}$ , $T_J = 175^\circ\text{C}$		250		
On-State Drain Current <sup>b</sup>	$I_{D(\text{on})}$	$V_{DS} = 5 \text{ V}$ , $V_{GS} = 10 \text{ V}$	60			A
Drain-Source On-State Resistance <sup>b</sup>	$R_{DS(\text{on})}$	$V_{GS} = 10 \text{ V}$ , $I_D = 40 \text{ A}$		0.0008		
		$V_{GS} = 10 \text{ V}$ , $I_D = 30 \text{ A}$ , $T_J = 125^\circ\text{C}$		0.0012		$\Omega$
		$V_{GS} = 10 \text{ V}$ , $I_D = 30 \text{ A}$ , $T_J = 175^\circ\text{C}$		0.0020		
		$V_{GS} = 7.5 \text{ V}$ , $I_D = 30 \text{ A}$		0.0009		
Forward Transconductance <sup>b</sup>	$g_{fs}$	$V_{DS} = 15 \text{ V}$ , $I_D = 20 \text{ A}$		60		S
<b>Dynamic</b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0 \text{ V}$ , $V_{DS} = 40 \text{ V}$ , $f = 1 \text{ MHz}$		8800		
Output Capacitance	$C_{oss}$			470		
Reverse Transfer Capacitance	$C_{rss}$			225		pF
Total Gate Charge <sup>c</sup>	$Q_g$	$V_{DS} = 40 \text{ V}$ , $V_{GS} = 10 \text{ V}$ , $I_D = 50 \text{ A}$		96	70	
Gate-Source Charge <sup>c</sup>	$Q_{gs}$			17		nC
Gate-Drain Charge <sup>c</sup>	$Q_{gd}$			15		
Turn-On Delay Time <sup>c</sup>	$t_{d(\text{on})}$	$V_{DD} = 40 \text{ V}$ , $R_L = 0.6 \Omega$ $I_D \geq 50 \text{ A}$ , $V_{GEN} = 10 \text{ V}$ , $R_g = 2.5 \Omega$		20	23	
Rise Time <sup>c</sup>	$t_r$			15	25	
Turn-Off Delay Time <sup>c</sup>	$t_{d(\text{off})}$			35	50	ns
Fall Time <sup>c</sup>	$t_f$			20	30	
<b>Source-Drain Diode Ratings and Characteristics</b> ( $T_C = 25^\circ\text{C}$ )						
Pulsed Current	$I_{SM}$				750	A
Diode Forward Voltage	$V_{SD}$	$I_F = 20 \text{ A}$ , $V_{GS} = 0 \text{ V}$		1	1.5	V
Reverse Recovery Time	$t_{rr}$	$I_F = 20 \text{ A}$ , $di/dt = 100 \text{ A}/\mu\text{s}$		4	135	ns

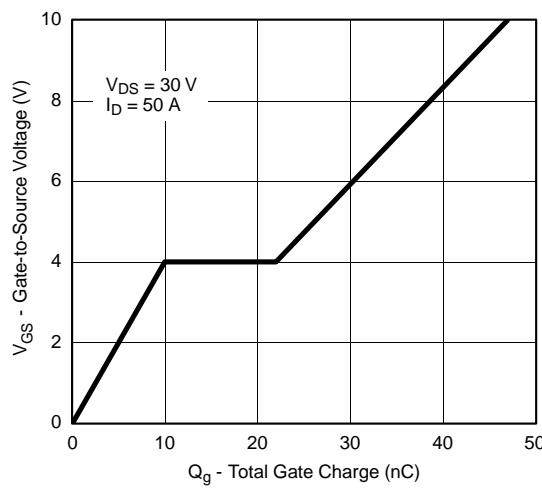
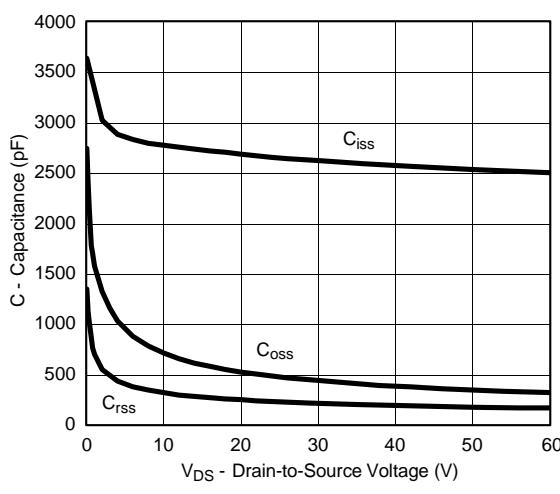
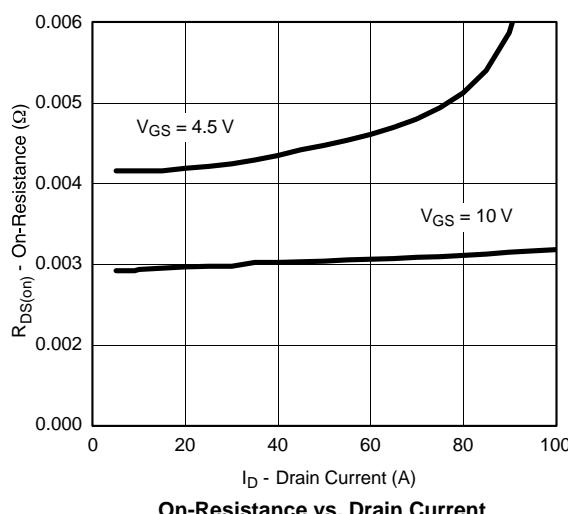
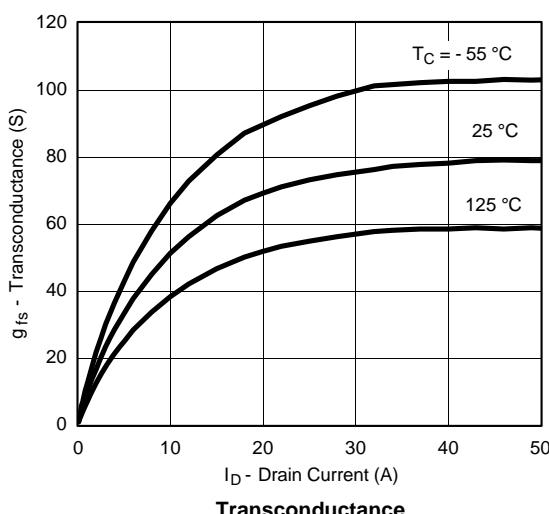
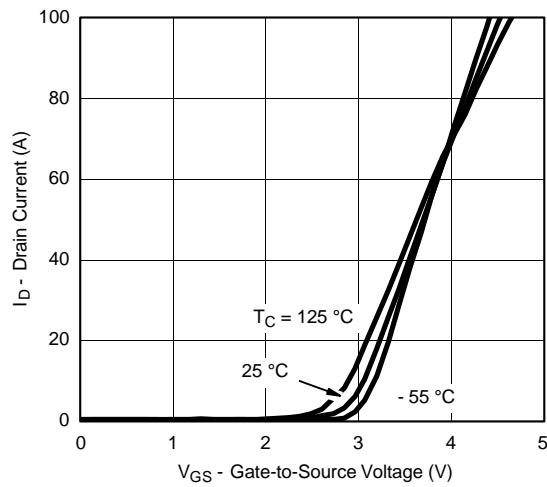
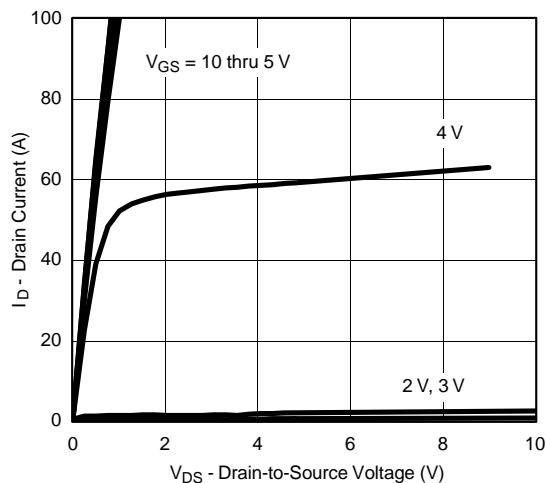
Notes:

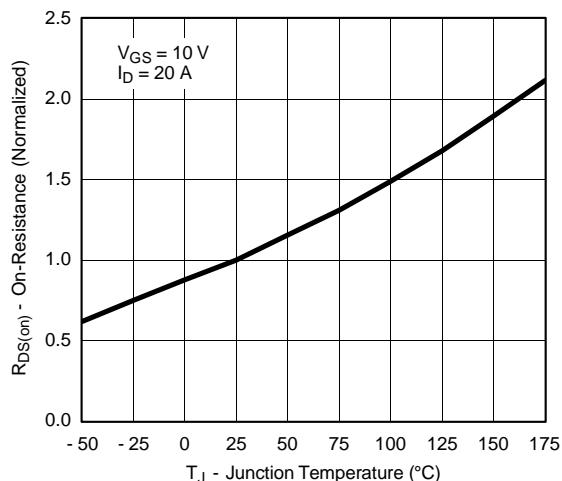
a. For design aid only; not subject to production testing.

b. Pulse test; pulse width  $\leq 300 \mu\text{s}$ , duty cycle  $\leq 2\%$ .

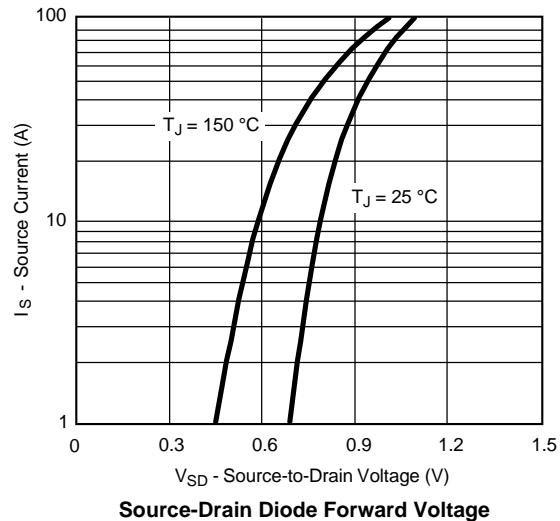
c. Independent of operating temperature.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

**TYPICAL CHARACTERISTICS** (25 °C unless noted)


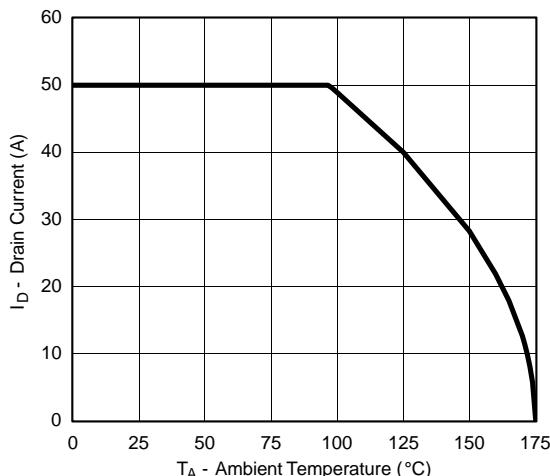
**TYPICAL CHARACTERISTICS** (25 °C unless noted)

On-Resistance vs. Junction Temperature

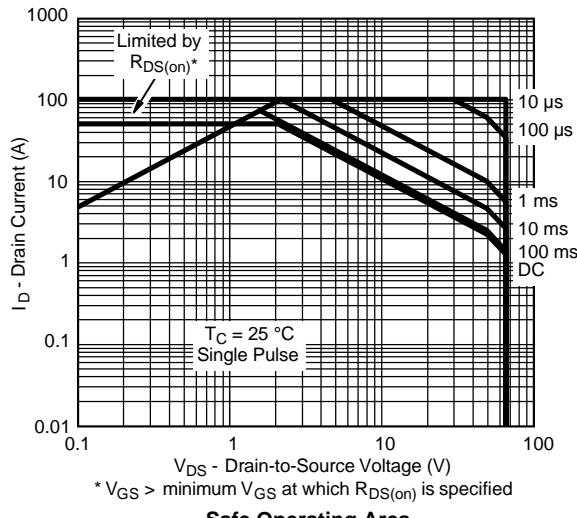


Source-Drain Diode Forward Voltage

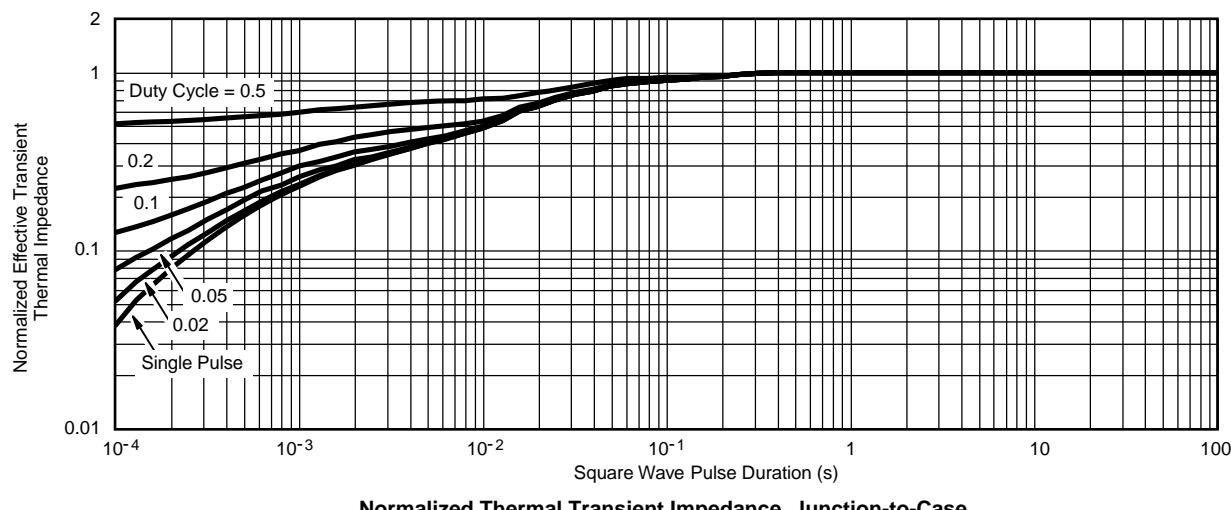
## THERMAL RATINGS



Maximum Drain Current vs. Ambient Temperature

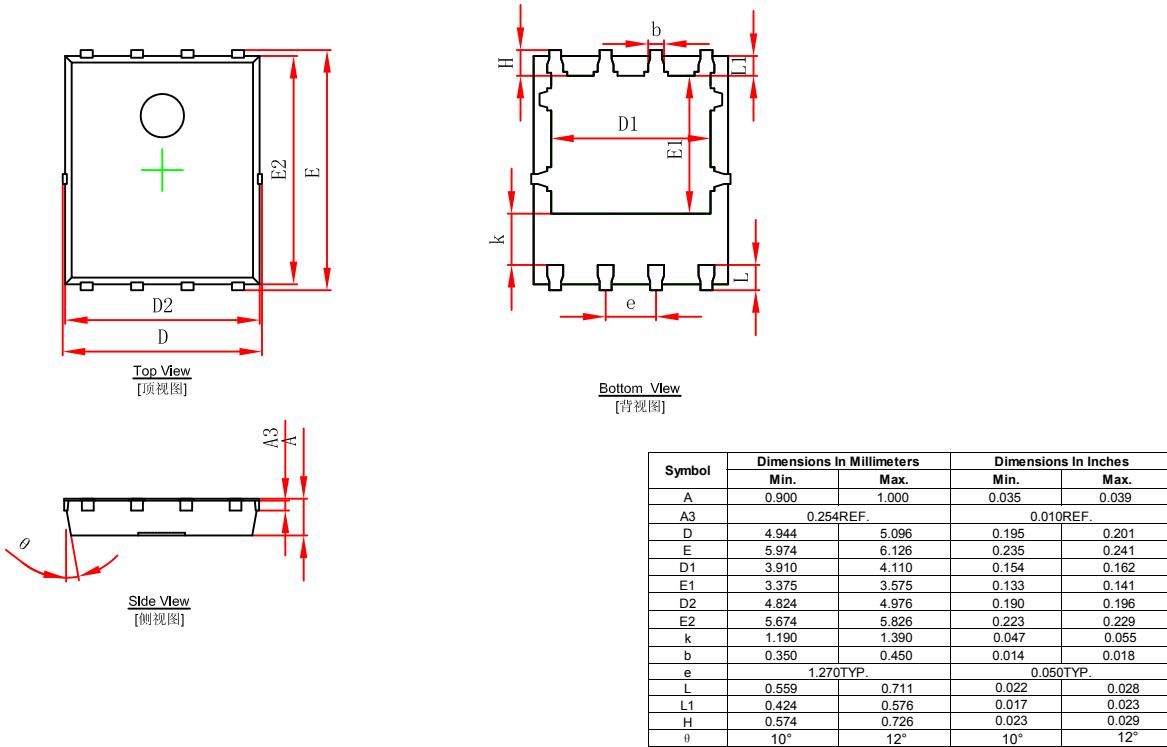


Safe Operating Area

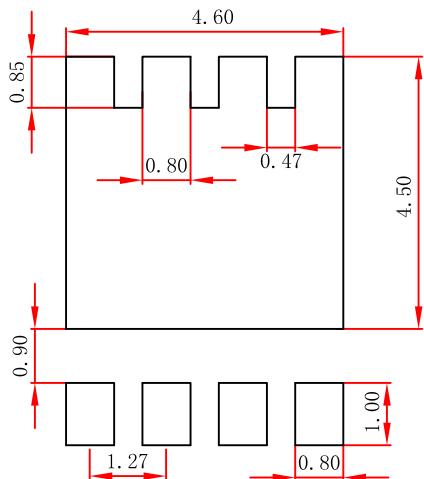


Normalized Thermal Transient Impedance, Junction-to-Case

### PDFNWB5x6-8L Package Outline Dimensions



### PDFNWB5x6-8L Suggested Pad Layout



#### Note:

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.05$  mm.
3. The pad layout is for reference purposes only.

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