

NTMFS5C410NLTWFT1G-VB Datasheet

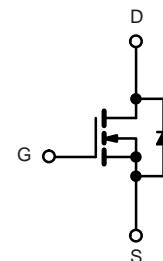
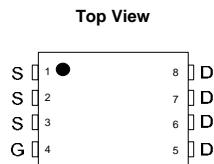
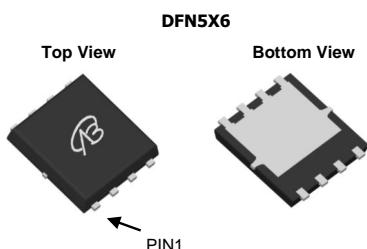
N-Channel 40V (D-S) MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A) ^a
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}	± 20	V
Continuous Drain Current ($T_J = 175$ °C) ^b	I_D	250	A
		150 ^a	
Pulsed Drain Current	I_{DM}	750	
Continuous Source Current (Diode Conduction)	I_S	250 ^a	
Avalanche Current	I_{AS}	125	
Single Avalanche Energy (Duty Cycle ≤ 1 %)	E_{AS}	134	mJ
Maximum Power Dissipation	P_D	136	W
		3 ^b , 8.3 ^{b, c}	
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 ^a	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. ^a	Max.	Unit
Static						
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}	$V_{DS} = 0 \text{ V}$, $V_{GS} = \pm 20 \text{ V}$			± 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		μA
		$V_{DS} = 30 \text{ V}$, $V_{GS} = 0 \text{ V}$, $T_J = 175^\circ\text{C}$		250		
On-State Drain Current ^b	$I_{D(\text{on})}$	$V_{DS} = 5 \text{ V}$, $V_{GS} = 10 \text{ V}$	60			A
Drain-Source On-State Resistance ^b	$R_{DS(\text{on})}$	$V_{GS} = 10 \text{ V}$, $I_D = 40 \text{ A}$		0.0008		
		$V_{GS} = 10 \text{ V}$, $I_D = 30 \text{ A}$, $T_J = 125^\circ\text{C}$		0.0012		Ω
		$V_{GS} = 10 \text{ V}$, $I_D = 30 \text{ A}$, $T_J = 175^\circ\text{C}$		0.0020		
		$V_{GS} = 7.5 \text{ V}$, $I_D = 30 \text{ A}$		0.0009		
Forward Transconductance ^b	g_{fs}	$V_{DS} = 15 \text{ V}$, $I_D = 20 \text{ A}$		60		S
Dynamic						
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 ^c	Q_g	$V_{DS} = 40 \text{ V}$, $V_{GS} = 10 \text{ V}$, $I_D = 50 \text{ A}$		96	70	
Gate-Source Charge ^c	Q_{gs}			17		nC
Gate-Drain Charge ^c	Q_{gd}			15		
Turn-On Delay Time ^c	$t_{d(\text{on})}$	$V_{DD} = 40 \text{ V}$, $R_L = 0.6 \Omega$ $I_D \geq 50 \text{ A}$, $V_{GEN} = 10 \text{ V}$, $R_g = 2.5 \Omega$		20	23	
Rise Time ^c	t_r			15	25	
Turn-Off Delay Time ^c	$t_{d(\text{off})}$			35	50	
Fall Time ^c	t_f			20	30	ns
Source-Drain Diode Ratings and Characteristics ($T_C = 25^\circ\text{C}$)						
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

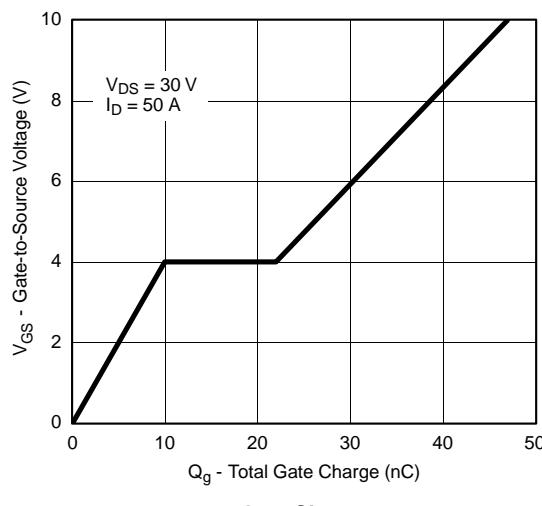
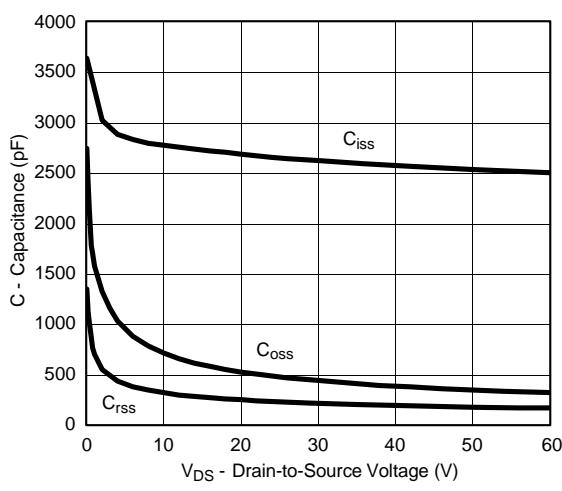
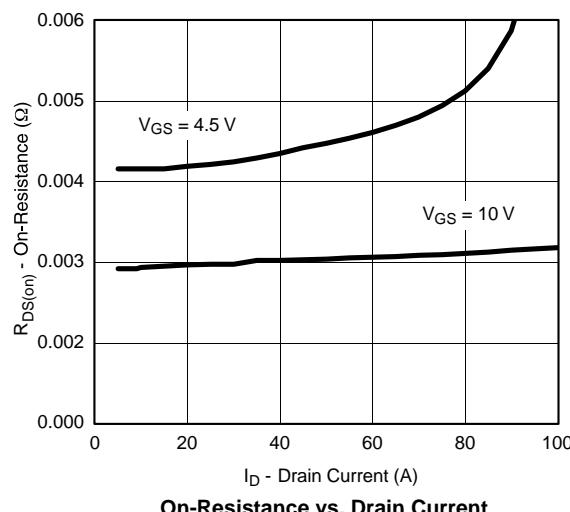
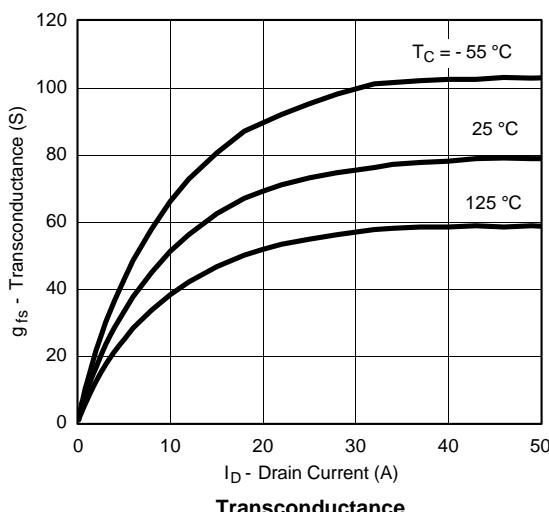
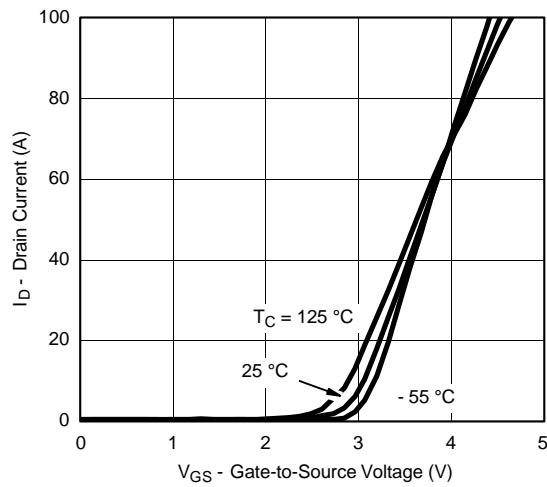
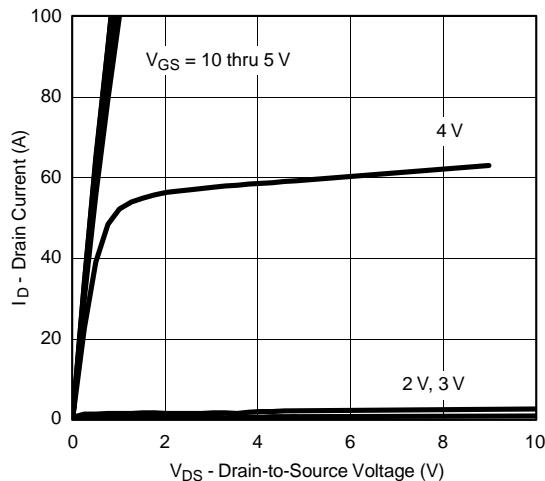
Notes:

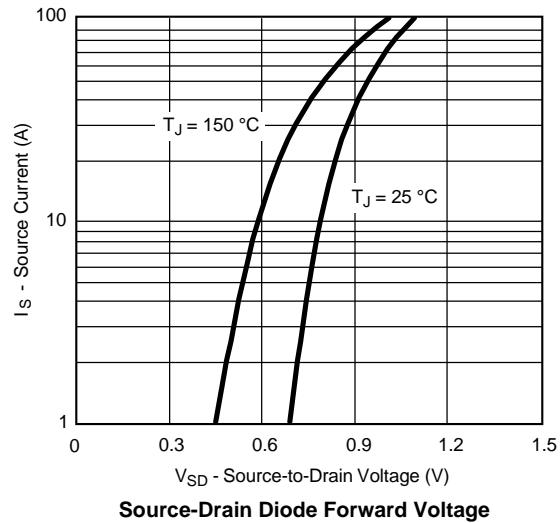
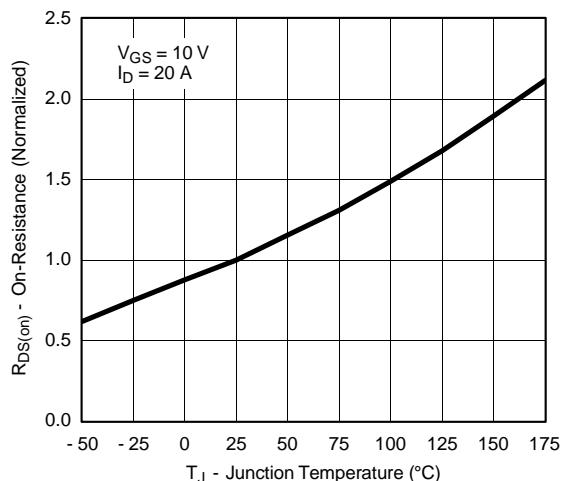
a. For design aid only; not subject to production testing.

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

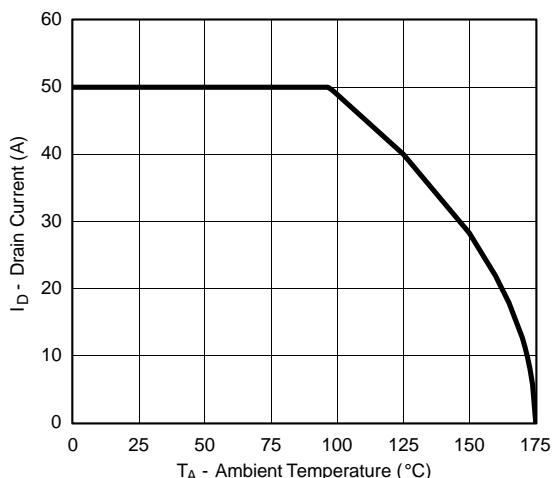
c. Independent of operating temperature.

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.

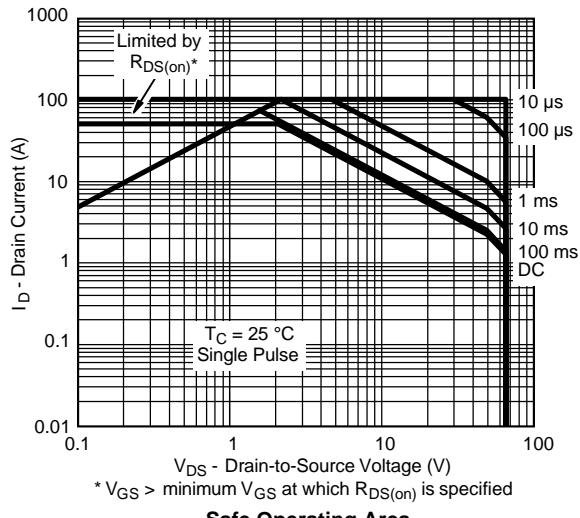
TYPICAL CHARACTERISTICS (25 °C unless noted)


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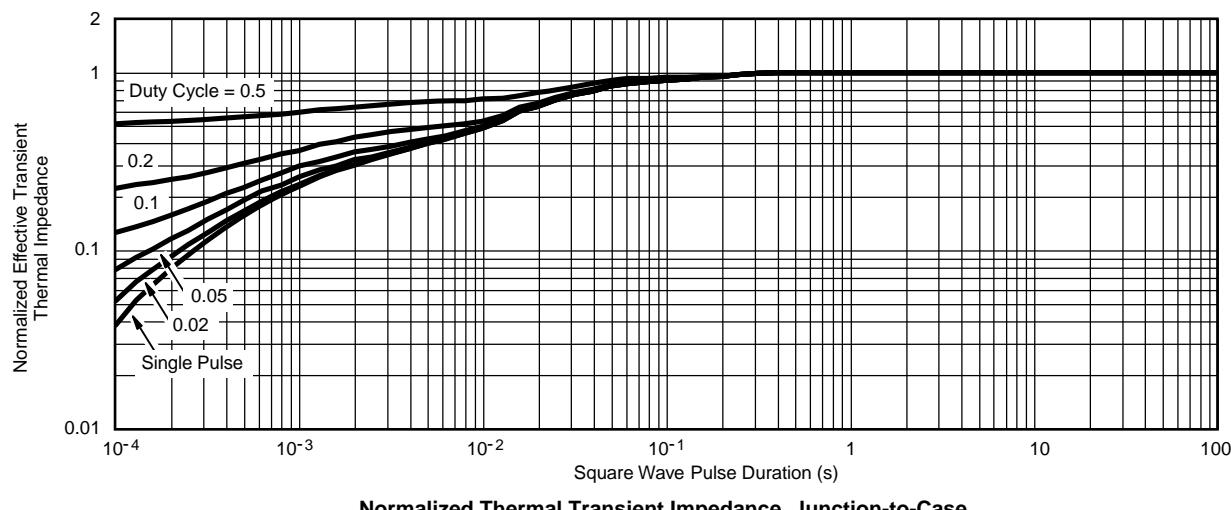
THERMAL RATINGS



Maximum Drain Current vs. Ambient Temperature

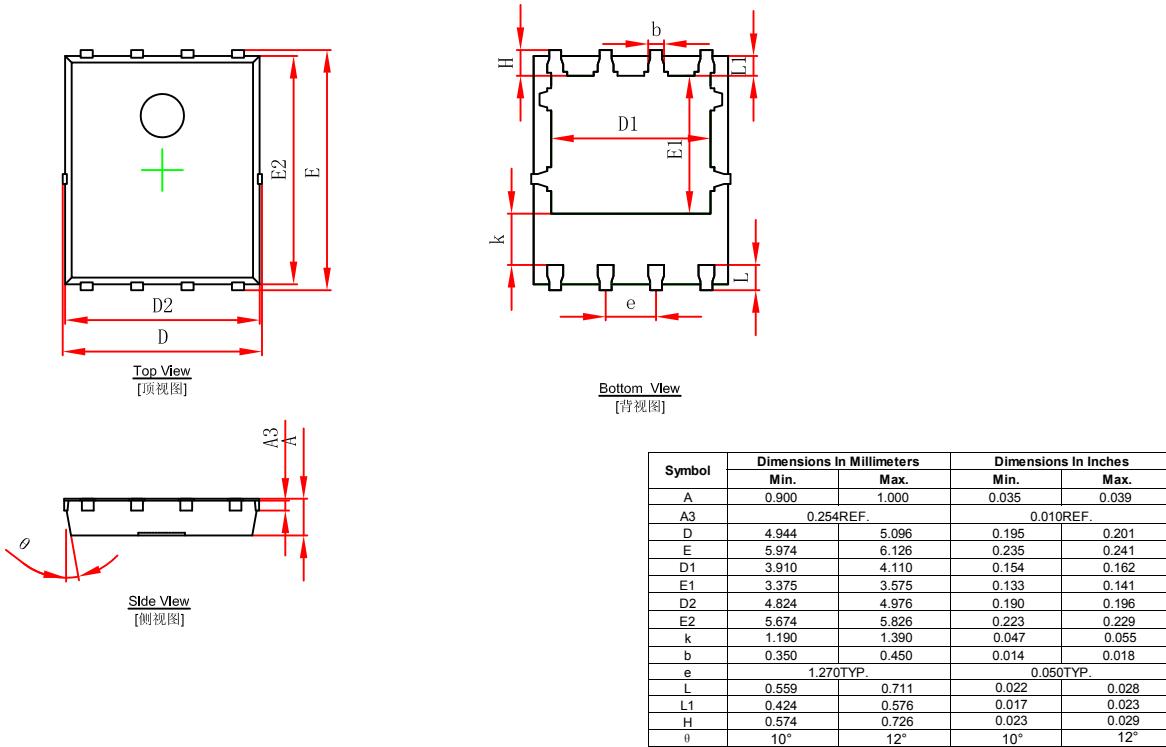


Safe Operating Area

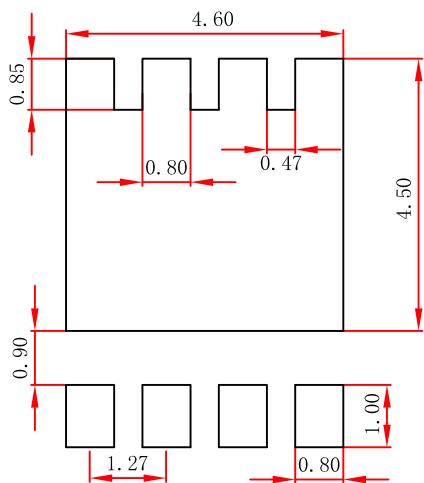


Normalized Thermal Transient Impedance, Junction-to-Case

PDFNWB5x6-8L Package Outline Dimensions



PDFNWB5x6-8L Suggested Pad Layout



Note:

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

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