

NVMFS5113PLT1G-VB Datasheet
P-Channel 60 V (D-S) 175 °C MOSFET

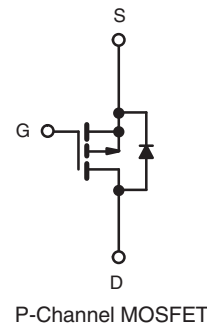
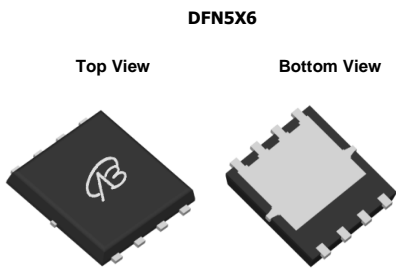
PRODUCT SUMMARY	
V _{DS} (V)	-60
R _{DS(on)} (Ω) at V _{GS} = -10 V	0.011
R _{DS(on)} (Ω) at V _{GS} = -4.5 V	0.014
I _D (A)	-60
Configuration	Single
Package	DFN 5X6

FEATURES

- TrenchFET® power MOSFET
- 100 % R_g and UIS tested



RoHS
COMPLIANT
HALOGEN
FREE



ABSOLUTE MAXIMUM RATINGS (T _C = 25 °C, unless otherwise noted)				
PARAMETER		SYMBOL	LIMIT	UNIT
Drain-Source Voltage		V _{DS}	-60	V
Gate-Source Voltage		V _{GS}	± 30	
Continuous Drain Current	T _C = 25 °C	I _D	-60	A
	T _C = 125 °C		-36	
Continuous Source Current (Diode Conduction) ^a		I _S	-180	
Pulsed Drain Current ^b		I _{DM}	-100	
Single Pulse Avalanche Current	L = 0.1 mH	I _{AS}	-36	
Single Pulse Avalanche Energy		E _{AS}	64.8	
Maximum Power Dissipation ^b	T _C = 25 °C	P _D	68	W
	T _C = 125 °C		22	
Operating Junction and Storage Temperature Range		T _J , T _{stg}	-55 to +175	°C
Soldering Recommendations (Peak Temperature) ^{d, e}			260	

THERMAL RESISTANCE RATINGS				
PARAMETER		SYMBOL	LIMIT	UNIT
Junction-to-Ambient	PCB Mount ^c	R _{thJA}	68	°C/W
Junction-to-Case (Drain)		R _{thJC}	2.2	

Notes

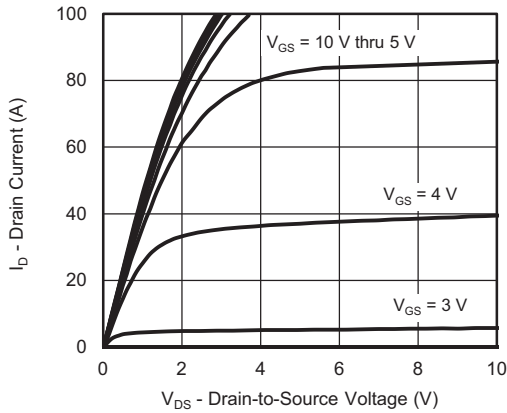
- Package limited.
- Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %.
- When mounted on 1" square PCB (FR4 material).

SPECIFICATIONS ($T_C = 25\text{ }^\circ\text{C}$, unless otherwise noted)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Static							
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0, I_D = -250\text{ }\mu\text{A}$		-60	-	-	V
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$		-1.5	-	-3.5	
Gate-Source Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 30\text{ V}$		-	-	± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS} = 0\text{ V}$	$V_{DS} = -60\text{ V}$	-	-	-1	μA
		$V_{GS} = 0\text{ V}$	$V_{DS} = -48\text{ V}, T_J = 125\text{ }^\circ\text{C}$	-	-	-50	
		$V_{GS} = 0\text{ V}$	$V_{DS} = -48\text{ V}, T_J = 175\text{ }^\circ\text{C}$	-	-	-150	
On-State Drain Current ^a	$I_{D(on)}$	$V_{GS} = -10\text{ V}$	$V_{DS} \geq -5\text{ V}$	-30	-	-	A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = -10\text{ V}$	$I_D = -10\text{ A}$	-	0.011	-	Ω
		$V_{GS} = -10\text{ V}$	$I_D = -10\text{ A}, T_J = 125\text{ }^\circ\text{C}$	-	0.024	-	
		$V_{GS} = -10\text{ V}$	$I_D = -10\text{ A}, T_J = 175\text{ }^\circ\text{C}$	-	0.036	-	
		$V_{GS} = -4.5\text{ V}$	$I_D = -5\text{ A}$	-	0.014	-	
Forward Transconductance ^b	g_{fs}	$V_{DS} = -15\text{ V}, I_D = -10\text{ A}$		-	26	-	S
Dynamic ^b							
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}$	$V_{DS} = -25\text{ V}, f = 1\text{ MHz}$	-	4000	-	μF
Output Capacitance	C_{oss}			-	310	450	
Reverse Transfer Capacitance	C_{rss}			-	200	275	
Total Gate Charge ^c	Q_g	$V_{GS} = -10\text{ V}$	$V_{DS} = -30\text{ V}, I_D = -5\text{ A}$	-	6.0	100	nC
Gate-Source Charge ^c	Q_{gs}			-	9.5	-	
Gate-Drain Charge ^c	Q_{gd}			-	19	-	
Gate Resistance	R_g	f = 1 MHz		0.50	1.19	1.80	Ω
Turn-On Delay Time ^c	$t_{d(on)}$	$V_{DD} = -30\text{ V}, R_L = 6\text{ }\Omega$ $I_D \cong -5\text{ A}, V_{GEN} = -10\text{ V}, R_g = 1\text{ }\Omega$		-	15	25	ns
Rise Time ^c	t_r			-	5	10	
Turn-Off Delay Time ^c	$t_{d(off)}$			-	40	75	
Fall Time ^c	t_f			-	6	12	
Source-Drain Diode Ratings and Characteristics ^b							
Pulsed Current ^a	I_{SM}			-	-	-180	A
Forward Voltage	V_{SD}	$I_F = -10\text{ A}, V_{GS} = 0\text{ V}$		-	-0.80	-1.2	V

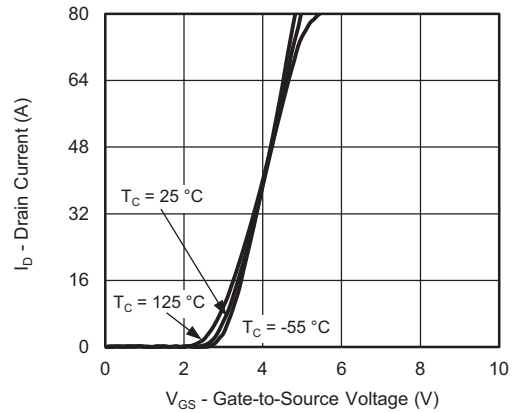
Notes

- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
- b. Guaranteed by design, not subject to production testing.
- c. Independent of operating temperature.

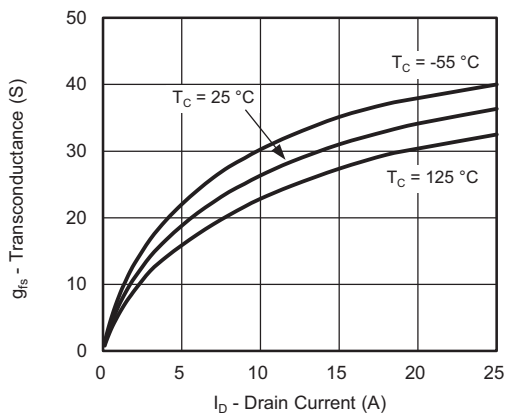
TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)



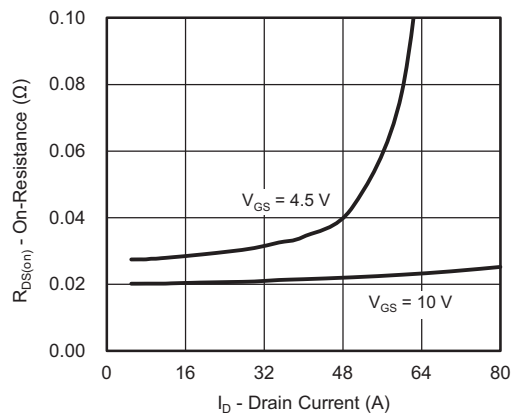
Output Characteristics



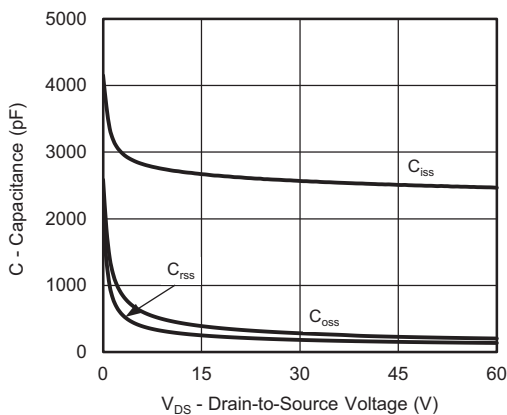
Transfer Characteristics



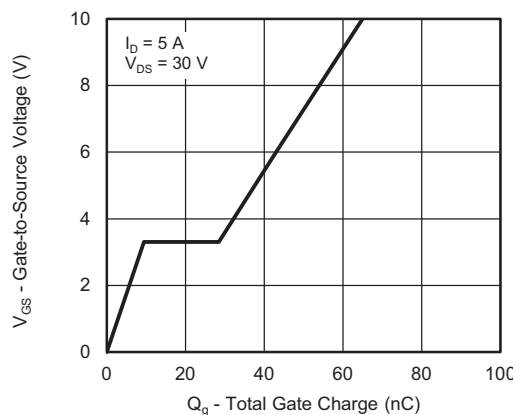
Transconductance



On-Resistance vs. Drain Current

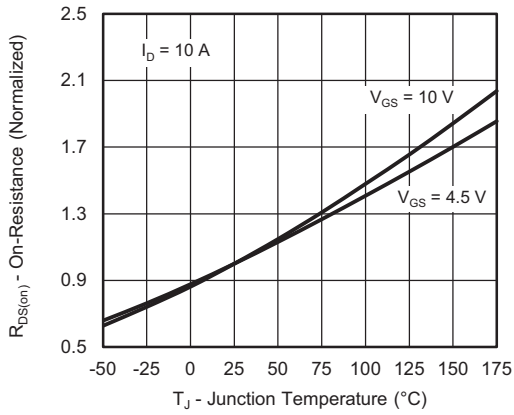


Capacitance

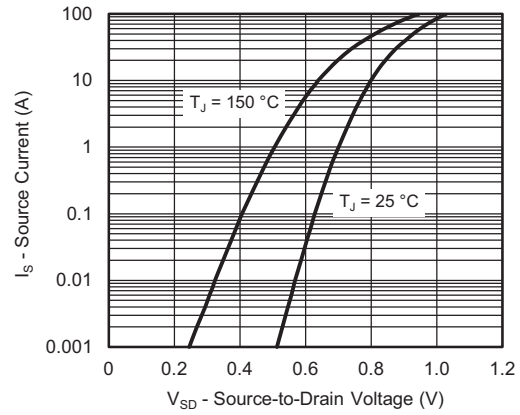


Gate Charge

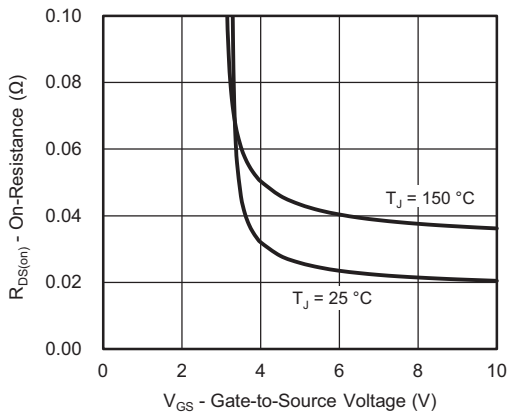
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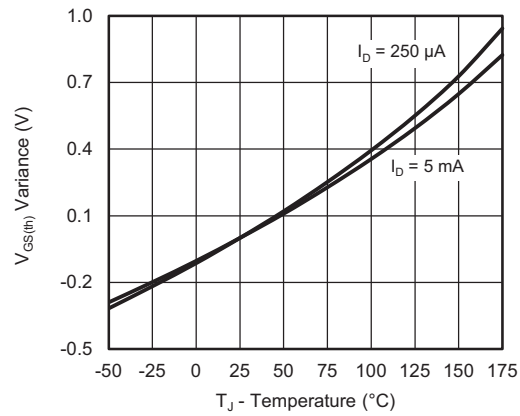
On-Resistance vs. Junction Temperature



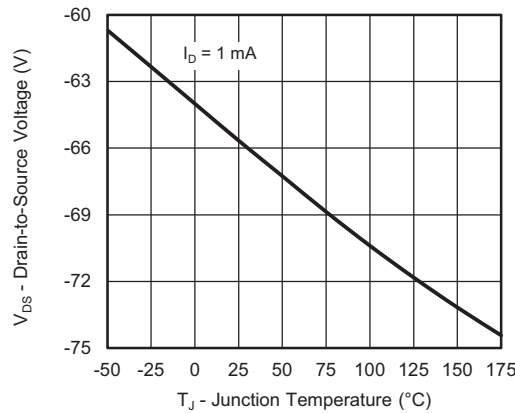
Source Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage

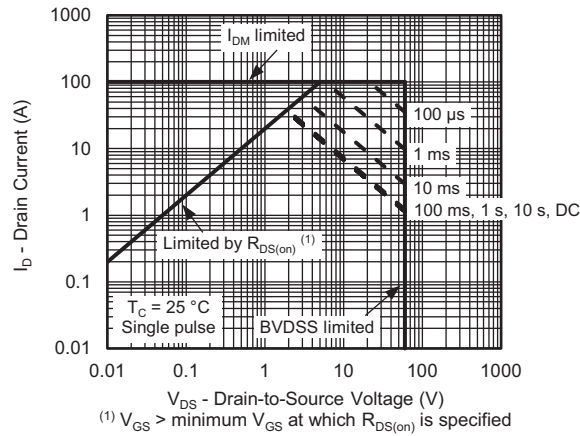


Threshold Voltage

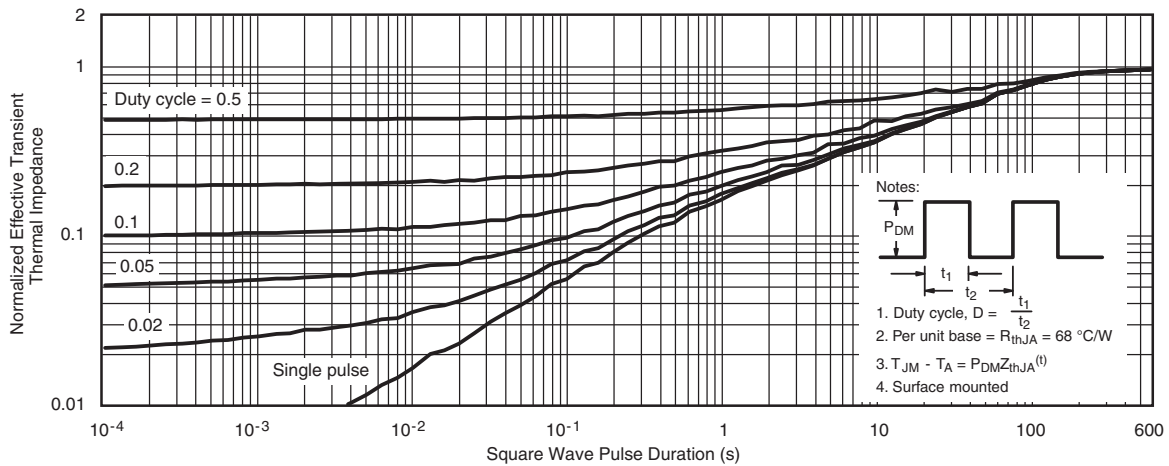


Drain-Source Breakdown vs. Junction Temperature

THERMAL RATINGS ($T_C = 25\text{ }^\circ\text{C}$, unless otherwise noted)

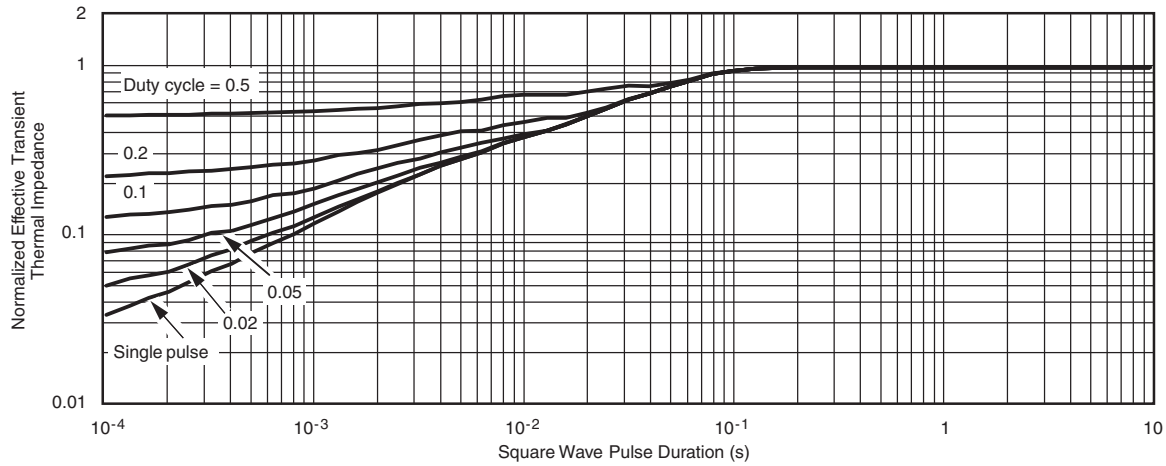


Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient

THERMAL RATINGS ($T_C = 25\text{ }^\circ\text{C}$, unless otherwise noted)

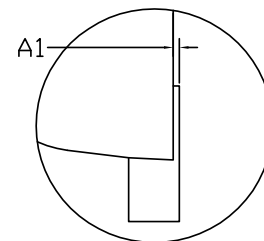
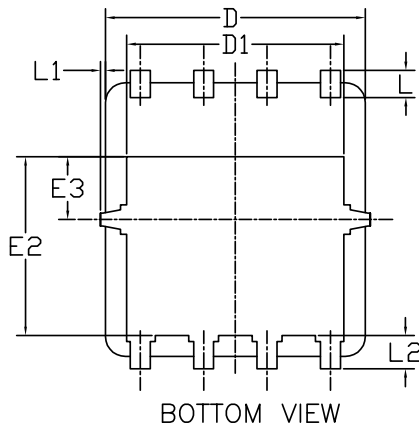
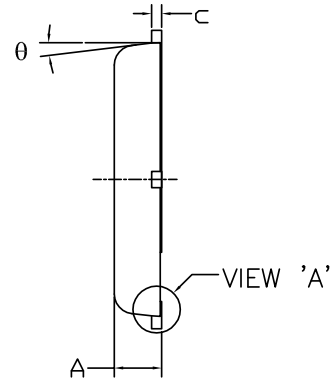
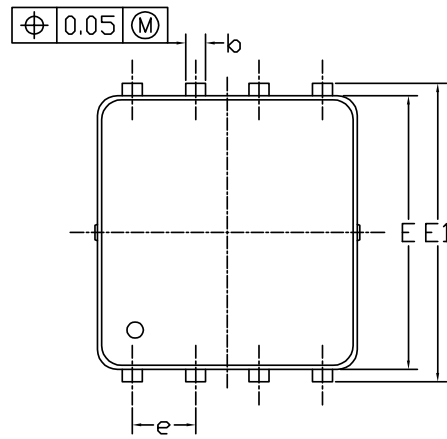


Normalized Thermal Transient Impedance, Junction-to-Case

Note

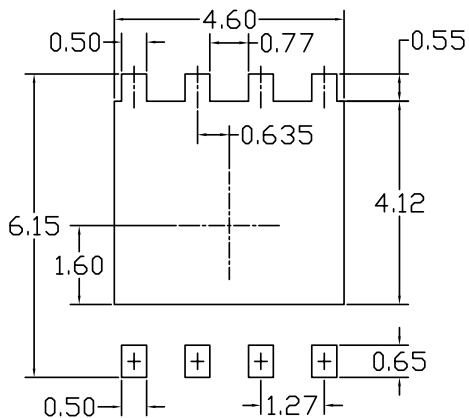
- The characteristics shown in the two graphs
 - Normalized Transient Thermal Impedance Junction-to-Ambient ($25\text{ }^\circ\text{C}$)
 - Normalized Transient Thermal Impedance Junction-to-Case ($25\text{ }^\circ\text{C}$)
 are given for general guidelines only to enable the user to get a “ball park” indication of part capabilities. The data are extracted from single pulse transient thermal impedance characteristics which are developed from empirical measurements. The latter is valid for the part mounted on printed circuit board - FR4, size 1" x 1" x 0.062", double sided with 2 oz. copper, 100 % on both sides. The part capabilities can widely vary depending on actual application parameters and operating conditions.

DFN5x6_8L_EP1_P PACKAGE OUTLIN



VIEW 'A'
(SCALE 5:1)

RECOMMENDED LAND PATTERN



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.85	0.95	1.00	0.033	0.037	0.039
A1	0.00	---	0.05	0.000	---	0.002
b	0.30	0.40	0.50	0.012	0.016	0.020
c	0.15	0.20	0.25	0.006	0.008	0.010
D	5.10	5.20	5.30	0.201	0.205	0.209
D1	4.25	4.35	4.45	0.167	0.171	0.175
E	5.45	5.55	5.65	0.215	0.219	0.222
E1	5.95	6.05	6.15	0.234	0.238	0.242
E2	3.525	3.625	3.725	0.139	0.143	0.147
E3	1.175	1.275	1.375	0.046	0.050	0.054
e	1.27 BSC			0.050 BSC		
L	0.45	0.55	0.65	0.018	0.022	0.026
L1	0	---	0.15	0	---	0.006
L2	0.68 REF			0.027 REF		
θ	0°	---	10°	0°	---	10°

UNIT: mm

NOTE

- PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
MOLD FLASH AT THE NON-LEAD SIDES SHOULD BE LESS THAN 6 MILS EACH.
- CONTROLLING DIMENSION IS MILLIMETER.
CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.

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