

Description

The NVTFS5C680NLWFTAG is the new generation trench N-channel MOSFET has been designed to minimize the on-state resistance ($R_{DS(ON)}$) yet maintain superior switching performance, making it ideal for high efficiency power management applications

Features

- High - speed switching
- Excellent gate charge x $R_{DS(ON)}$ product (FOM) for extremely low $R_{DS(ON)}$
- **100% UIS Tested**
- **100% Avalanche Tested**
- Lead-Free, Halogen-Free; RoHS Compliant

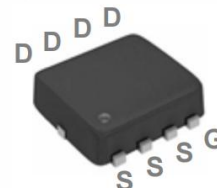
Applications

- Power-management functions
- Industrial DC/DC Conversion Circuits
- Motor Drive
- LED Lighting

V_{DSS}	60V
I_D	30A
$R_{DS(ON) Typ}$	11mΩ @ $V_{GS}=10V$
$R_{DS(ON) Typ}$	14mΩ @ $V_{GS}=4.5V$

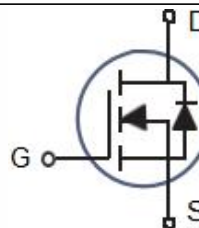
Outline

PDFN3.3x3.3-8L Pin Configuration



Equivalent

(1,2,3)Source
(4)Gate
(5,6,7,8)Drain



Packaging specifications

Part No.	Package	Marking	Basic ordering unit.(pcs)
NVTFS5C680NLWFTAG	PDFN3x3-8L		5000

Absolute Maximum Ratings

Parameter	Symbol	Limit	Units
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous ^(Note2)	$T_C=25^{\circ}C$	30	A
	$T_C=70^{\circ}C$	24	A
-Pulsed ^(Note 1· Note 2)	I_{DM}	120	A
Single Pulse Avalanche Energy ^(Note 3)	E_{AS}	121	mJ
Maximum Power Dissipation	$T_C=25^{\circ}C$	33	W
	$T_C=100^{\circ}C$	13	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C
Thermal Resistance Junction-Ambient	$R_{\theta JA}$	60	°C /W
Thermal Resistance Junction-Case	$R_{\theta JC}$	3.8	°C/W

Electrical Characteristics (T_C=25 °C, unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V , I _D =250uA	60			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =48V , V _{GS} =0V			1	uA
Gate-Body Leakage Current	I _{GSS}	V _{GS} = ±20V , V _{DS} =0V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D =250uA	1.0	1.5	2.2	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V , I _D =10A		11	14	mΩ
		V _{GS} =4.5V , I _D =8A		14	18	mΩ
Forward Transconductance	g _{FS}	V _{DS} =10V , I _D =8A		32		S
DYNAMIC CHARACTERISTICS Note4						
Input Capacitance	C _{ISS}	V _{DS} =30V , V _{GS} =0 V , f =1.0MHz		2100		pF
Output Capacitance	C _{OSS}			130		pF
Reverse Transfer Capacitance	C _{RSS}			120		pF
Gate resistance	R _g	V _{GS} =0V,V _{DS} =0V, f=1MHz		2.8		Ω
Total Gate Charge	Q _g	V _{DS} =30V , I _D =5A , V _{GS} =10V		32		nC
Gate-Source Charge	Q _{gs}			7.3		nC
Gate-Drain Charge	Q _{gd}			5.2		nC
SWITCHING CHARACTERISTICS Note4						
Turn-On Delay Time	t _{D(ON)}	V _{DD} =30V , I _D =1A , V _{GS} =10V , R _{GEN} =6 Ω		15		ns
Rise Time	t _r			14		ns
Turn-Off Delay Time	t _{D(OFF)}			55		ns
Fall Time	t _f			11		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Diode Forward Voltage	V _{SD}	V _{GS} =0V , I _S =10A			1.0	V

Notes:

- 1、Pulse Test Width < 300us,Duty Cycle< 2%
- 2、Drain current limited by maximum junction temperature.
- 3、Starting T_j=25°C ,L=0.5mH,V_{DD}=30V,V_{GS}=10V ,R_G=25Ω
- 4、Guaranteed by design,not subject to production testing.

Typical Performance Characteristics

Fig.1 Continuous Drain Current vs. TC

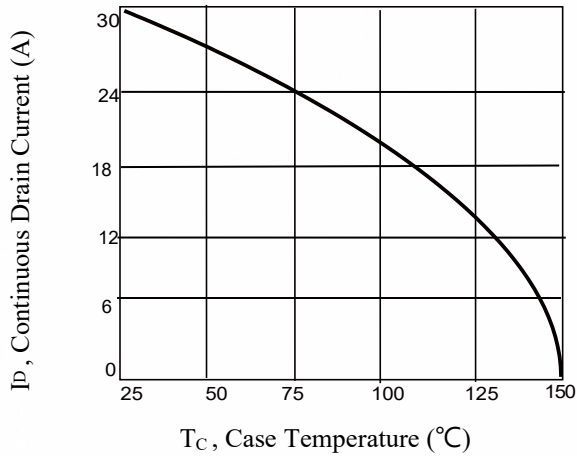


Fig.2 Normalized $R_{DS(ON)}$ vs. T_J

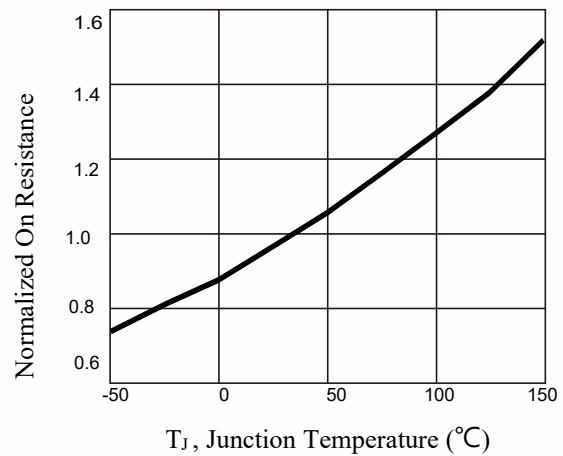


Fig.3 Normalized V_{th} vs. T_J

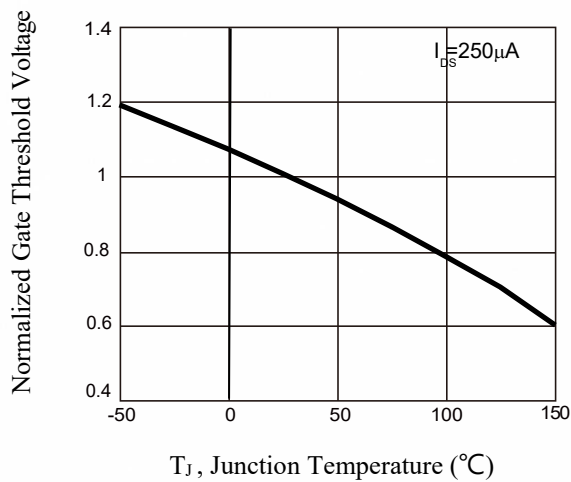


Fig.4 Gate Charge Waveform

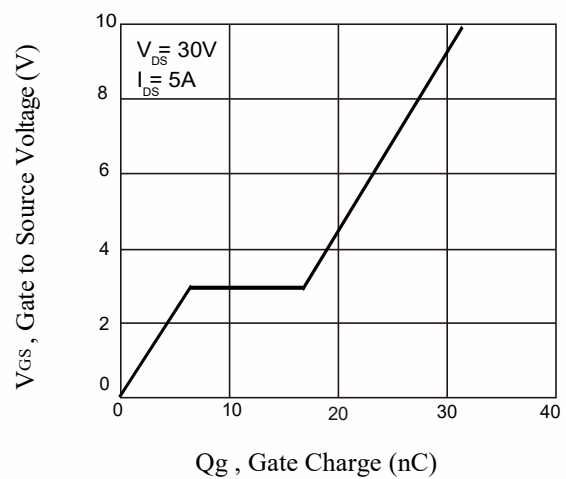


Fig.5 Typical Output Characteristics

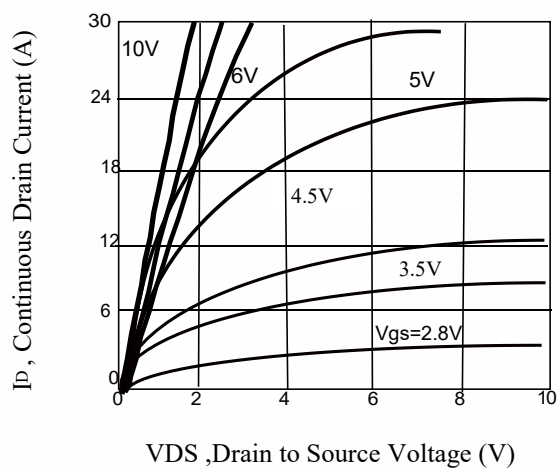


Fig.6 Turn-On Resistance vs. I_D

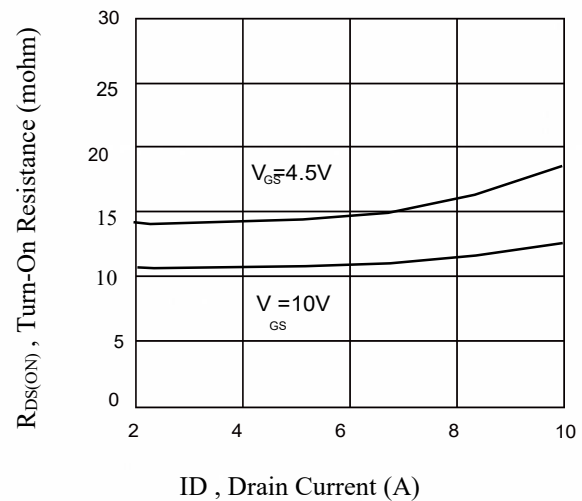


Fig.7 Capacitance

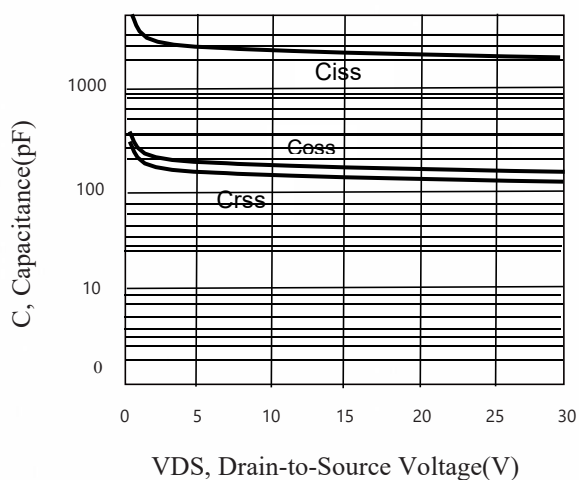


Fig.8 Typical Source-Drain Diode Forward Voltage

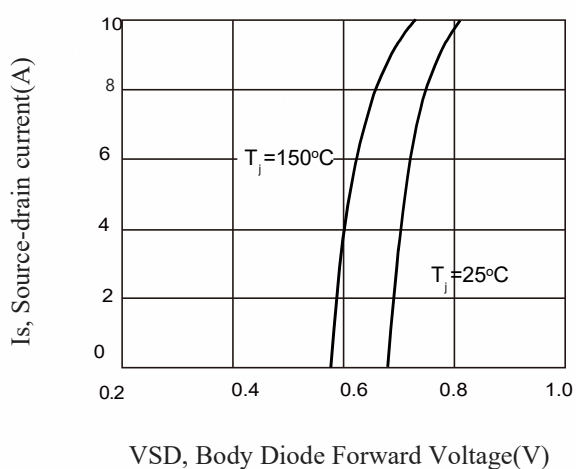


Fig.9 Normalized Transient Impedance

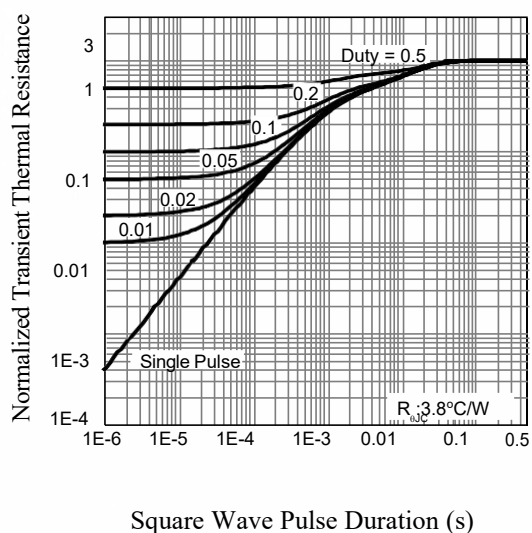


Fig.10 Maximum Safe Operation Area

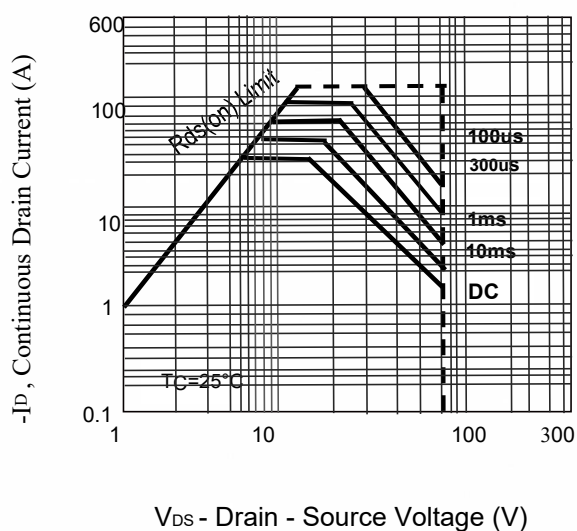


Figure11a. Switching Test Circuit

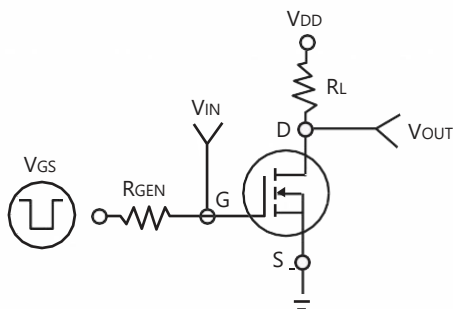
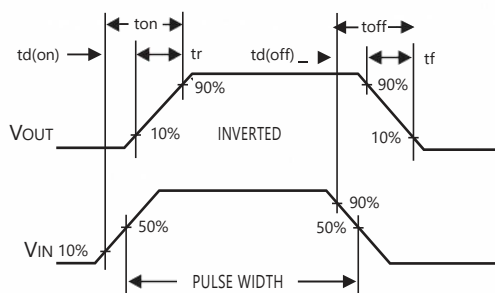
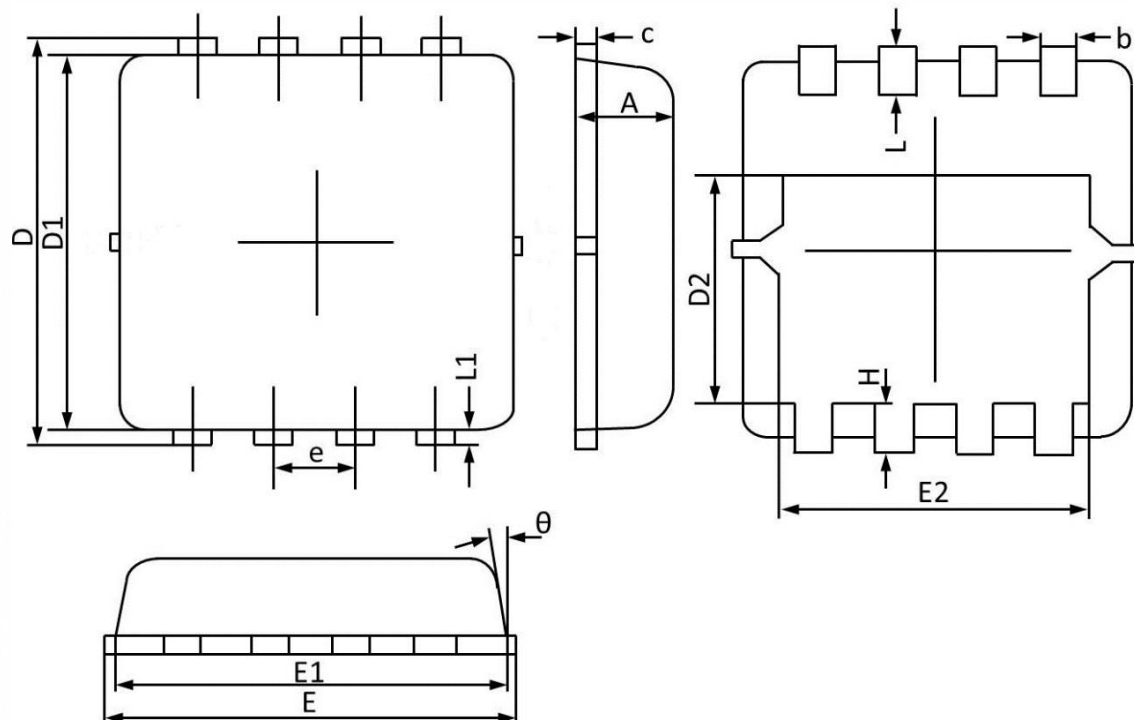


Figure11b. Switching Waveforms



PDFN3x3-8L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	0.900	0.700	0.035	0.028
b	0.350	0.250	0.014	0.010
c	0.250	0.100	0.010	0.004
D	3.500	3.050	0.138	0.120
D1	3.200	2.900	0.126	0.114
D2	1.950	1.350	0.077	0.053
E	3.400	3.000	0.134	0.118
E1	3.300	2.900	0.130	0.114
E2	2.600	2.350	0.102	0.093
e	0.65BSC		0.026BSC	
H	0.750	0.300	0.030	0.012
L	0.600	0.300	0.024	0.012
L1	0.200	0.060	0.008	0.002
θ	14°	6°	14°	6°

NOTICE

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