

Description

The SI7738DP-T1-GE3 is the new generation SplitGate 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

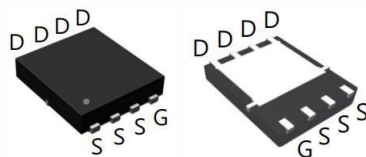
Applications

- Load Switch
- Power Management
- Networking
- Industrial DC/DC Conversion Circuits

V_{DS}	150V
I_D	50A
$R_{DS(ON)}$	13mΩ @ $V_{GS}=10V$

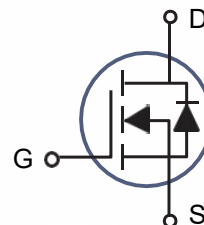
Outline

PDFN5x6-8L Pin Configuration



Equivalent

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



Packaging specifications

Part No.	Package	Marking	Basic ordering unit.(pcs)
SI7738DP-T1-GE3	PDFN5x6-8L		5000

Absolute Maximum Ratings

Parameter		Symbol	Limit	Units
Drain-Source Voltage		V_{DS}	150	V
Gate-Source Voltage		V_{GS}	±20	V
Drain Current-Continuous(Note2)	$T_C=25^{\circ}C$	I_D	50	A
	$T_C=70^{\circ}C$		40	A
-Pulsed(Note 1· Note 2)		I_{DM}	200	A
Maximum Power Dissipation	$T_C=25^{\circ}C$	P_D	89	W
	$T_C=100^{\circ}C$		35	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C
Thermal Resistance Junction-Ambient		$R_{\theta JA}$	44	°C /W
Thermal Resistance Junction-Case		$R_{\theta JC}$	1.4	°C/W

Electrical Characteristics ($T_C=25^\circ\text{C}$, 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	150			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =120V , 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	2	3.0	4	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V , I _D =10A		13	16	mΩ
Forward Transconductance	g _{FS}	V _{DS} =10V , I _D =10A		17		S
DYNAMIC CHARACTERISTICS Note4						
Input Capacitance	C _{ISS}	V _{DS} =75V , V _{GS} =0 V , f =1.0MHz		2880		pF
Output Capacitance	C _{OSS}			220		pF
Reverse Transfer Capacitance	C _{RSS}			20		pF
Total Gate Charge	Q _g	V _{DS} =75V ,I _D =5A , V _{GS} =10V		44		nC
Gate-Source Charge	Q _{gs}	V _{DS} =75V , I _D =5A , V _{GS} =10V		16		nC
Gate-Drain Charge	Q _{gd}			15		nC
SWITCHING CHARACTERISTICS Note4						
Turn-On Delay Time	t _{D(ON)}	V _{DD} =75V , I _D =5A , V _{GS} =10V , R _{GEN} =6Ω		26		ns
Rise Time	tr			18		ns
Turn-Off Delay Time	t _{D(OFF)}			42		ns
Fall Time	tf			14		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Diode Forward Voltage	V _{SD}	V _{GS} =0V , I _S =10A			1.2	V

Notes:

- 1、Pulse Test Width < 300us, Duty Cycle < 2%
- 2、Drain current limited by maximum junction temperature.
- 3、Starting $T_j=25^\circ\text{C}$, $L=0.5mH$, $V_{DD}=75V$, $V_{GS}=10V$, $R_G=6\Omega$
- 4、Guaranteed by design, not subject to production testing.

Typical Performance Characteristics

Fig.1 Continuous Drain Current vs. T_A

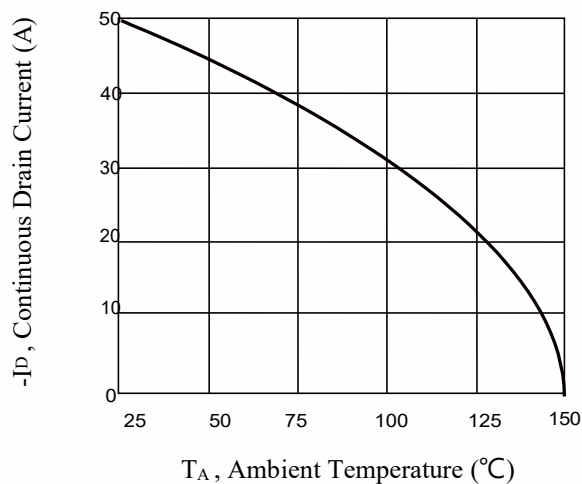


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

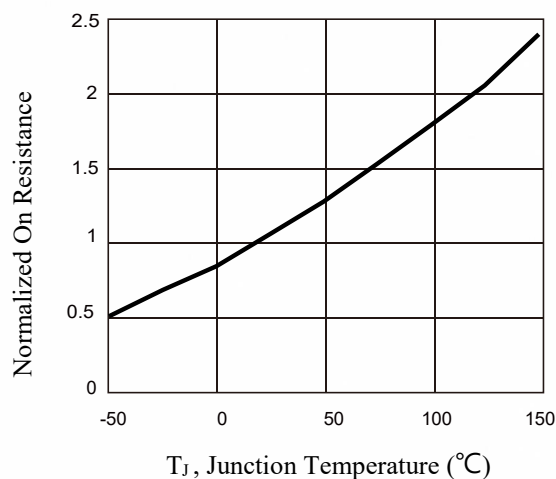


Fig.3 Normalized V_{th} vs. T_J

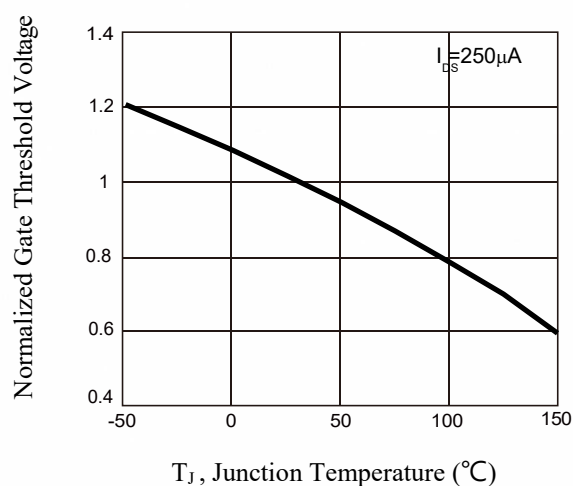


Fig.4 Gate Charge Waveform

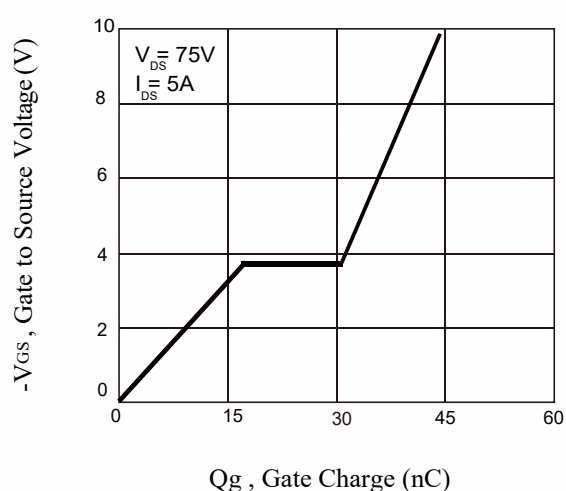


Fig.5 Typical Output Characteristics

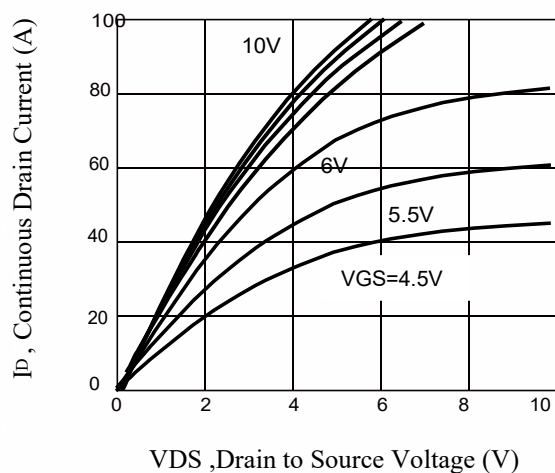


Fig.6 Capacitance

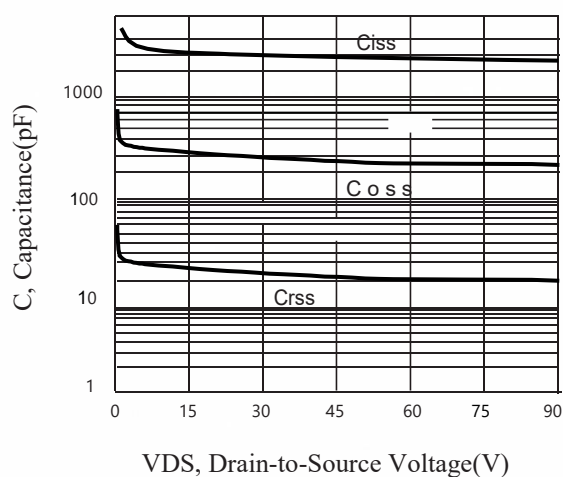


Fig.7 Capacitance Characteristics

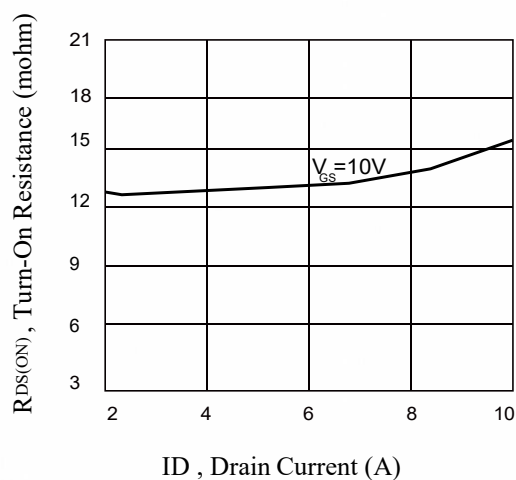


Fig.8 Typical Source-Drain Diode Forward Voltage

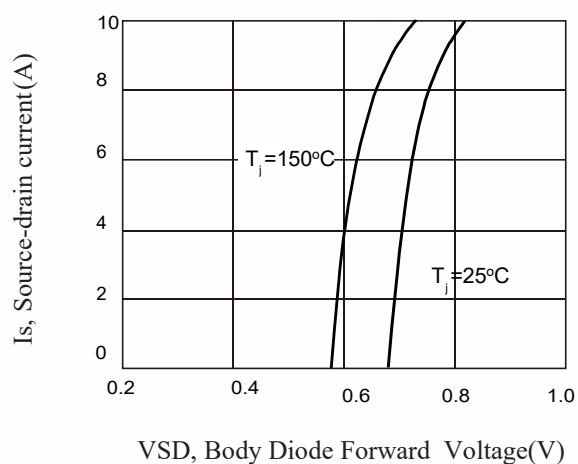


Fig.9 Normalized Transient Impedance

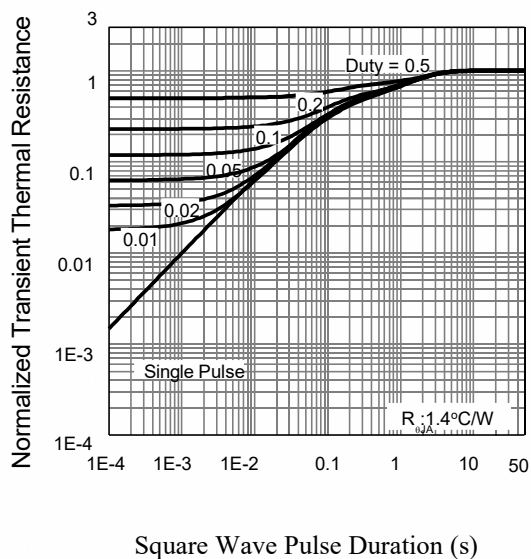


Fig.10 Maximum Safe Operation Area

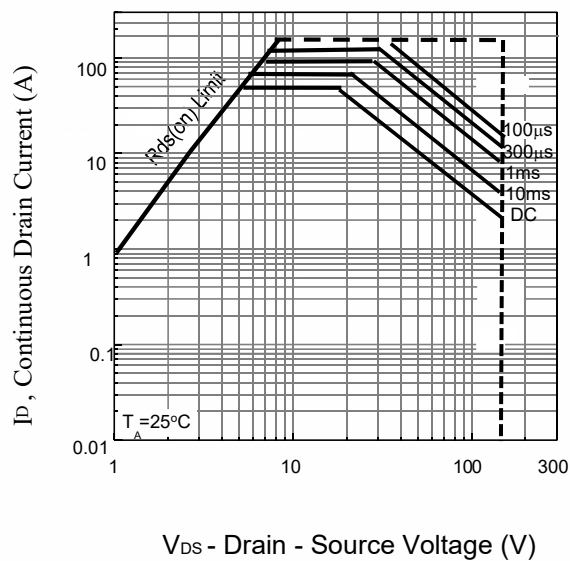


Figure 11a.

Switching Test Circuit

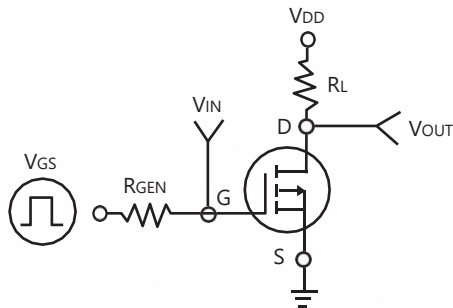


Figure 11b. Switching Waveforms

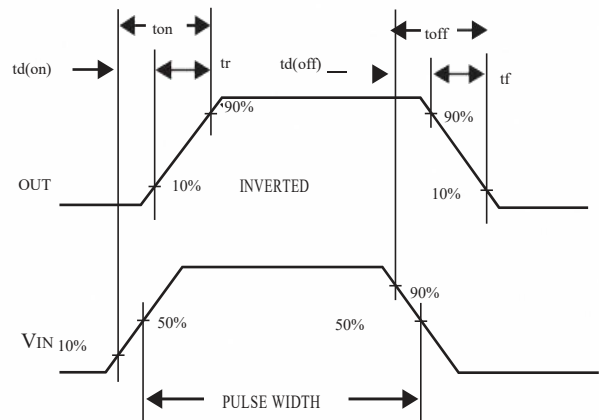


Figure 12a. Unclamped Inductive Test Circuit

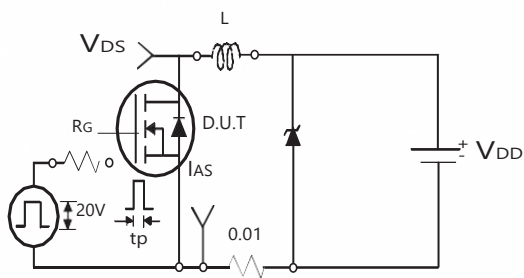
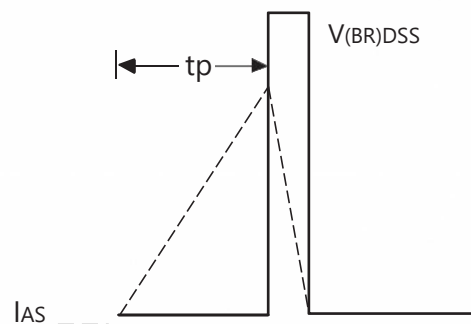


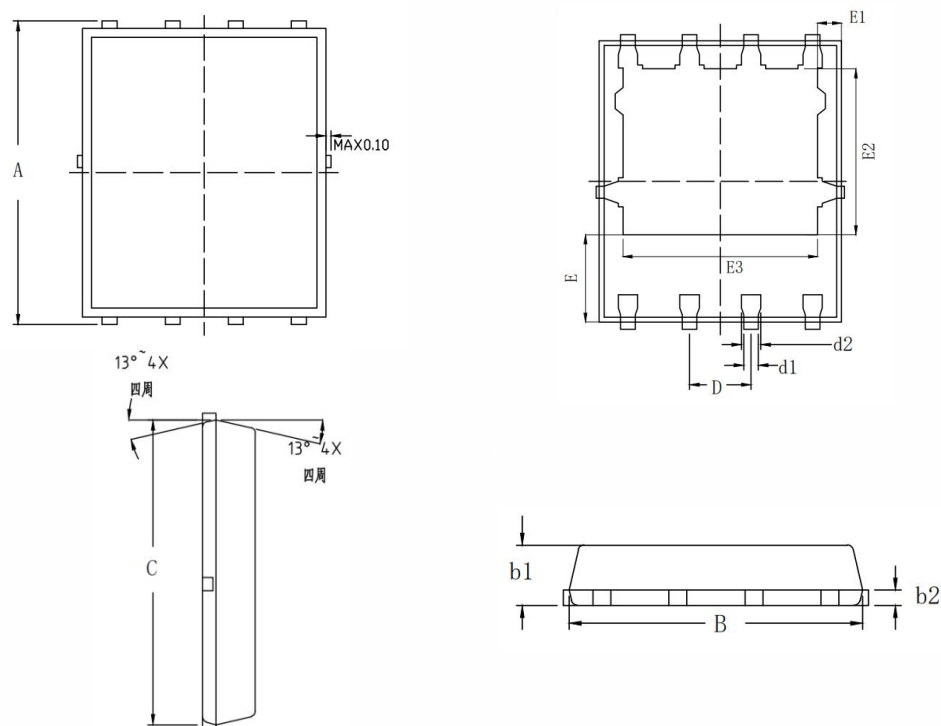
Figure 12b. Unclamped Inductive Waveforms



NOTICE

NKGL reserves the to make modifications,enhancements,improvements,corrections or other changes without further notice to any product herein.NKGL does not assume any liability arising out of the application or use of any product described herein.

PDFN5x6-8L Package Information



PDFN5x6-8L COMMON DIMENSION(MM)

PKG			
SYMBOL	MIN	TYP	MAX
A	6.000	6.100	6.200
B	4.875	4.900	4.925
b1	0.975	1.000	1.025
b2	0.246	0.254	0.262
C	5.775	5.800	5.825
D	1.245	1.270	1.295
d1	0.275	0.300	0.325
d2	0.375	0.400	0.425
E	1.725	1.775	1.825
E1	0.395	0.445	0.495
E2	3.425	3.475	3.525
E3	3.960	4.010	4.060