



Description

The SI7784DP-T1-GE3 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

$V_{DS} = 30V$ $I_D = 80A$

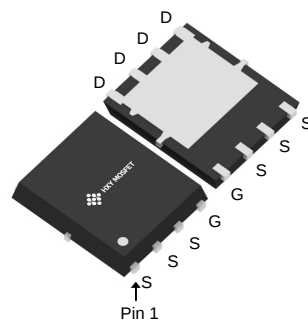
$R_{DS(ON)} < 6m\Omega$ $V_{GS}=10V$

Application

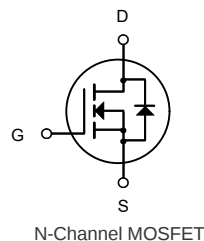
Battery protection

Load switch

Uninterruptible power supply



DFN5X6-8L
(DFN-8(5x6))



N-Channel MOSFET

Package Marking and Ordering Information

Product ID	Pack	Brand	Qty(PCS)
SI7784DP-T1-GE3	DFN5X6-8L(DFN-8(5x6))	HXY MOSFET	5000

Absolute Maximum Ratings ($T_C=25^{\circ}C$ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_{D@T_C=25^{\circ}C}$	Continuous Drain Current, $V_{GS} @ 10V$	80	A
$I_{D@T_C=70^{\circ}C}$	Continuous Drain Current, $V_{GS} @ 10V$	45	A
I_{DM}	Pulsed Drain Current ²	280	A
EAS	Single Pulse Avalanche Energy ³	56	mJ
$P_D@T_C=25^{\circ}C$	Total Power Dissipation ⁴	37	W
T_{STG}	Storage Temperature Range	-55 to 150	$^{\circ}C$
T_J	Operating Junction Temperature Range	-55 to 150	$^{\circ}C$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	30	$^{\circ}C/W$



Electrical Characteristics (T_C=25°C Unless Otherwise Noted)

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
Static Electrical Characteristics @ T _j =25°C (unless otherwise stated)						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V I _D =250μA	30	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =30V,V _{GS} =0V	--	--	0.1	μA
	Zero Gate Voltage Drain Current(T _J =125°C)	V _{DS} =30V,V _{GS} =0V	--	--	100	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±20V,V _{DS} =0V	--	--	±100	nA
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} =V _{GS} ,I _D =250μA	1.0	1.7	2.5	V
R _{DS(ON)}	Drain-Source On-State Resistance③	V _{GS} =10V, I _D =20A	--	4.7	6	mΩ
R _{DS(ON)}	Drain-Source On-State Resistance③	V _{GS} =4.5V, I _D =16A	--	5.4	8	mΩ
Dynamic Electrical Characteristics @ T _J = 25°C (unless otherwise stated)						
C _{iss}	Input Capacitance	V _{DS} =15V,V _{GS} =0V, f=1MHz	--	1930	--	pF
C _{oss}	Output Capacitance		--	310	--	pF
C _{rss}	Reverse Transfer Capacitance		--	260	--	pF
R _g	Gate Resistance	f=1MHz	--	0.85	--	
Q _g	Total Gate Charge	V _{DS} =15V,I _D =20A, V _{GS} =10V	--	38	--	nC
Q _{gs}	Gate-Source Charge		--	5.1	--	nC
Q _{gd}	Gate-Drain Charge		--	12	--	nC
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DD} =15V, I _D =20A, R _G =3, V _{GS} =10V	--	8.5	--	nS
t _r	Turn-on Rise Time		--	9	--	nS
t _{d(off)}	Turn-Off Delay Time		--	31	--	nS
t _f	Turn-Off Fall Time		--	9	--	nS
Source- Drain Diode Characteristics@ T _J = 25°C (unless otherwise stated)						
V _{SD}	Forward on voltage	I _{SD} =20A,V _{GS} =0V	--	0.8	1.2	V
t _{rr}	Reverse Recovery Time	T _J =25°C,I _{sd} =20A, V _{GS} =0V	--	16	--	nS
Q _{rr}	Reverse Recovery Charge	di/dt=500A/μs		42		nC

NOTE:

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Limited by T_{Jmax}, starting T_J = 25°C, L = 0.5mH, R_G = 25 , I_{AS} = 15A, V_{GS} =10V. Part not recommended for use above this value
- ③ Pulse width ≤ 300μs; duty cycle≤ 2%.



Typical Characteristics

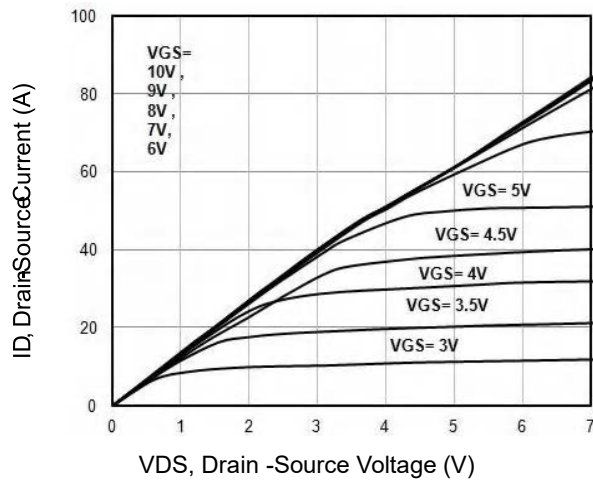


Fig1. Typical Output Characteristics

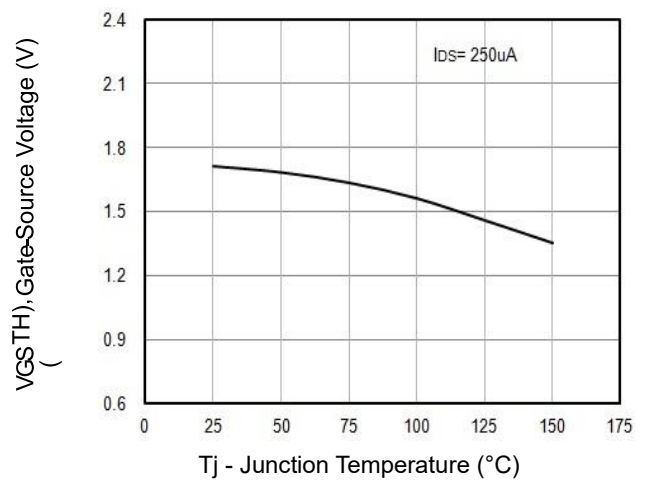


Fig2. $V_{GS(TH)}$ Gate-Source Voltage Vs. T_J

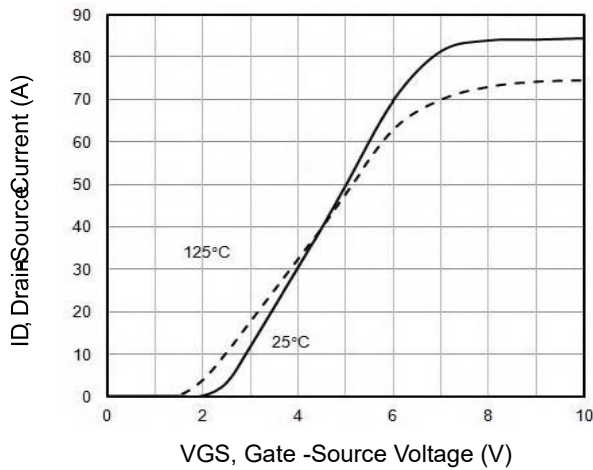


Fig3. Typical Transfer Characteristics

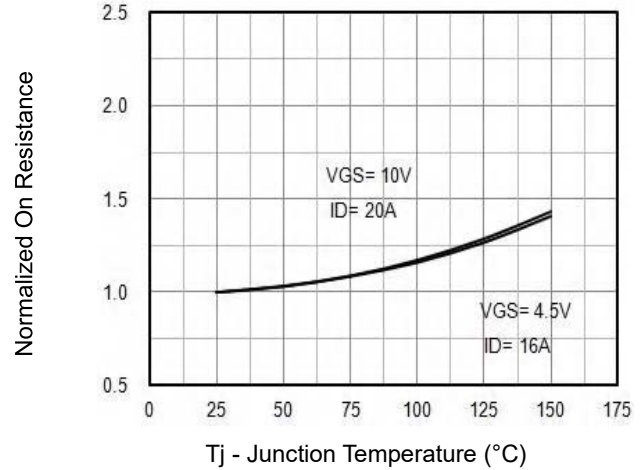


Fig4. Normalized On-Resistance Vs. T_J

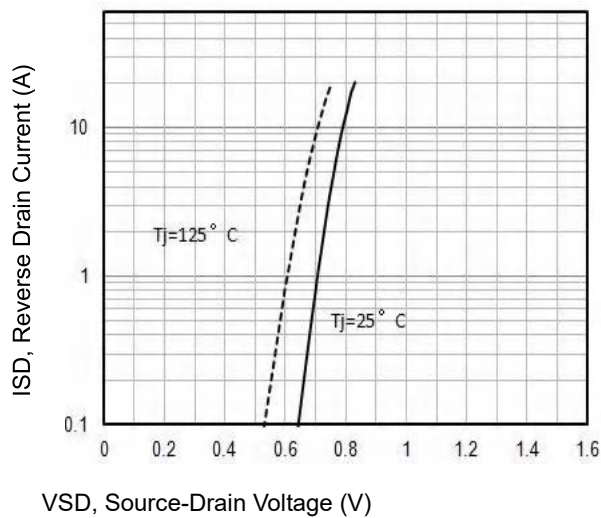


Fig6. Maximum Safe Operating Area
Voltage

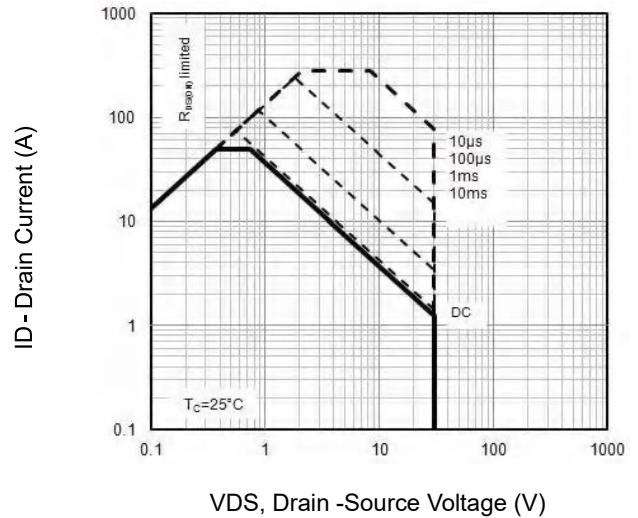


Fig5. Typical Source-Drain Diode Forward

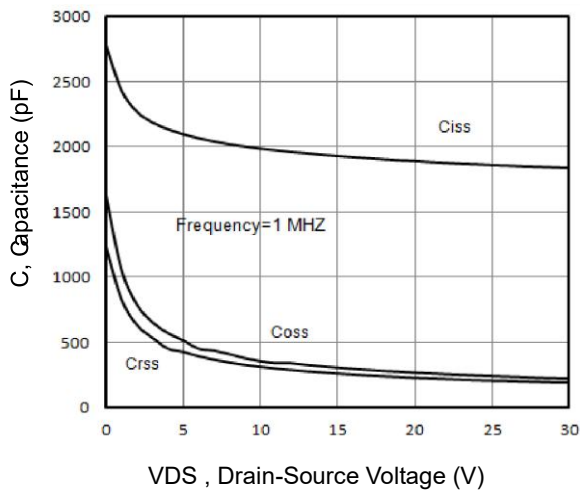


Fig7. Typical Capacitance Vs. Drain-Source Voltage



Fig8. Typical Gate Charge Vs. Gate-Source Voltage

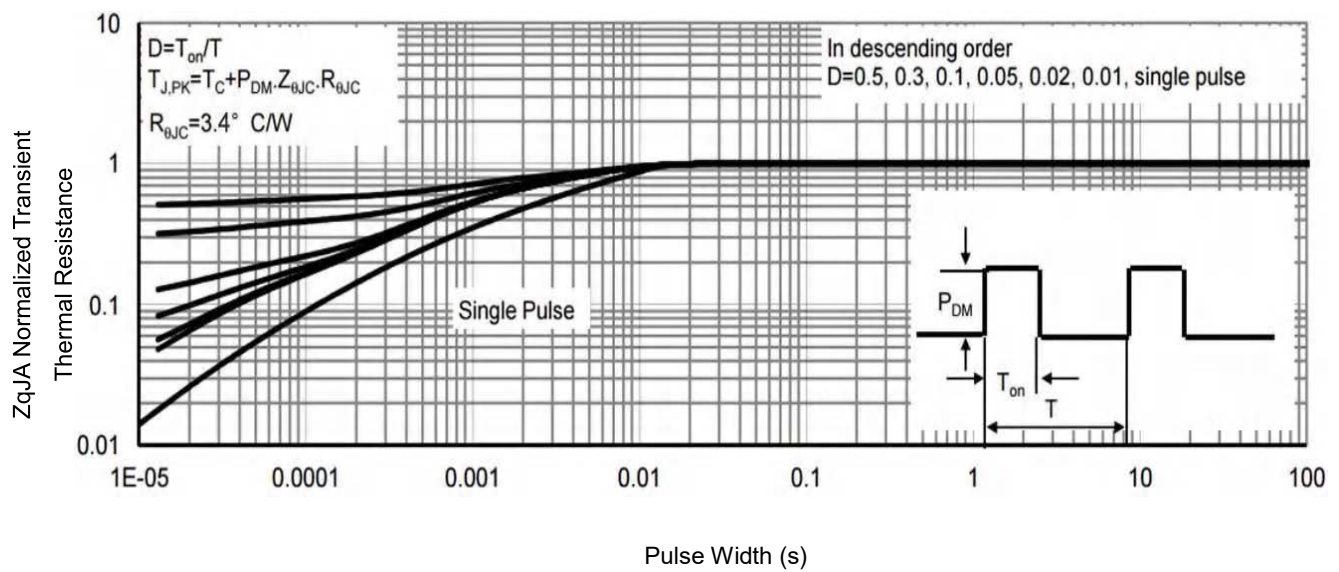


Fig9. Normalized Maximum Transient Thermal Impedance

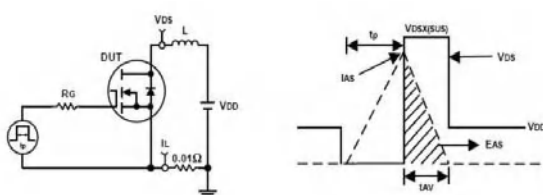


Fig10. Unclamped Inductive Test Circuit and waveforms

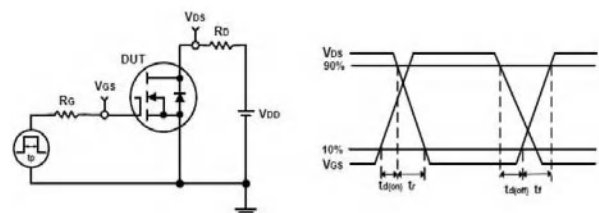


Fig11. Switching Time Test Circuit and waveforms



DFN5X6-8L(DFN-8(5x6)) Package Information



SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.95	5	5.05	0.195	0.197	0.199
A1	4.82	4.9	4.98	0.190	0.193	0.196
D	5.98	6	6.02	0.235	0.236	0.237
D1	5.67	5.75	5.83	0.223	0.226	0.230
B	0.9	0.95	1	0.035	0.037	0.039
B1	0.254REF			0.010REF		
C	3.95	4	4.05	0.156	0.157	0.159
C1	0.35	0.4	0.45	0.014	0.016	0.018
C2	1.27TYP			0.5TYP		
θ1	8°	10°	12°	8°	10°	12°
L1	0.63	0.64	0.65	0.025	0.025	0.026
L2	1.2	1.3	1.4	0.047	0.051	0.055
L3	3.415	3.42	3.425	0.134	0.135	0.135
H	0.24	0.25	0.26	0.009	0.010	0.010



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