



Description

The SI7860DP-T1-E3 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

$V_{DS} = 30V$ $I_D = 50A$

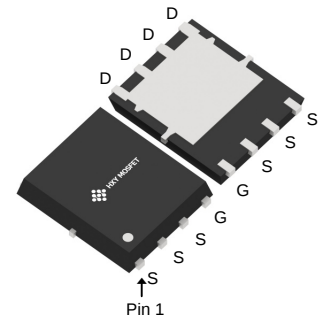
$R_{DS(ON)} < 8.5m\Omega$ $V_{GS}=10V$

Application

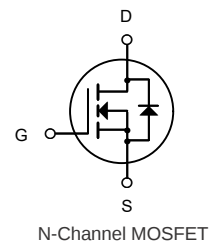
Battery protection

Load switch

Uninterruptible power supply



DFN5X6-8L



N-Channel MOSFET

Package Marking and Ordering Information

Product ID	Pack	Brand	Qty(PCS)
SI7860DP-T1-E3	DFN5X6-8L	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, $V_{GS} @ 10V$	60	A
$I_D@T_c=100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	38	A
I_{DM}	Pulsed Drain Current ¹	200	A
EAS	Single Pulse Avalanche Energy ²	36	mJ
I_{AS}	Avalanche Current	50	A
$P_D@T_c=25^\circ C$	Total Power Dissipation ⁴	31	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	62	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ³	27	$^\circ C/W$



Electrical Characteristics ($T_J=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	30	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS}=0V, V_{DS}=24V$	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0A$	---	---	± 100	nA
$V_{GS(th)}$	GATE-Source Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.2	1.5	2.5	V
$R_{DS(ON)}$	Drain-Source On Resistance ⁴	$V_{GS}=10V, I_D=30A$	---	6.5	8.5	m Ω
		$V_{GS}=4.5V, I_D=15A$	---	11	14	
G_{FS}	Forward Transconductance	$V_{DS}=5V, I_D=30A$	---	38	---	S
C_{iss}	Input Capacitance	$V_{DS}=15V, V_{GS}=0V,$ $f=1\text{MHz}$	---	1317	1844	pF
C_{oss}	Output Capacitance		---	163	228	
C_{rss}	Reverse Transfer Capacitance		---	131	183	
$t_{d(on)}$	Turn-On Delay Time	$V_{DD}=15V, I_D=15A,$ $V_{GS}=15V, R_G=3.3\Omega$	---	4.6	9.2	ns
t_r	Rise Time		---	12.2	22	ns
$t_{d(off)}$	Turn-Off Delay Time		---	26.6	53	ns
t_f	Fall Time		---	8	16	ns
Q_g	Total Gate Charge	$V_{GS}=4.5V,$ $V_{DS}=15V, I_D=15A$	---	17.6	21	nC
Q_{gs}	Gate-Source Charge		---	2.35	5.9	nC
Q_{gd}	Gate-Drain "Miller" Charge		---	5.9	7.1	nC
V_{SD}	Source-Drain Diode Forward Voltage	$V_{GS}=0V, I_S=1A$	---	---	1	V
I_S	Continuous Source Current	$V_G=V_D=0V,$ Force Current	---	---	58	A
I_{SM}	Pulsed Source Current		---	---	115	A
t_{rr}	Reverse Recovery Time	$I_F=30A,$ $dI/dt=100A/\mu s, T_J=25^{\circ}\text{C}$	---	9.2	---	ns
Q_{rr}	Reverse Recovery Charge		---	2	---	nC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. E_{AS} condition: Starting $T_J=25^{\circ}\text{C}$, $V_{DD}=15V$, $V_G=10V$, $R_G=25\Omega$, $L=0.5\text{mH}$, $I_{AS}=14A$
3. $R_{\theta JA}$ is measured with the device mounted on a 1inch^2 pad of 2oz copper FR4 PCB
4. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$.



Typical Characteristics

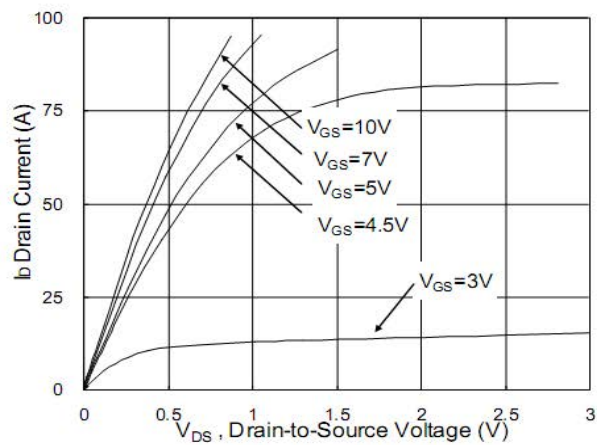


Fig.1 Typical Output Characteristics

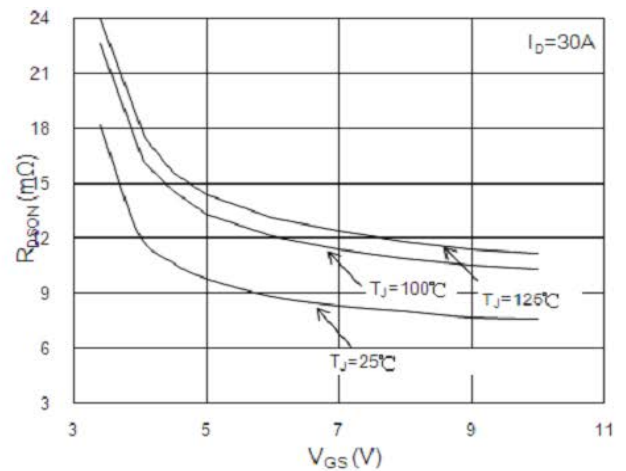


Fig.2 On-Resistance vs. Gate-Source

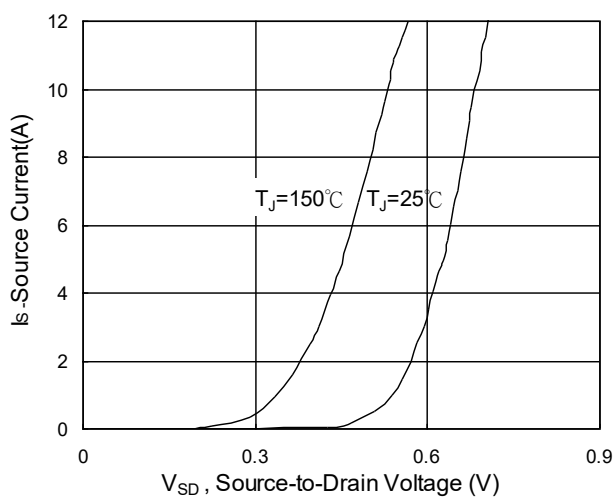


Fig.3 Forward Characteristics of reverse

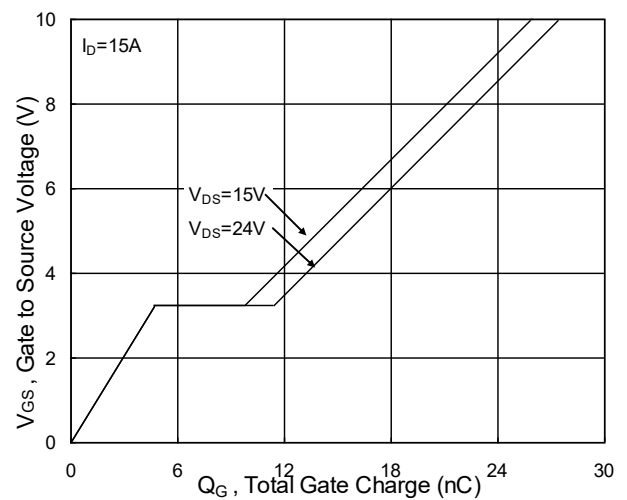


Fig.4 Gate-Charge Characteristics

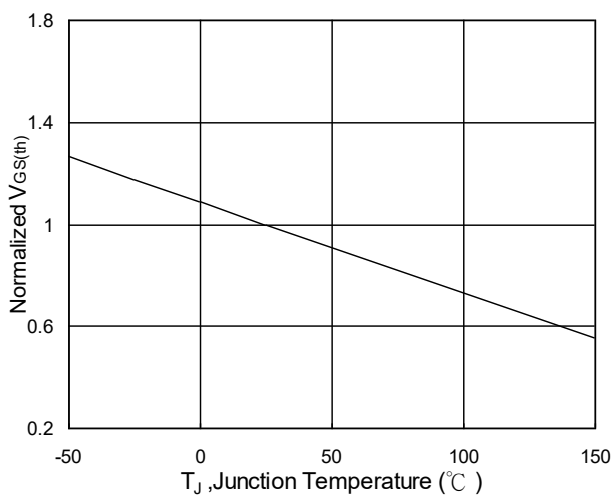


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

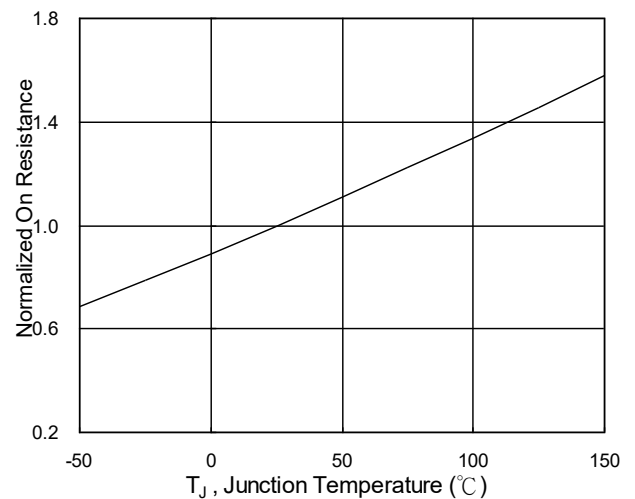


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

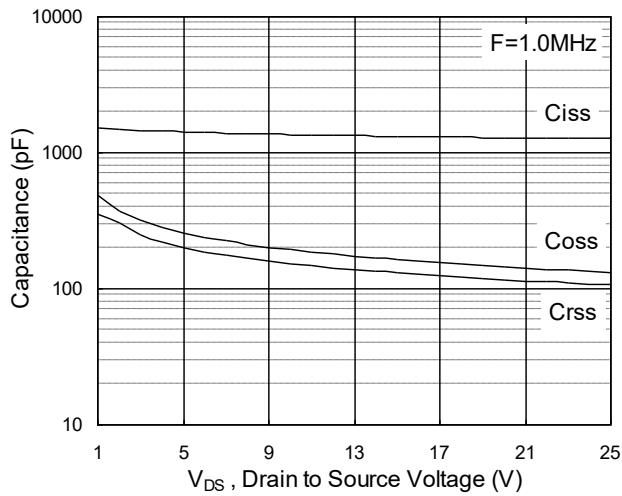


Fig.7 Capacitance

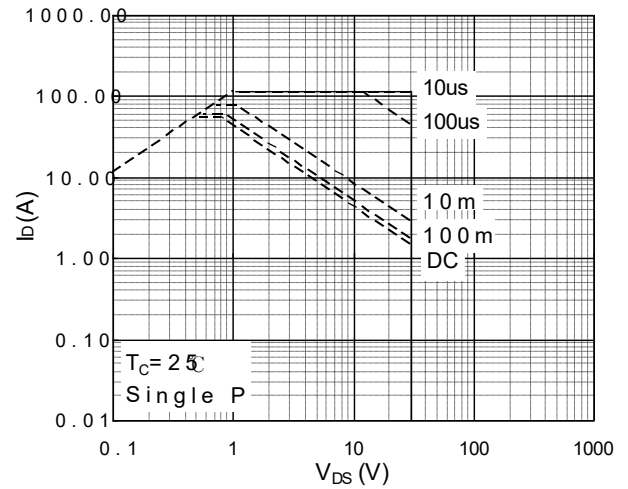


Fig.8 Safe Operating Area

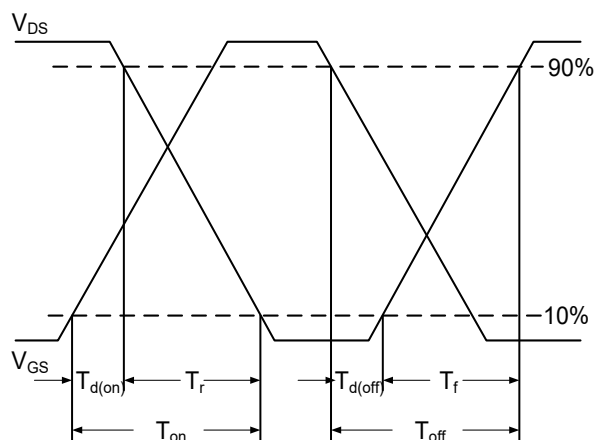


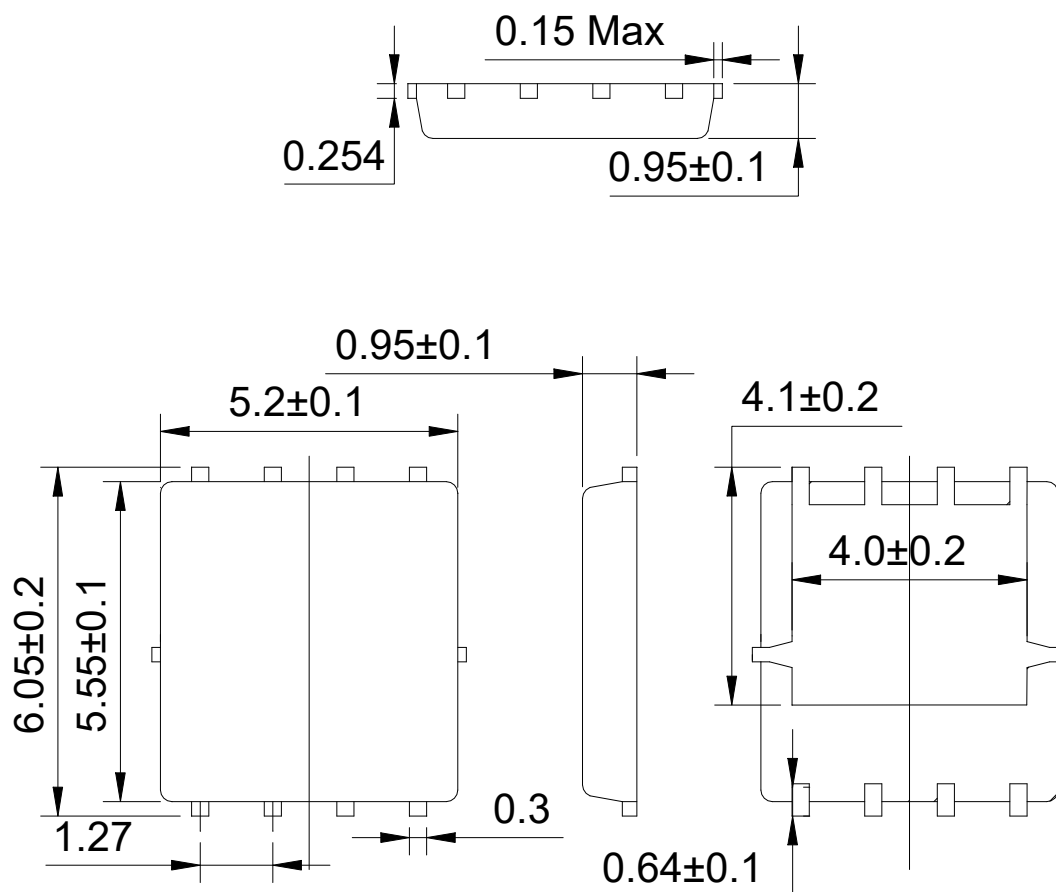
Fig.10 Switching Time Waveform





DFN5X6-8L Package Information

Unit:mm





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