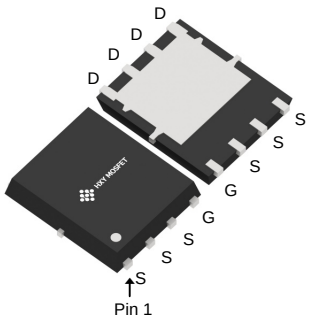
SI7860DP-T1-E3

N-Channel Enhancement Mode MOSFET

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.

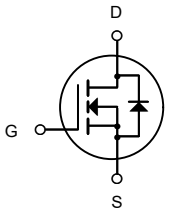


DFN5X6-8L

General Features

V_{DS} = 30V I_D = 50A

$R_{DS(ON)}$ < 8.5mΩ V_{GS}=10V



N-Channel MOSFET

Application

Battery protection

Load switch

Uninterruptible power supply

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°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℃	Continuous Drain Current, V_{GS} @ 10V	60	A
I_D@T_C=100℃	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℃	Total Power Dissipation[4]	31	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
$R_{\theta JA}$	Thermal Resistance Junction-Ambient	62	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[3]	27	℃/W

Electrical Characteristics (T_J=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
BV_{DSS}	Drain-Sourtce Breakdown Voltage	V_{GS}=0V,I_D=250μA	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}=±20V, V_{DS}=0A	---	---	±100	nA
$V_{GS(th)}$	GATE-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=250μA	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	mΩ
		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=1MHz	---	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=3.3Ω	---	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
IS	Continuous Source Current	VG=VD=0V , Force Current	---	---	58	A
ISM	Pulsed Source Current		---	---	115	A
trr	Reverse Recovery Time	IF=30A , dI/dt=100A/μs,TJ=25℃	---	9.2	---	ns
Qrr	Reverse Recovery Charge		---	2	---	nC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. E_{AS} condition: Starting T_J=25C, V_{DD}=15V, V_G=10V, R_G=25ohm, L=0.5mH, 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≤300μs, Duty Cycle≤0.5%.

Typical Characteristics

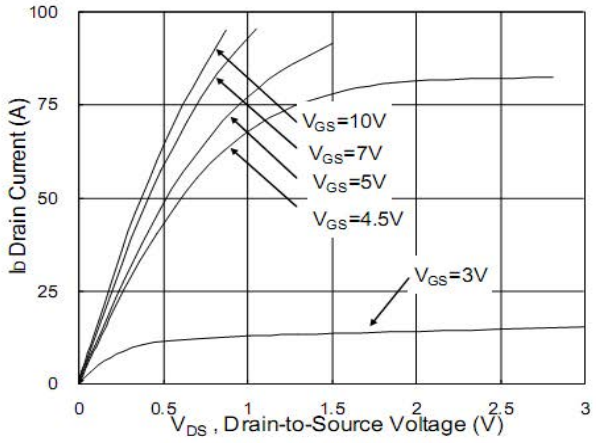


Fig.1 Typical Output Characteristics

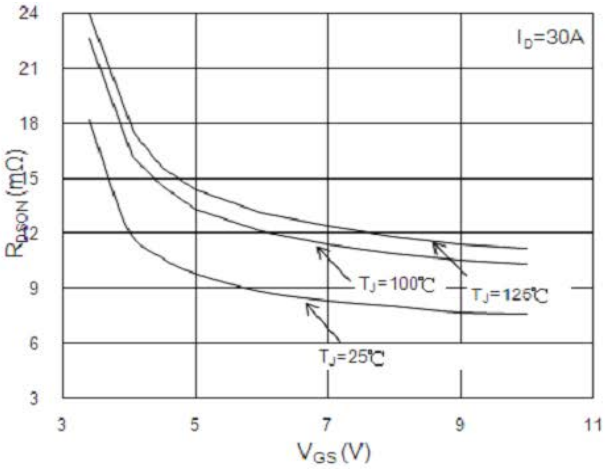


Fig.2 On-Resistance vs. Gate-Source

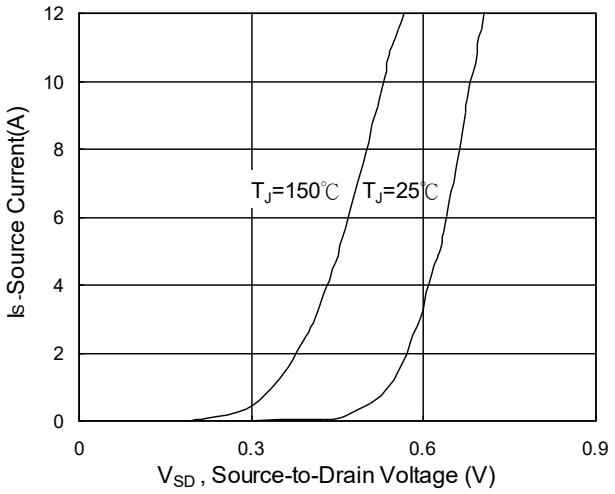


Fig.3 Forward Characteristics of reverse

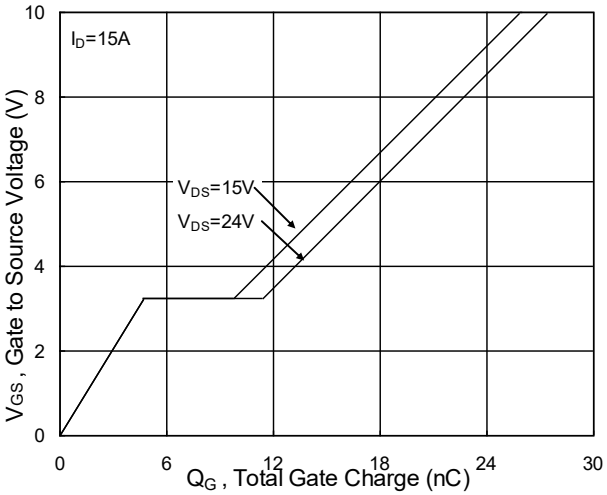


Fig.4 Gate-Charge Characteristics

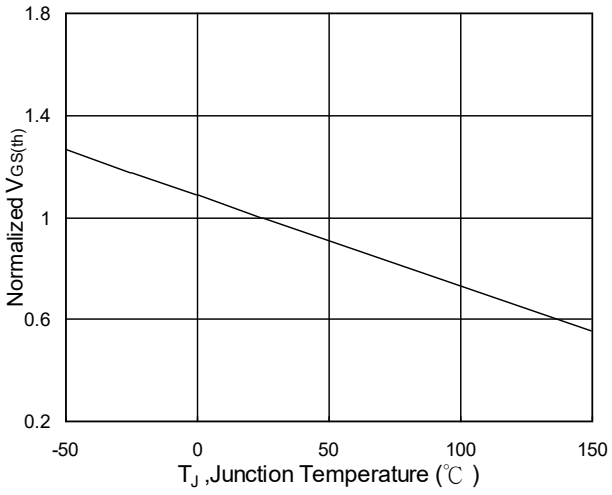


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

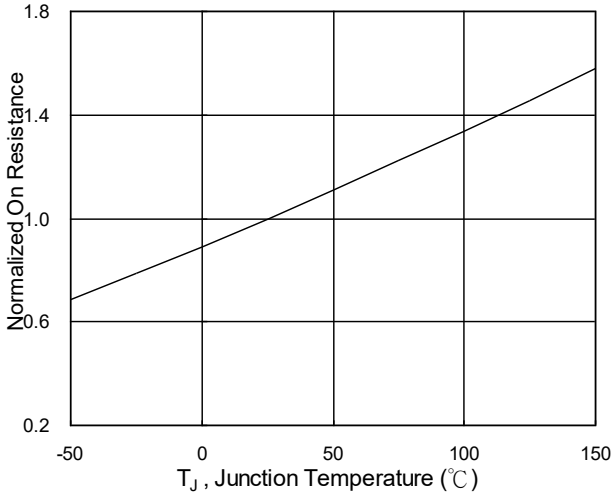


Fig.6 Normalized R_{DSON} vs. T_J

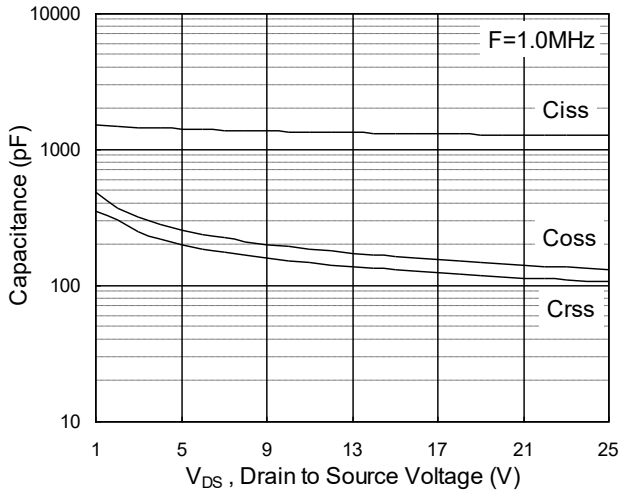


Fig.7 Capacitance

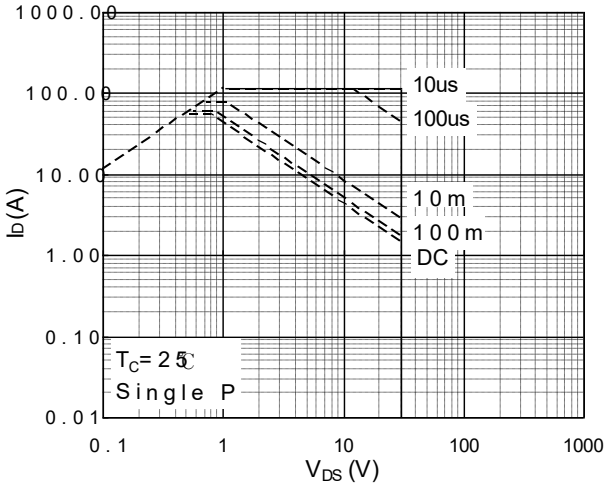
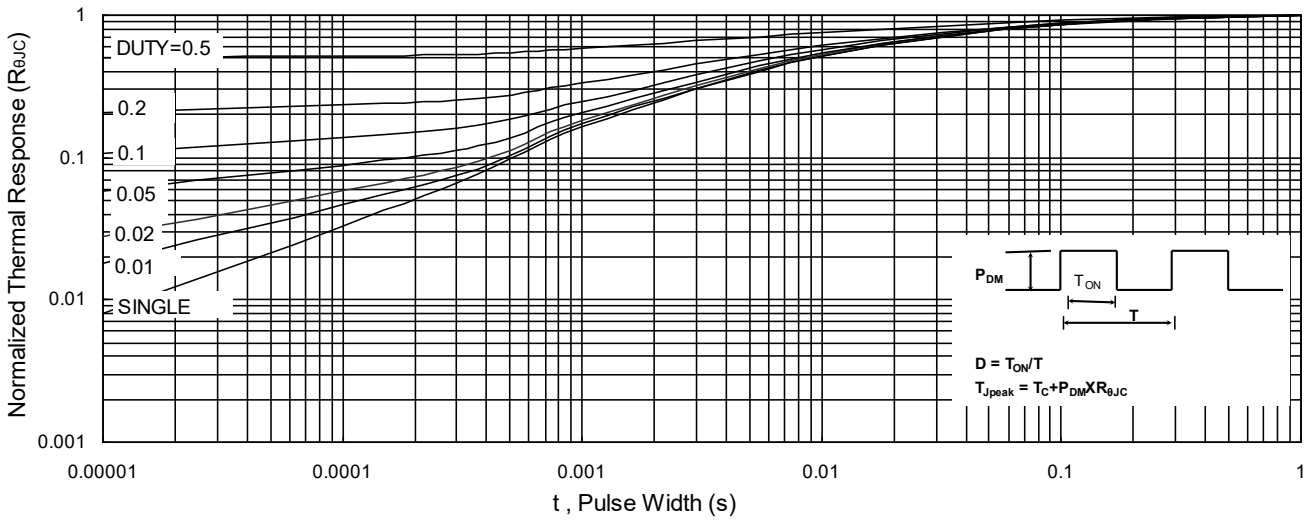
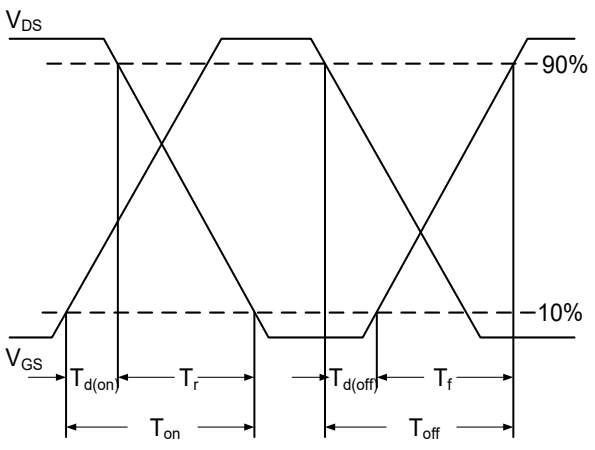


Fig.8 Safe Operating Area





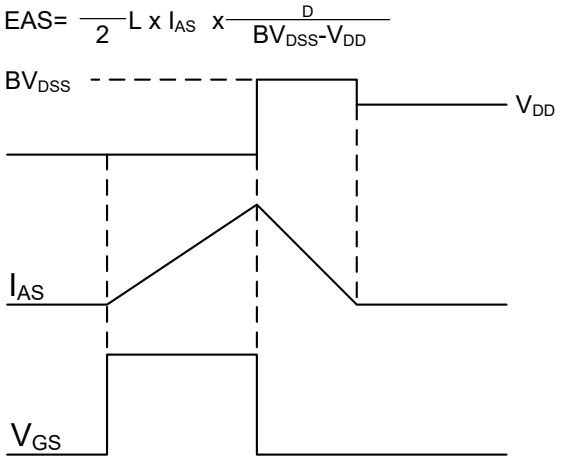
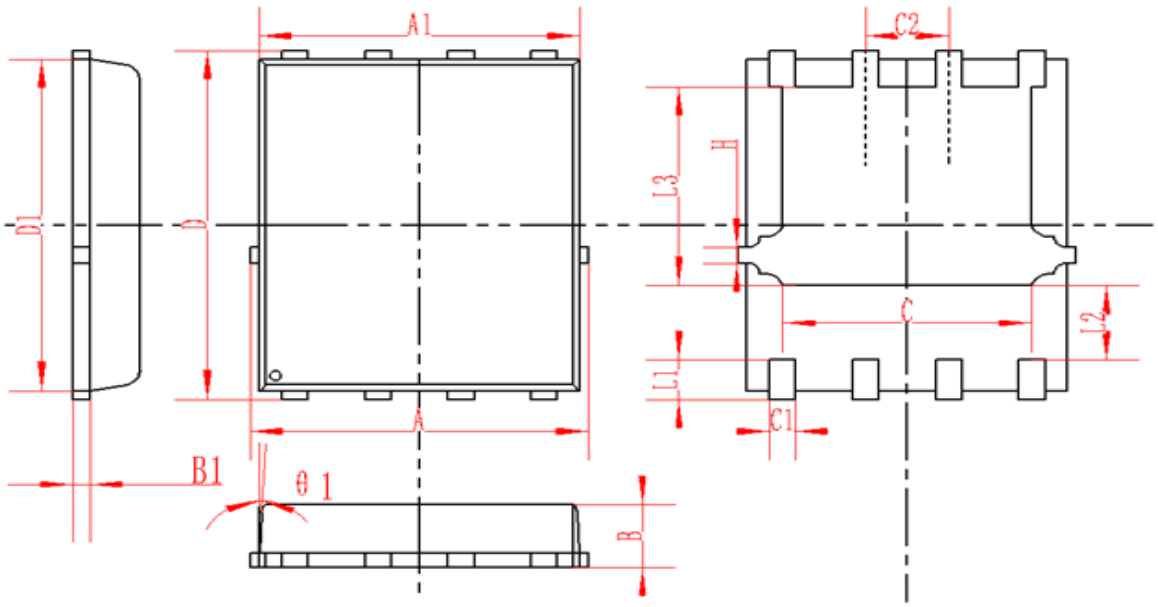


Fig.10 Switching Time Waveform

DFN5X6-8L Package Information



SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	5.3	5.5	5.7	0.208	0.216	0.224
A1	5.1	5.2	5.3	0.2	0.204	0.209
D	5.98	6	6.02	0.235	0.236	0.237
D1	5.85	6.05	6.25	0.23	0.238	0.246
B	0.85	0.95	1.05	0.033	0.037	0.041
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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P6SMB200A PESD5V0S1BB BZT52C3V3S HAD8542ARZ HXY2300MI SS1045 SS510C SS5150B
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