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Si7850DP-MS

Product specification

Description

The Si7850DP-MS uses advanced trench technology to provide excellent RDS(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.

Features

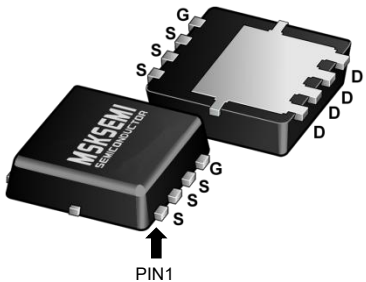
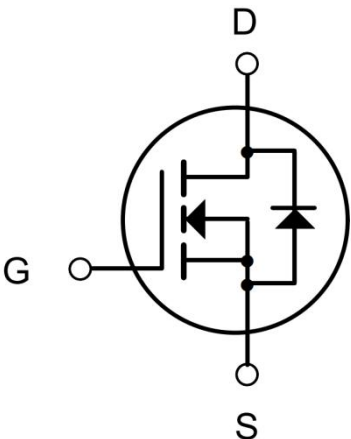

VDS = 60V ID =30 A

RDS(ON) < 25mΩ @ VGS=10V

Application

- Battery protection
- Load switch
- Uninterruptible power supply

Reference News

PACKAGE OUTLINE	N-Channel MOSFET	Marking
 <p>DFN5X6-8L</p>		

Absolute Maximum Ratings (TC=25°C unless otherwise noted)

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	60	V
VGS	Gate-Source Voltage	±20	V
Id@Tc=25°C	Continuous Drain Current, VGS @ 10V ¹	30	A
Id@Tc=100°C	Continuous Drain Current, VGS @ 10V ¹	15	A
IDM	Pulsed Drain Current ²	46	A
EAS	Single Pulse Avalanche Energy ³	25.5	mJ
IAS	Avalanche Current	22.6	A
Pd@Tc=25°C	Total Power Dissipation ⁴	34.7	W
TSTG	Storage Temperature Range	-55 to 150	°C
TJ	Operating Junction Temperature Range	-55 to 150	°C
RθJA	Thermal Resistance Junction-ambient ¹	62	°C/ W
RθJC	Thermal Resistance Junction-Case ¹	3.6	°C/ W

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
B _V DSS	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	60	---	---	V
Δ B _V DSS/ Δ T _J	B _V DSS Temperature Coefficient	Reference to 25°C, I _D =1mA	---	0.063	---	V/°C
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V, I _D =15A	---	20	25	mΩ
		V _{GS} =4.5V, I _D =10A	---	24	20	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.2	---	2.5	V
Δ V _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	-5.24	---	MV/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =48V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =48V, V _{GS} =0V, T _J =55°C	---	---	5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} = ±20V, V _{DS} =0V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =5V, I _D =15A	---	17	---	S
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz	---	3.2	---	Ω
Q _g	Total Gate Charge (4.5V)	V _{DS} =48V, V _{GS} =4.5V, I _D =12A	---	12.6	---	nC
Q _{gs}	Gate-Source Charge		---	3.2	---	
Q _{gd}	Gate-Drain Charge		---	6.3	---	
T _{d(on)}	Turn-On Delay Time		---	8	---	
T _r	Rise Time	V _{DD} =30V, V _{GS} =10V, R _G =3.3Ω, I _D =10A	---	14.2	---	ns
T _{d(off)}	Turn-Off Delay Time		---	24.4	---	
T _f	Fall Time		---	4.6	---	
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1MHz	---	1378	---	pF
C _{oss}	Output Capacitance		---	86	---	
C _{rss}	Reverse Transfer Capacitance		---	64	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current ^{1,5}	V _G =V _D =0V, Force Current	---	---	30	A
I _{SM}	Pulsed Source Current ^{2,5}		---	---	46	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V, I _S =1A, T _J =25°C	---	---	1.2	V

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2.The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%
- 3.The EAS data shows Max. rating. The test condition is V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=22.6A
- 4.The power dissipation is limited by 150C junction temperature
- 5.The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.

Typical Characteristics

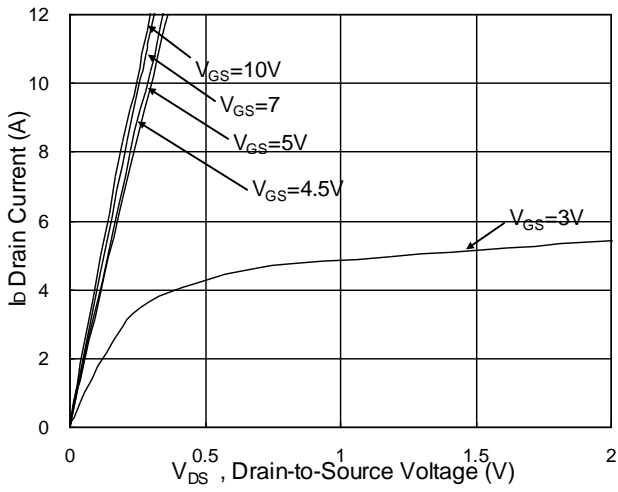


Fig.1 Typical Output Characteristics

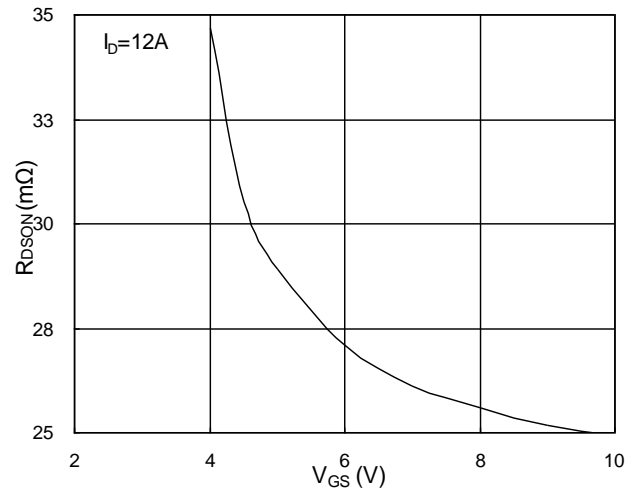


Fig.2 On-Resistance v.s Gate-Source

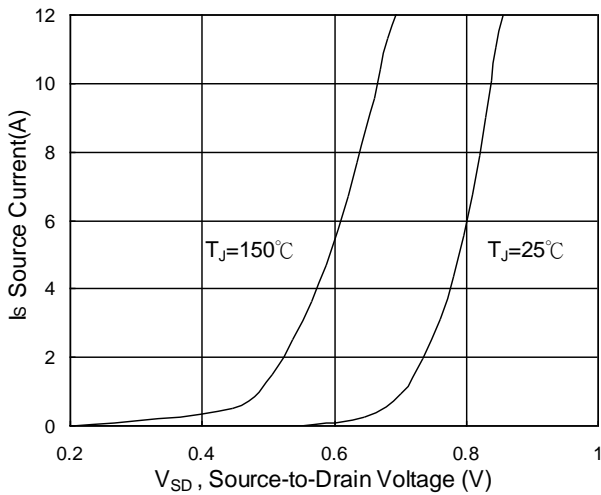


Fig.3 Forward Characteristics of Reverse

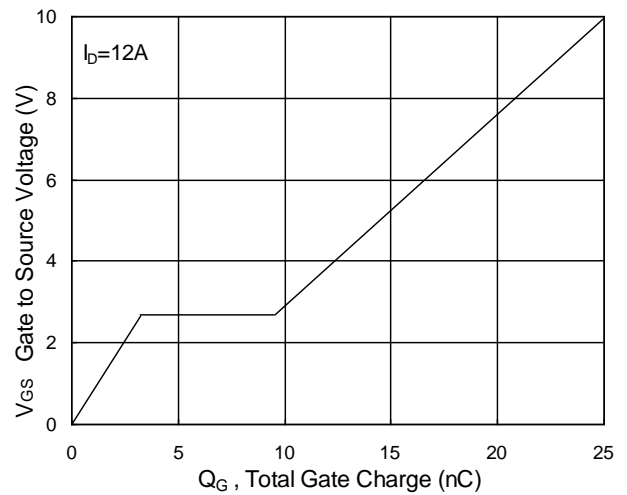


Fig.4 Gate-Charge Characteristics

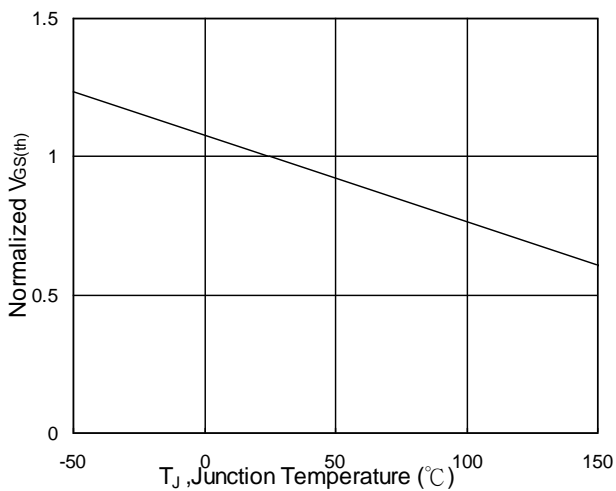


Fig.5 Normalized V_{GS(th)} v.s T_J

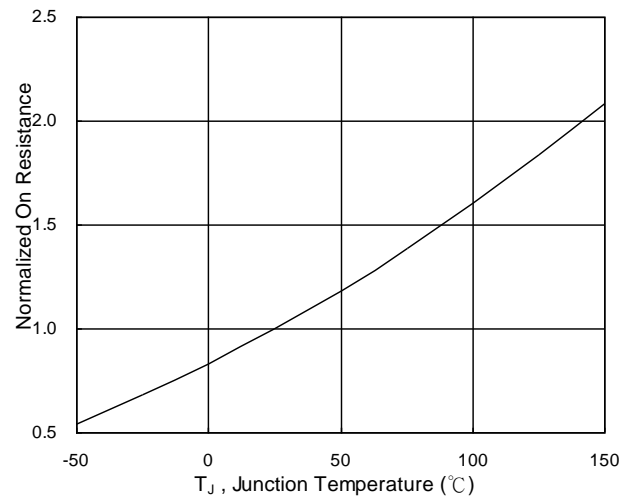


Fig.6 Normalized R_{DS(on)} v.s T_J

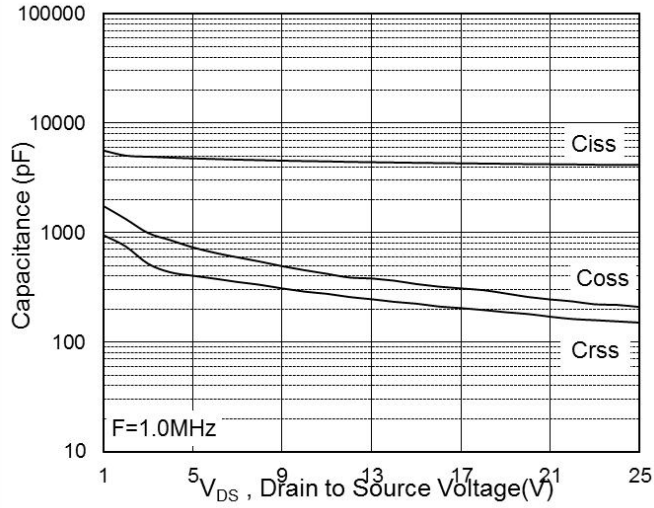


Fig.7 Capacitance

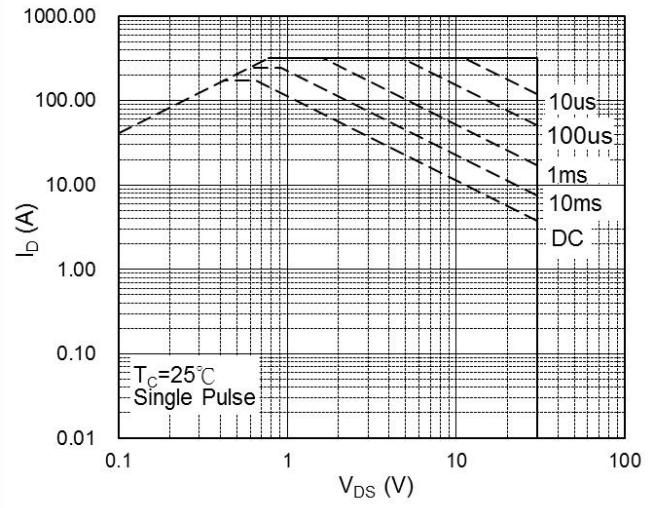


Fig.8 Safe Operating Area

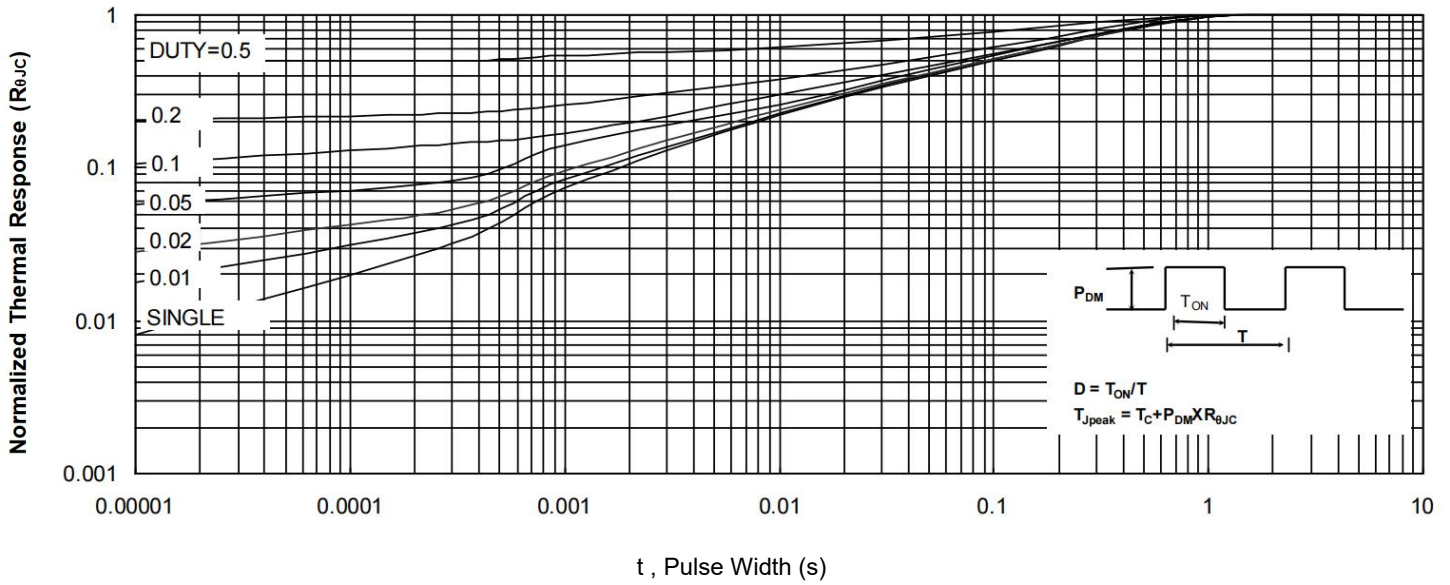


Fig.9 Normalized Maximum Transient Thermal Impedance

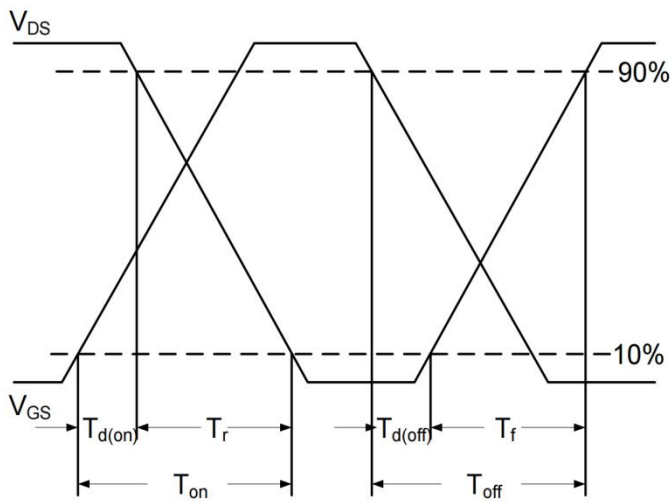


Fig.10 Switching Time Waveform

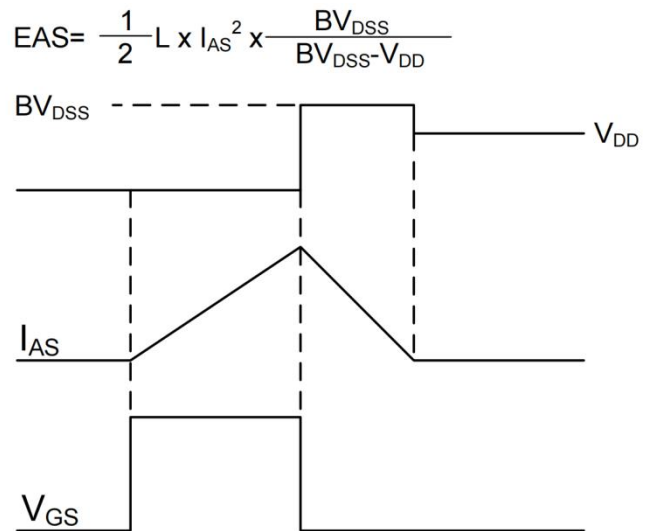
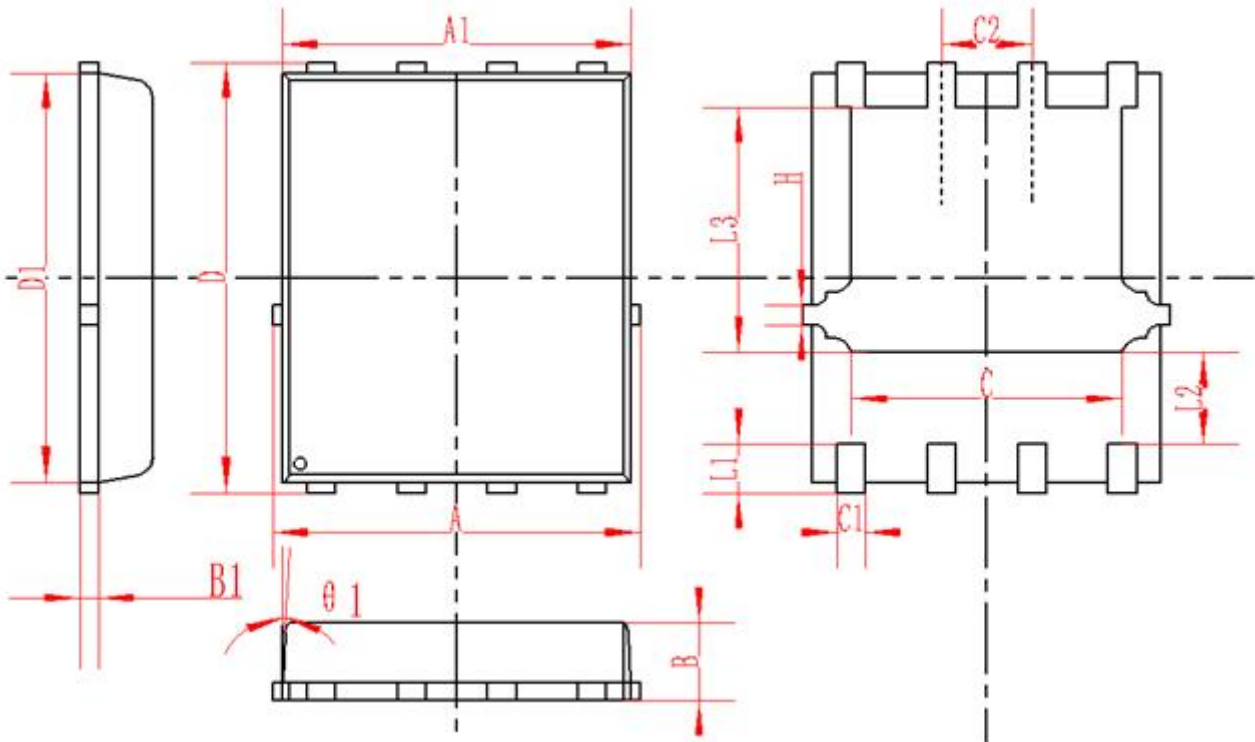


Fig.11 Unclamped Inductive Switching Waveform

$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$

DFN5X6-8L 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

REEL SPECIFICATION

P/N	PKG	QTY
Si7850DP-MS	DFN5X6-8L	5000

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