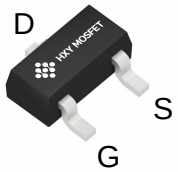
HM5121

P-Channel Enhancement Mode MOSFET

Description

The HM5121 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V.
This device is suitable for use as a Battery protection or in other Switching application.



SOT-23-3L

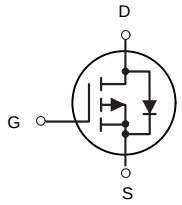
General Features

V_{DS} = -20V,I_D = -7A

$R_{DS(ON)}$ < 26mΩ @ V_{GS}=4.5V

Application

High power and current handing capability
Lead free product is acquired
Surface mount package
PWM applications
Load switch
Power management



P-Channel MOSFET

Ordering Information

Product ID	Pack	Marking	Qty(PCS)
HM5121	SOT-23-3L	20P07	3000PCS

Absolute Maximum Ratings (T_A=25℃unless otherwise noted)

Symbol	Parameter	Limit	Unit
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-Source Voltage	±12	V
I_D	Drain Current-Continuous	-7	A
I_{DM}	Drain Current-Pulsed (Note 1)	-18.8	A
P_D	Maximum Power Dissipation	1	W
T_J,T_{STG}	Operating Junction and Storage Temperature Range	-55 To 150	℃
$R_{\theta JA}$	Thermal Resistance,Junction-to-Ambient (Note 2)	125	℃/W

Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=-250uA	-20	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BVDSS Temperature Coefficient	Reference to 25℃ , I_D=-1mA	---	-0.01	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=-4.5V , I_D=-6.5A	---	20	26	mΩ
		V_{GS}=-2.5V , I_D=-5A	---	34	40	
		V_{GS}=-1.8V , I_D=-1.5A	---	---	---	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250uA	-0.6	-0.8	-1.4	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	---	---	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-20V , V_{GS}=0V , T_J=25℃	---	---	-1	uA
		V_{DS}=-16V , V_{GS}=0V , T_J=55℃	---	---	---	
I_{GSS}	Gate-Source Leakage Current	V_{GS} =±12V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=-5V , I_D=-3A	---	10	---	S
Q_g	Total Gate Charge (-4.5V)	V_{DS}=-10V , V_{GS}=-4.5V , I_D=-6.5A	---	10	---	nC
Q_{gs}	Gate-Source Charge		---	1.5	---	
Q_{gd}	Gate-Drain Charge		---	3	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=-10V , V_{GS}=-4.5V , R_G=6.0Ω I_D=-1A	---	30	---	ns
T_r	Rise Time		---	25	---	
$T_{d(off)}$	Turn-Off Delay Time		---	70	---	
T_f	Fall Time		---	50	---	
C_{iss}	Input Capacitance	V_{DS}=-10V , V_{GS}=0V , f=1MHz	---	1210	---	pF
C_{oss}	Output Capacitance		---	310	---	
C_{rss}	Reverse Transfer Capacitance		---	290	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,4]	V_G=V_D=0V , Force Current	---	---	-7.0	A
I_{SM}	Pulsed Source Current[2,4]		---	---	-18.8	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=-1A , T_J=25℃	---	---	-1	V
t_{rr}	Reverse Recovery Time	I_F=-4A , dI/dt=100A/μs , T_J=25℃	---	52	---	nS
Q_{rr}	Reverse Recovery Charge		---	28	---	nC

Note :
1.The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
3.The power dissipation is limited by 150℃ junction temperature
4.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

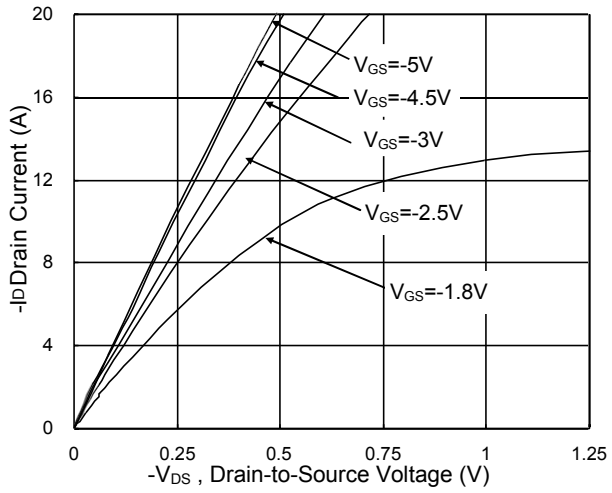


Fig.1 Typical Output Characteristics

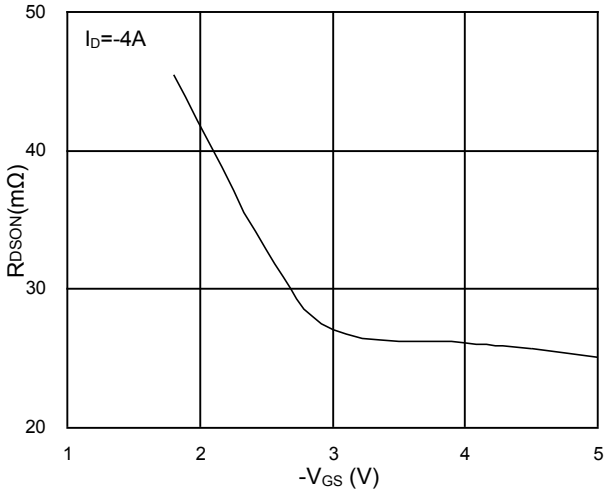


Fig.2 On-Resistance vs. Gate-Source

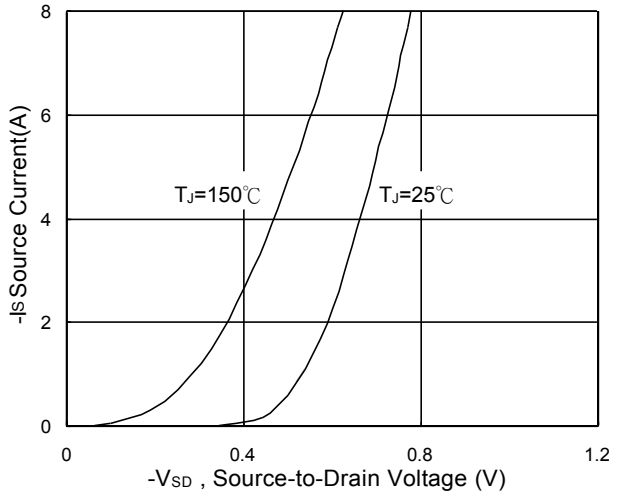


Fig.3 Forward Characteristics Of Reverse

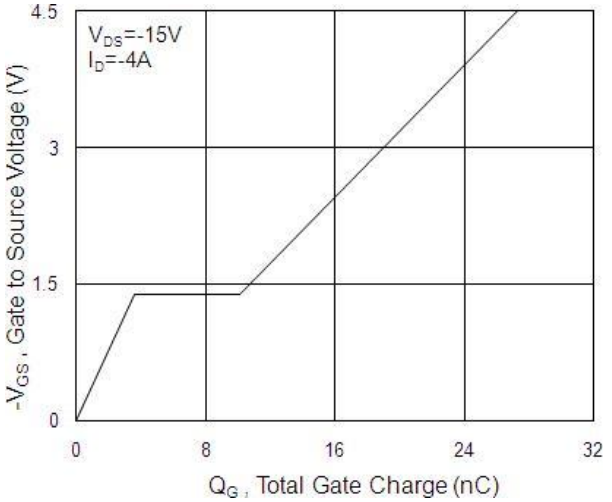


Fig.4 Gate-Charge Characteristics

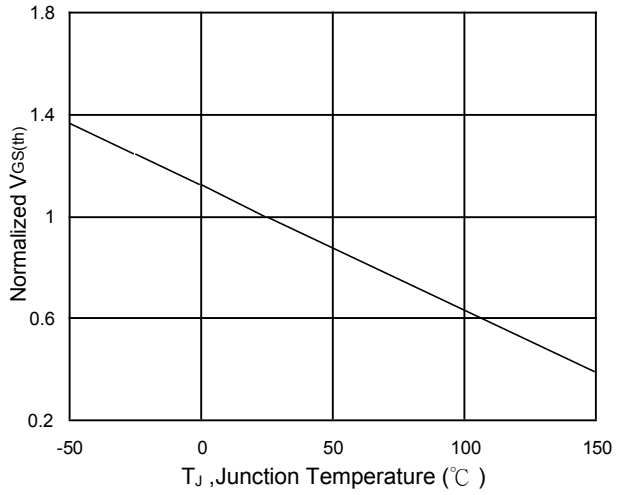


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

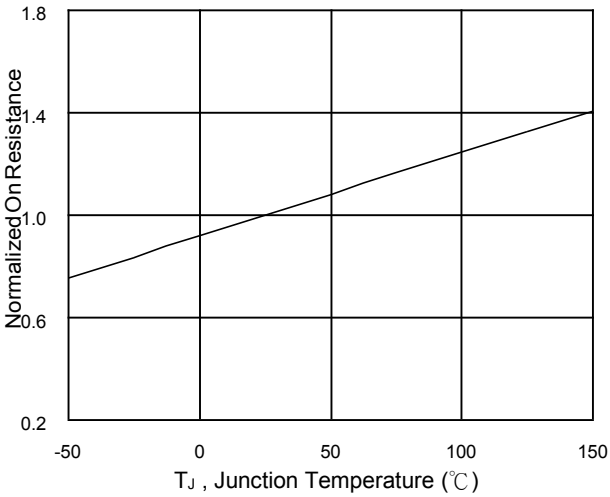


Fig.6 Normalized R_{DSON} vs. T_J

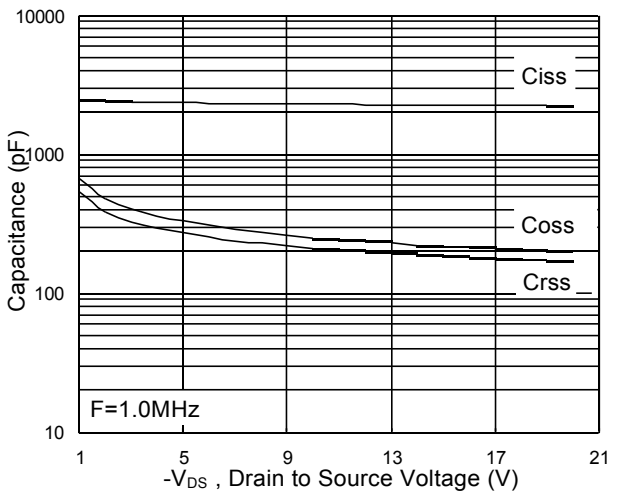


Fig.7 Capacitance

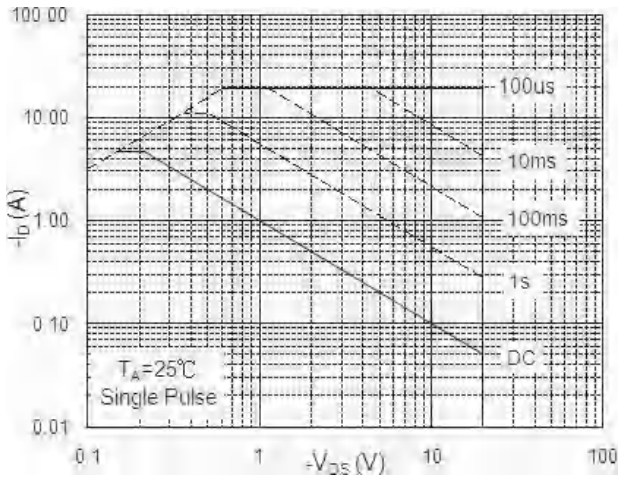


Fig.8 Safe Operating Area

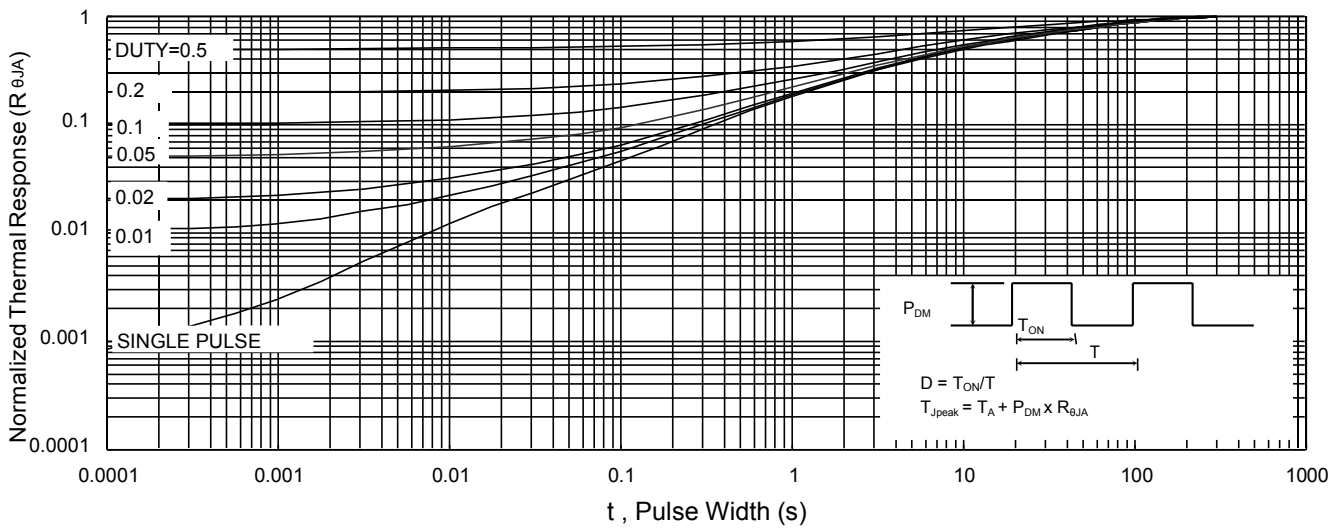


Fig.9 Normalized Maximum Transient Thermal Impedance

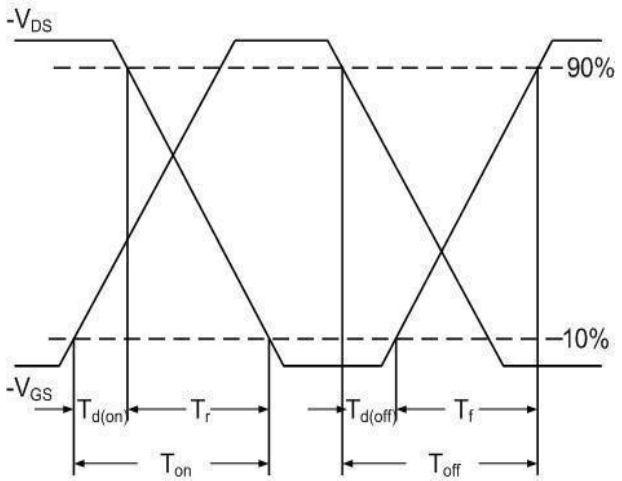


Fig.10 Switching Time Waveform

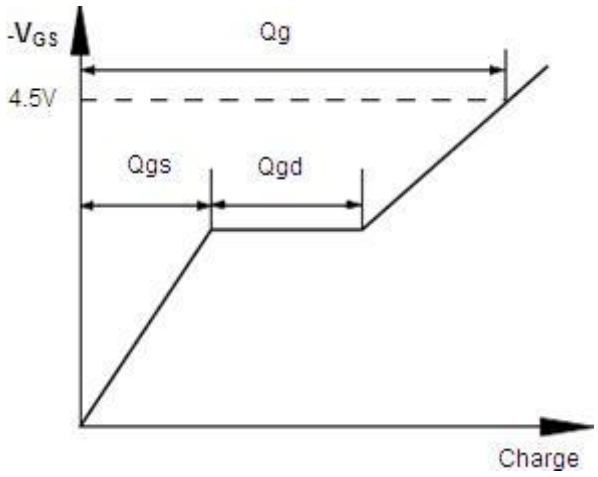
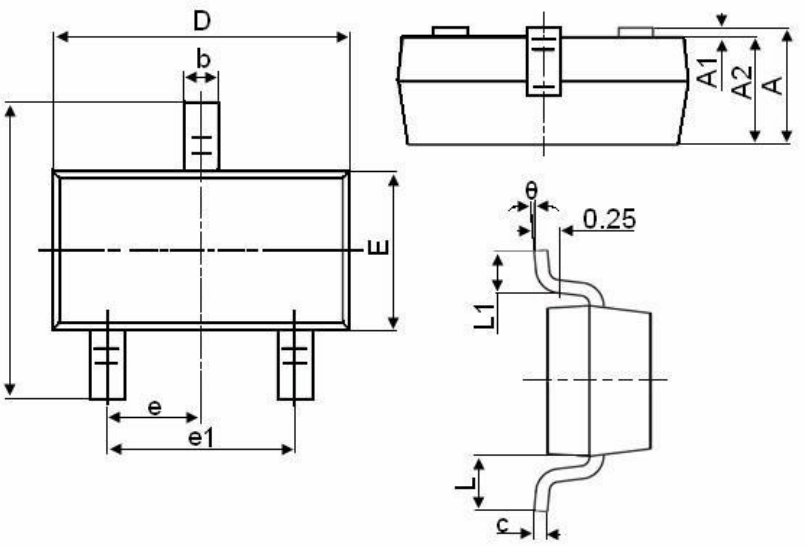


Fig.11 Gate Charge Waveform

SOT-23-3L Package Information



Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	1.050	1.250
A1	0.000	0.100
A2	1.050	1.150
b	0.300	0.500
c	0.100	0.200
D	2.800	3.000
E	1.500	1.700
E1	2.650	2.950
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.600
θ	0°	8°

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