



Description

The SIR401DP-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

$V_{DS} = -18V$ $I_D = -80A$

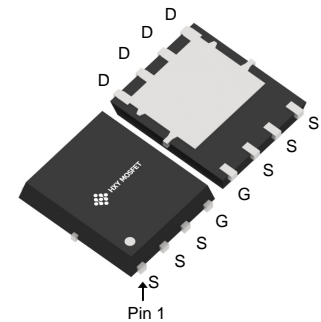
$R_{DS(ON)} < 3\text{ m}\Omega$ $V_{GS} = -10V$

Application

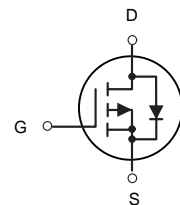
Battery protection

Load switch

Uninterruptible power supply



DFN5X6-8L
(PowerPAK-SO-8)



P-Channel MOSFET

Package Marking and Ordering Information

Product ID	Pack	Brand	Qty(PCS)
SIR401DP-T1-GE3	DFN5X6-8L (PowerPAK-SO-8)	HXY MOSFET	5000

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-18	V
V_{GS}	Gate-Source Voltage	± 12	V
$I_D@T_c=25^{\circ}\text{C}$	Continuous Drain Current, V_{GS} @ 10V ¹	-80	A
I_{DM}	Pulsed Drain Current ²	-360	A
$P_D@T_c=25^{\circ}\text{C}$	Total Power Dissipation ⁴	41.67	W
T_{STG}	Storage Temperature Range	-55 to 150	$^{\circ}\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^{\circ}\text{C}$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	62	$^{\circ}\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	3	$^{\circ}\text{C/W}$



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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V , I _D =-250uA	-18	---	---	V
ΔBV _{DSS} /ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C , I _D =-1mA	---	-0.008	---	V/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =-20V , V _{GS} =0V , T _J =25°C	---	---	-1	uA
		V _{DS} =-16V , V _{GS} =0V , T _J =125°C	---	---	-30	uA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±12V , V _{DS} =0V	---	---	±500	nA
R _{DS(ON)}	Static Drain-Source On-Resistance					mΩ
		V _{GS} =-4.5V , I _D =-20A	---	2.5	3.0	
		V _{GS} =-2.5V , I _D =-20A	---	3.3	4.5	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =-250uA	-0.4	-0.6	-1.0	V
ΔV _{GS}	V _{GS(th)} Temperature Coefficient		---	-3.44	---	mV/°C
g _{fs}	Forward Transconductance	V _{DS} =-10V , I _S =-3A	---	30	---	S
Q _g	Total Gate Charge ^{2, 3}	V _{DS} =-16V , V _{GS} =-4.5V , I _D =-5A	---	149	225	nC
Q _{gs}	Gate-Source Charge ^{2, 3}		---	14.4	22	
Q _{gd}	Gate-Drain Charge ^{2, 3}		---	42.8	65	
T _{d(on)}	Turn-On Delay Time ^{2, 3}	V _{DD} =-15V , V _{GS} =-4.5V , R _G =25Ω I _D =-1A	---	21.2	42	nS
T _r	Rise Time ^{2, 3}		---	20.6	40	
T _{d(off)}	Turn-Off Delay Time ^{2, 3}		---	26	52	
T _f	Fall Time ^{2, 3}		---	400	600	
C _{iss}	Input Capacitance	V _{DS} =-15V , V _{GS} =0V , F=1MHz	---	12000	16000	pF
C _{oss}	Output Capacitance		---	1670	2500	
C _{rss}	Reverse Transfer Capacitance		---	730	1100	
R _g	Gate resistance	V _{GS} =0V , V _{DS} =0V , F=1MHz	---	2.6	---	Ω
I _S	Continuous Source Current	V _G =V _D =0V , Force Current	---	---	-85	A
I _{SM}	Pulsed Source Current		---	---	-190	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V , I _S =-1A , T _J =25°C	---	---	-1	V

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
3. Essentially independent of operating temperature.



Typical Performance Characteristics

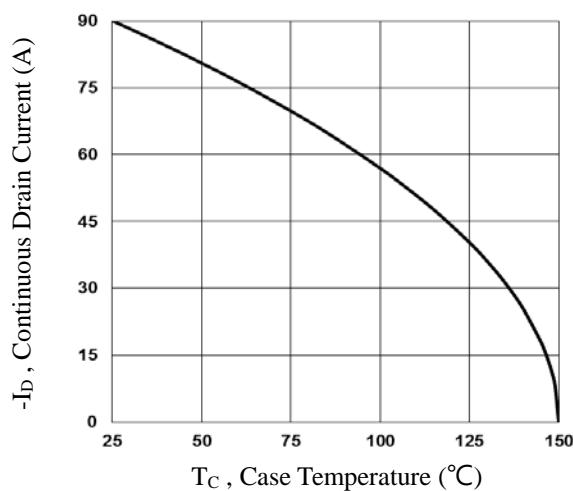


Fig.1 Continuous Drain Current vs. T_C

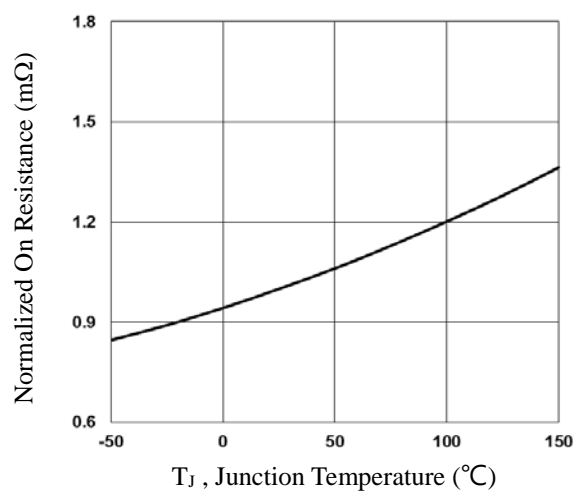


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

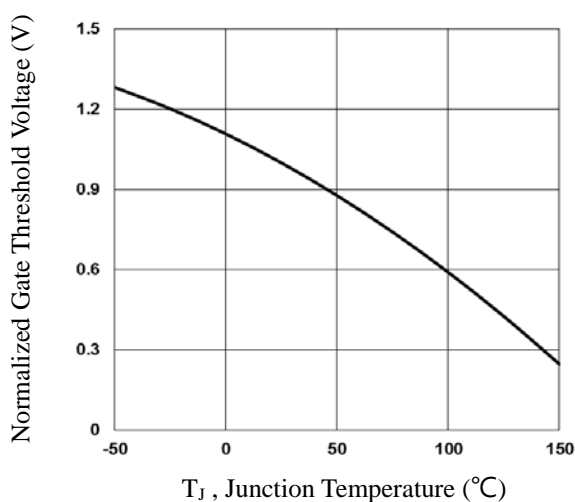


Fig.3 Normalized V_{th} vs. T_J

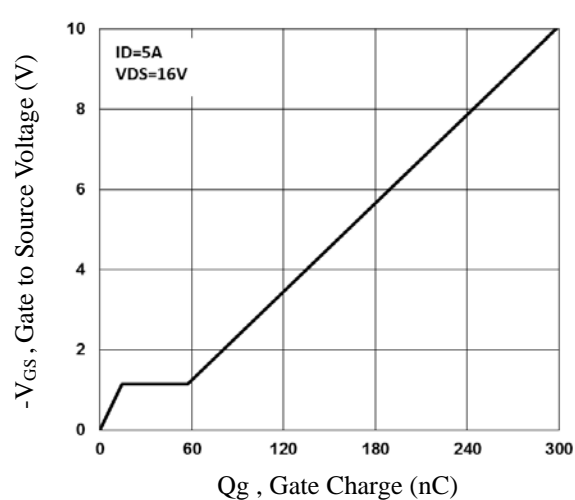


Fig.4 Gate Charge Waveform

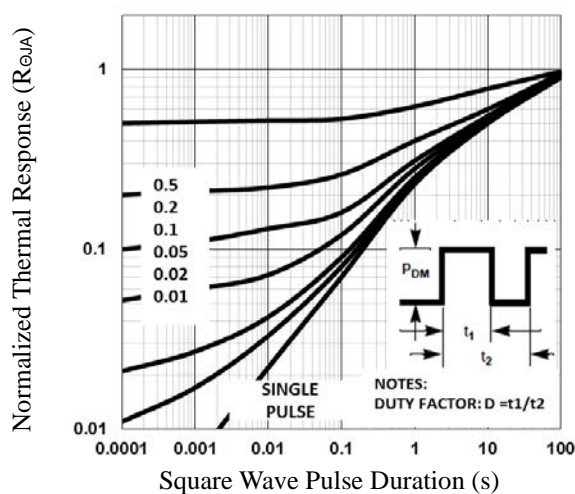


Fig.5 Normalized Transient Response

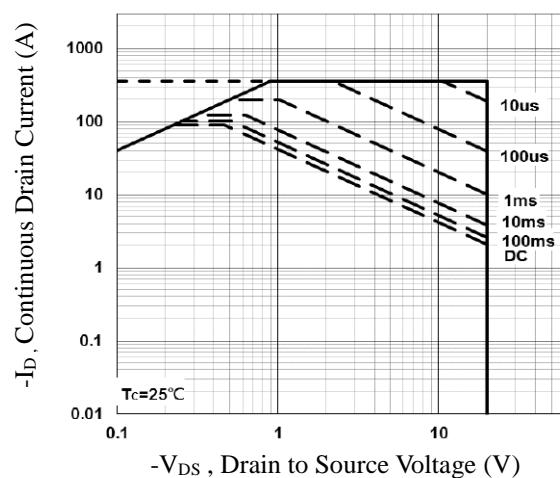


Fig.6 Maximum Safe Operation Area

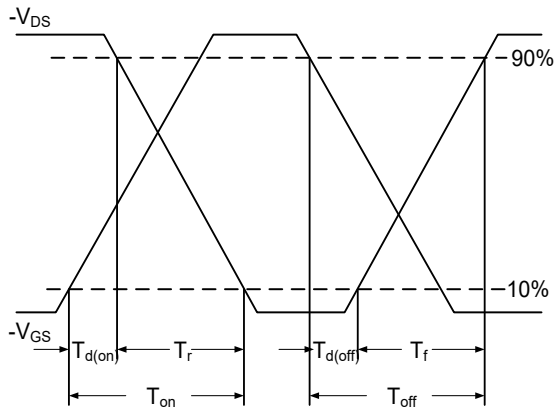


Fig.7 Switching Time Waveform

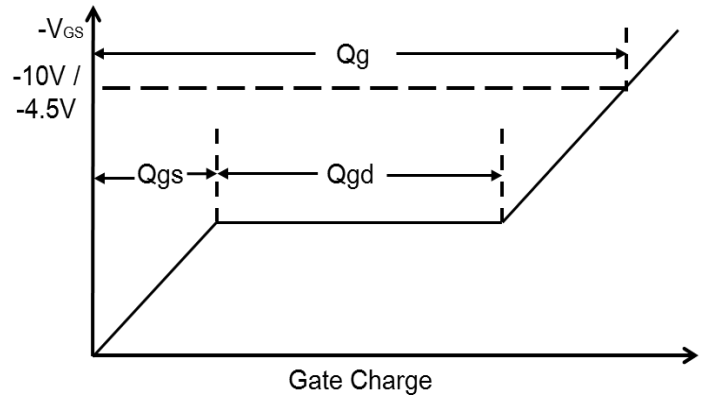
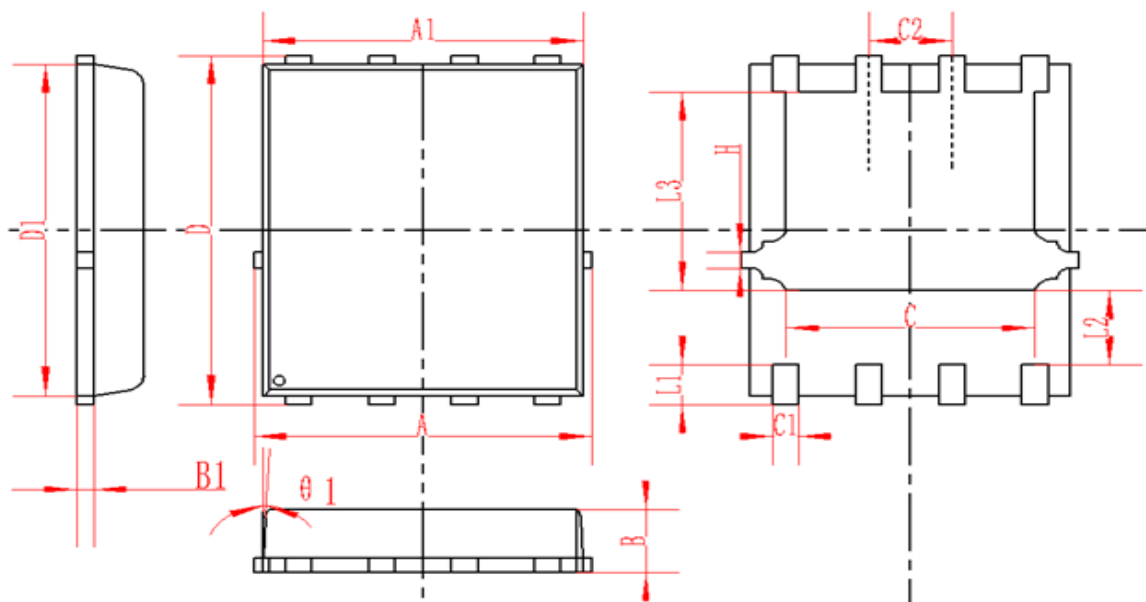


Fig.8 Gate Charge Waveform



DFN3X3-8L(PowerPAK-SO-8) 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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