HSK4101

P-Ch 40V Fast Switching MOSFETs

Description

The HSK4101 is the high cell density trenched P-ch MOSFETs, which provides excellent RDSON and efficiency for most of the small power switching and load switch applications.
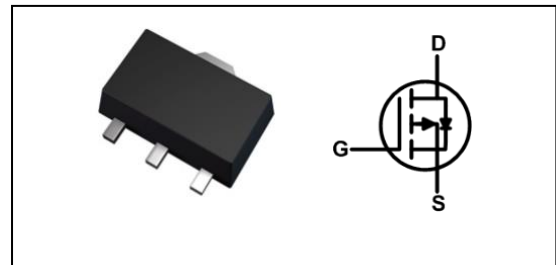
The HSK4101 meet the RoHS and Green Product requirement with full function reliability approved.

- Green Device Available
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- Advanced high cell density Trench technology

Product Summary

V_{DS}	-40	V
$R_{DS(ON),max}$	70	mΩ
I_D	-5.8	A

SOT89 Pin Configuration

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-40	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_A=25°C$	Continuous Drain Current, V_{GS} @ -4.5V[1]	-5.8	A
$I_D@T_A=70°C$	Continuous Drain Current, V_{GS} @ -4.5V[1]	-5.0	A
I_{DM}	Pulsed Drain Current[2]	-20	A
$P_D@T_A=25°C$	Total Power Dissipation[3]	1.4	W
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	---	125	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	85	°C/W

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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	-40	---	---	V
$\triangle$BV$_{DSS}$/$\triangle$T$_J$	BV$_{DSS}$ Temperature Coefficient	Reference to 25℃ , I$_D$=-1mA	---	-0.018	---	V/℃
R$_{DS(ON)}$	Static Drain-Source On-Resistance$_2$	V$_{GS}$=-4.5V , I$_D$=-3A	---	---	70	mΩ
		V$_{GS}$=-2.5V , I$_D$=-2A	---	---	100	
V$_{GS(th)}$	Gate Threshold Voltage	V$_{GS}$=V$_{DS}$, I$_D$ =-250uA	-1.0	---	-2.5	V
$\triangle$V$_{GS(th)}$	V$_{GS(th)}$ Temperature Coefficient		---	2.5	---	mV/℃
I$_{DSS}$	Drain-Source Leakage Current	V$_{DS}$=-24V , V$_{GS}$=0V , T$_J$=25℃	---	---	-1	uA
		V$_{DS}$=-24V , V$_{GS}$=0V , T$_J$=55℃			-5	
I$_{GSS}$	Gate-Source Leakage Current	V$_{GS}$=±20V , V$_{DS}$=0V	---	---	±100	nA
gfs	Forward Transconductance	V$_{DS}$=-5V , I$_D$=-3A	---	5.8	---	S
Q$_g$	Total Gate Charge (-4.5V)	V$_{DS}$=-32V , V$_{GS}$=-4.5V , I$_D$=-3A	---	6.4	---	nC
Q$_{gs}$	Gate-Source Charge		---	2.1	---	
Q$_{gd}$	Gate-Drain Charge		---	2.5	---	
T$_{d(on)}$	Turn-On Delay Time	V$_{DD}$=-20V , V$_{GS}$=-4.5V , R$_G$=3.3Ω, I$_D$=-3A	---	4.2	---	ns
T$_r$	Rise Time		---	23	---	
T$_{d(off)}$	Turn-Off Delay Time		---	26.8	---	
T$_f$	Fall Time		---	20.6	---	
C$_{iss}$	Input Capacitance	V$_{DS}$=-15V , V$_{GS}$=0V , f=1MHz	---	620	---	pF
C$_{oss}$	Output Capacitance		---	65	---	
C$_{rss}$	Reverse Transfer Capacitance		---	53	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I$_S$	Continuous Source Current$_{1,4}$	V$_G$=V$_D$=0V , Force Current	---	---	-5.8	A
I$_{SM}$	Pulsed Source Current$_{2,4}$		---	---	-20	A
V$_{SD}$	Diode Forward Voltage$_2$	V$_{GS}$=0V , I$_S$=-1A , T$_J$=25℃	---	---	-1	V

Note :
1.The data tested by surface mounted on a 1 inch$_2$ FR-4 board with 2OZ copper.
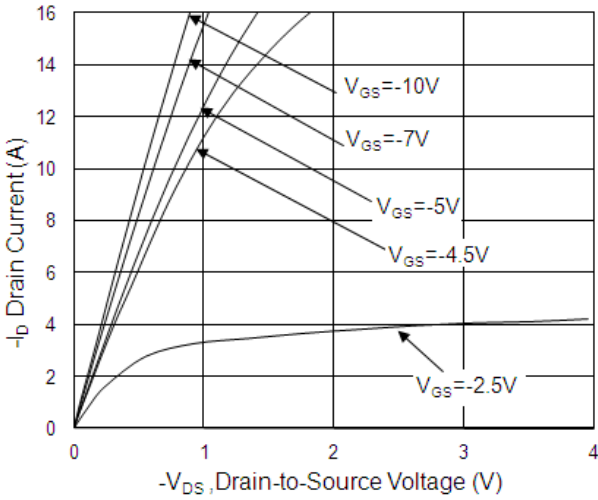2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
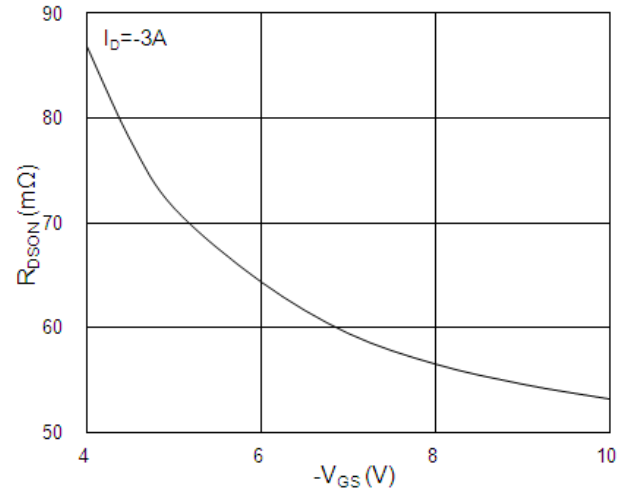3.The power dissipation is limited by 150℃ junction temperature
4.The data is theoretically the same as I$_D$ and I$_{DM}$, in real applications , should be limited by total power dissipation.
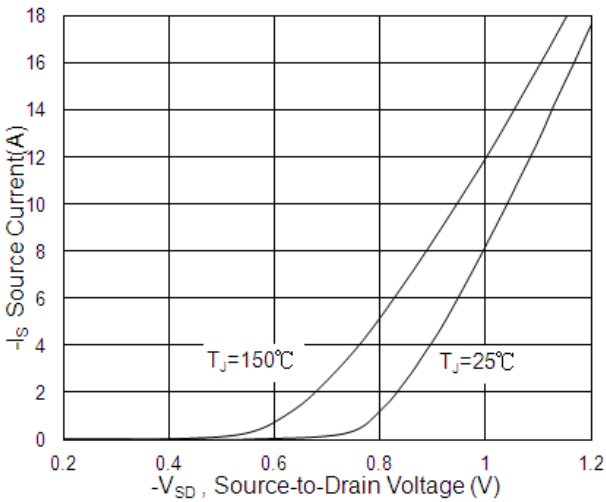
HUASHUO SEMICONDUCTOR

Typical Characteristics
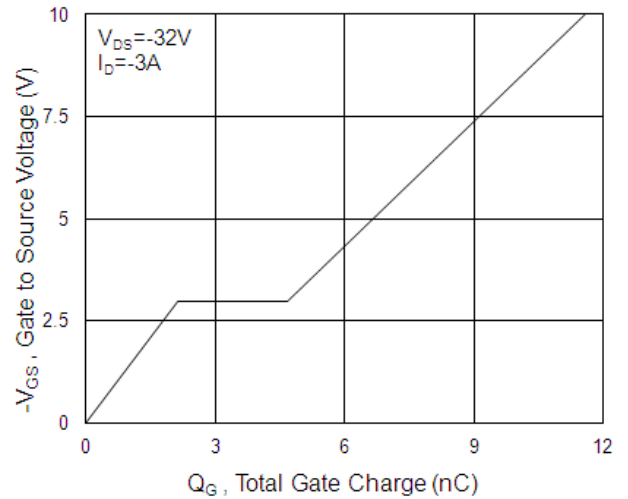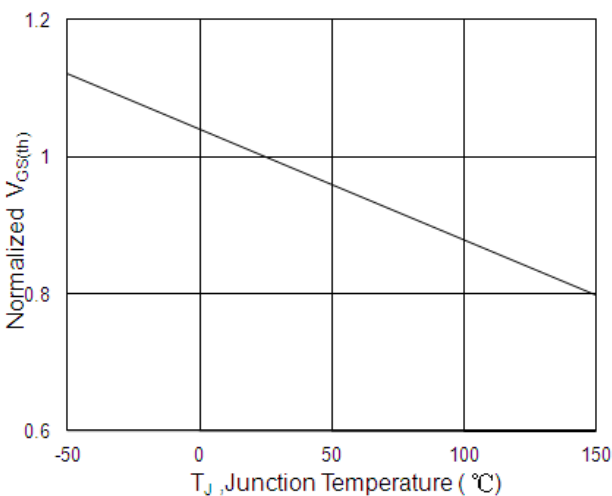

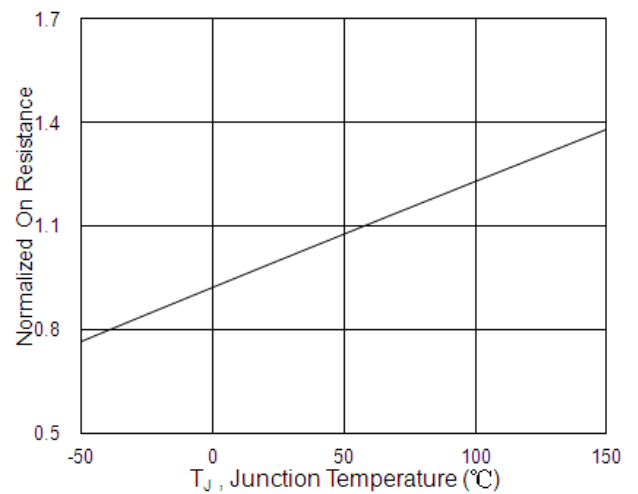Fig.1 Typical Output Characteristics

Fig.2 On-Resistance vs. G-S Voltage

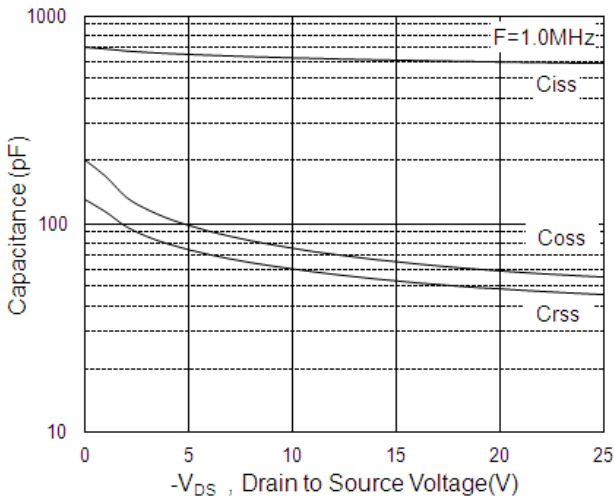Fig.3 Forward Characteristics Of Reverse

Fig.4 Gate-Charge Characteristics
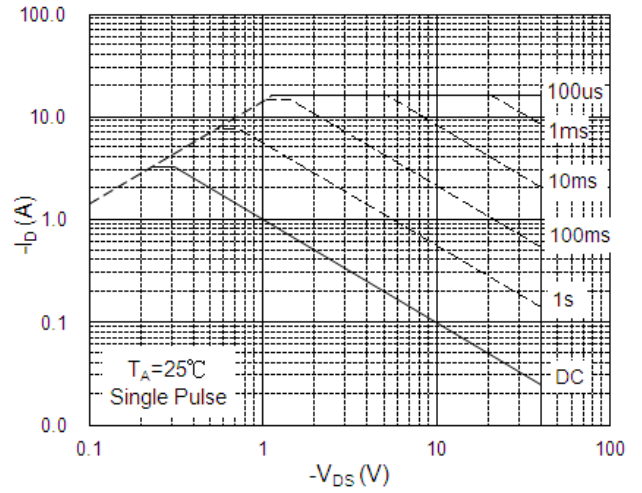

Fig.5 Normalized $V_{GS(th)}$ vs. T_J
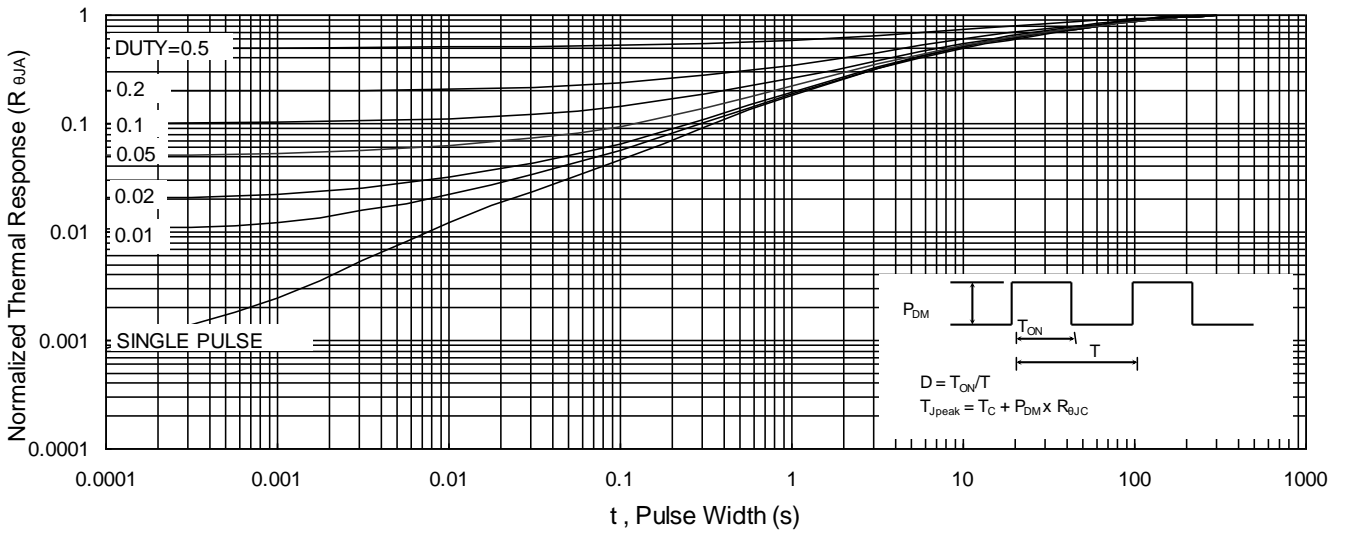

Fig.6 Normalized R_{DSON} vs. T_J

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Fig.7 Capacitance

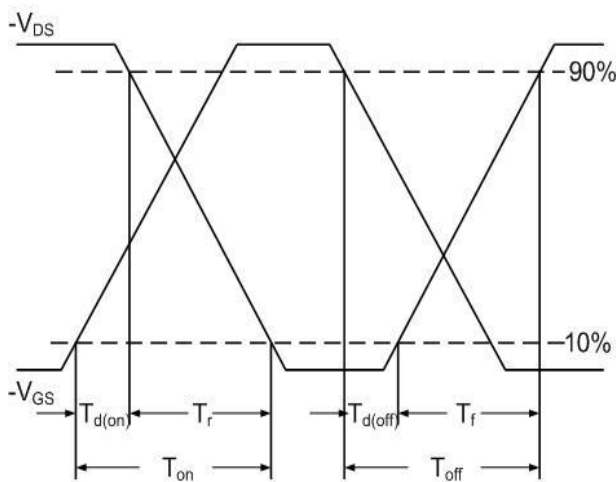**Fig.8 Safe Operating Area**
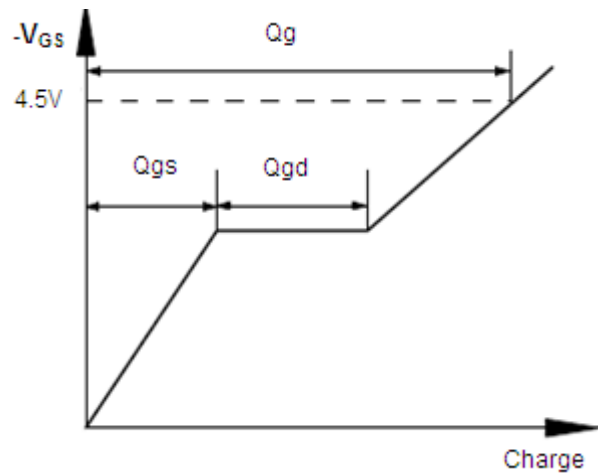

$$D = T_{ON}/T$$
$$T_{Jpeak} = T_C + P_{DM} \times R_{\theta JC}$$

Fig.9 Normalized Maximum Transient Thermal Impedance

Fig.10 Switching Time Waveform

Fig.11 Gate Charge Waveform

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Ordering Information

Part Number	Package code	Packaging
HSK4101	SOT-89	4000/Tape&Reel

SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.397	1.600	0.055	0.063
b	0.420	0.540	0.017	0.021
b1	0.420	0.540	0.017	0.021
B	2.388	2.591	0.094	0.102
C	3.937	4.242	0.155	0.167
C1	0.787	1.194	0.031	0.047
D	4.394	4.597	0.173	0.181
D1	1.397	1.753	0.055	0.069
e	1.448	1.549	0.057	0.061
H	0.350	0.44	0.014	0.017