

General Description

The HSL0004 is the high cell density trench N-ch MOSFETs, which provides excellent RDSON and efficiency for most of the small power switching and load switch applications. The HSL0004 meets the RoHS and Green Product requirement with full function reliability approved.

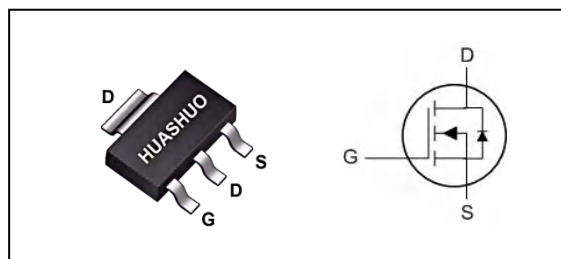
Features

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

Product Summary

V_{DS}	100	V
$R_{DS(ON),typ}$	90	mΩ
I_D	3	A

SOT-223 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_A=25^{\circ}C$	Continuous Drain Current, $V_{GS} @ 10V^1$	3	A
$I_D@T_A=70^{\circ}C$	Continuous Drain Current, $V_{GS} @ 10V^1$	2.5	A
I_{DM}	Pulsed Drain Current ²	10	A
$P_D@T_A=25^{\circ}C$	Total Power Dissipation ³	1.5	W
T_{STG}	Storage Temperature Range	-55 to 150	$^{\circ}C$
T_J	Operating Junction Temperature Range	-55 to 150	$^{\circ}C$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient ¹	---	85	$^{\circ}C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	30	$^{\circ}C/W$

N-Ch 100V Fast Switching MOSFETs
Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	100	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=10V, I_D=2A$	---	90	112	$m\Omega$
		$V_{GS}=4.5V, I_D=1A$	---	95	120	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.0	1.5	2.5	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=80V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=80V, V_{GS}=0V, T_J=55^\circ\text{C}$	---	---	5	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
g_{fs}	Forward Transconductance	$V_{DS}=5V, I_D=2A$	---	20	---	S
R_g	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1\text{MHz}$	---	2	4	Ω
Q_g	Total Gate Charge (10V)	$V_{DS}=80V, V_{GS}=10V, I_D=2A$	---	26.2	36.7	nC
Q_{gs}	Gate-Source Charge		---	3.8	5.32	
Q_{gd}	Gate-Drain Charge		---	4.8	6.7	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=50V, V_{GS}=10V, R_G=3.3\Omega, I_D=2A$	---	4.2	8.4	ns
T_r	Rise Time		---	7.6	14	
$T_{d(off)}$	Turn-Off Delay Time		---	41	82	
T_f	Fall Time		---	14	28	
C_{iss}	Input Capacitance	$V_{DS}=15V, V_{GS}=0V, f=1\text{MHz}$	---	1535	2149	pF
C_{oss}	Output Capacitance		---	60	84	
C_{rss}	Reverse Transfer Capacitance		---	37	52	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current ^{1,4}	$V_G=V_D=0V$, Force Current	---	---	2.5	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$	---	---	1.2	V
t_{rr}	Reverse Recovery Time	$I_F=2A, dI/dt=100A/\mu s, T_J=25^\circ\text{C}$	---	35	---	nS
Q_{rr}	Reverse Recovery Charge		---	17	---	nC

Note:

1. The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.

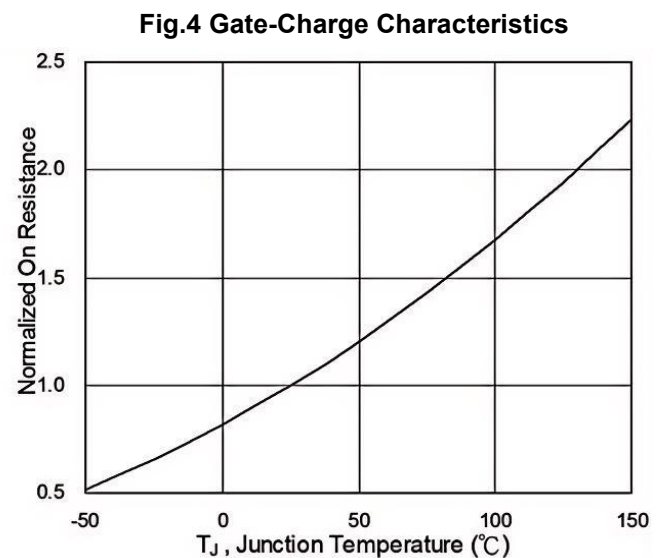
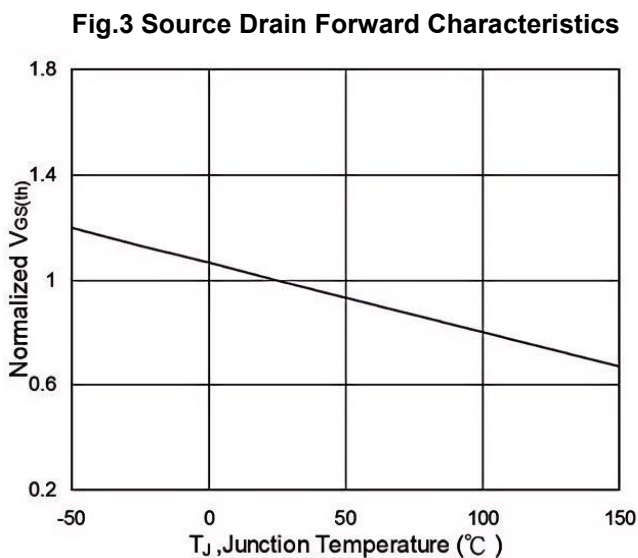
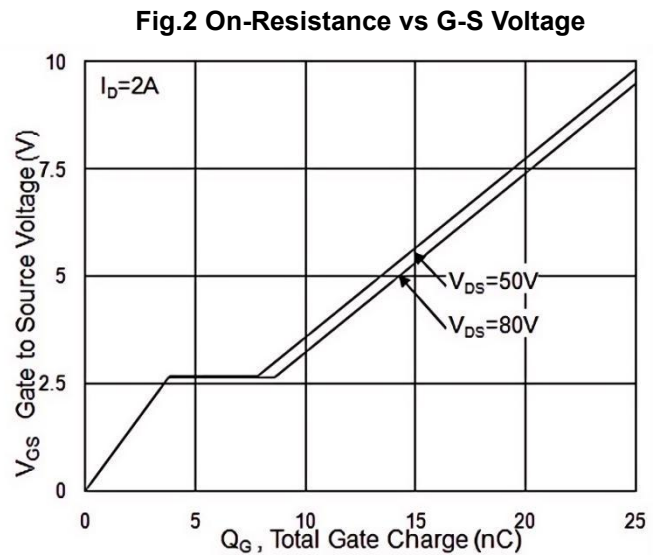
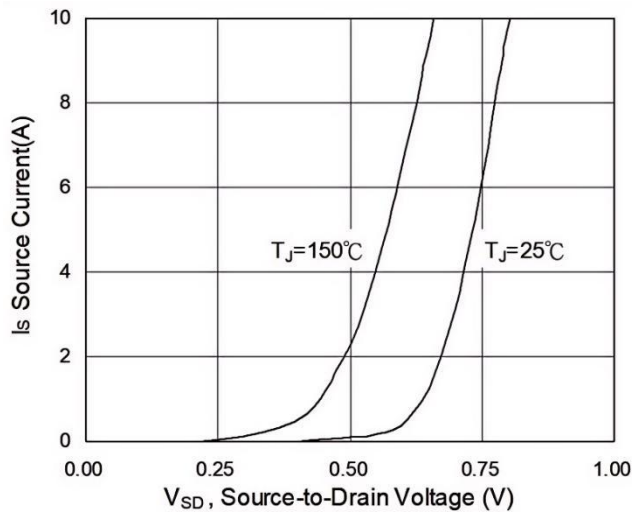
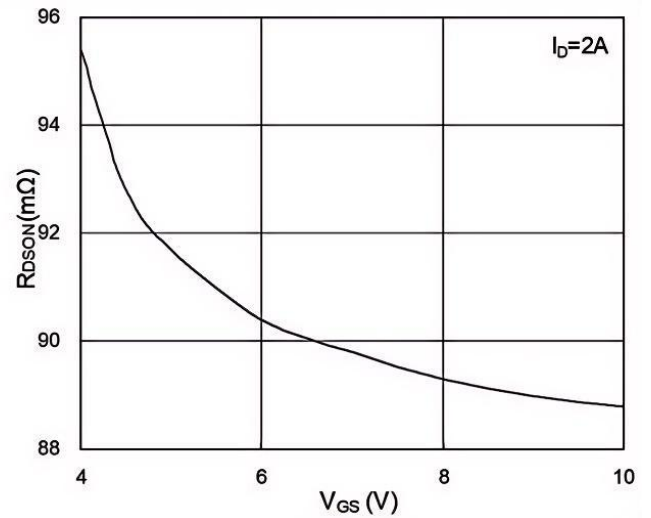
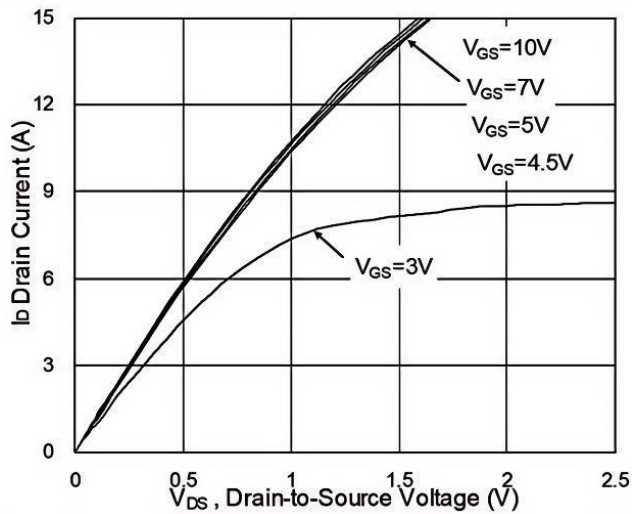
2. The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$

3. The power dissipation is limited by 150°C 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





N-Ch 100V Fast Switching MOSFETs

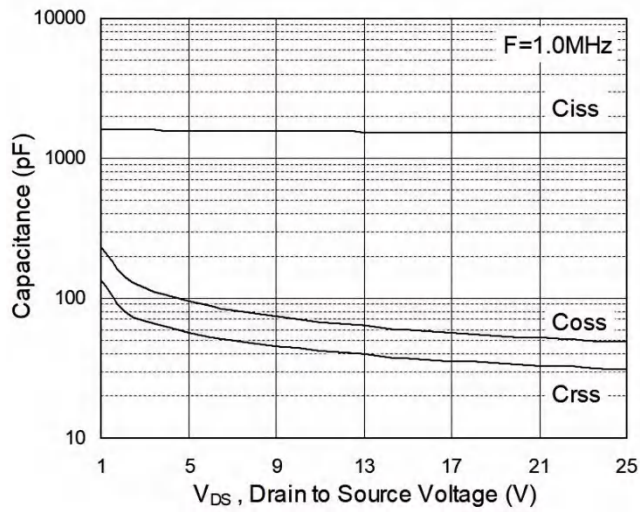


Fig.7 Capacitance

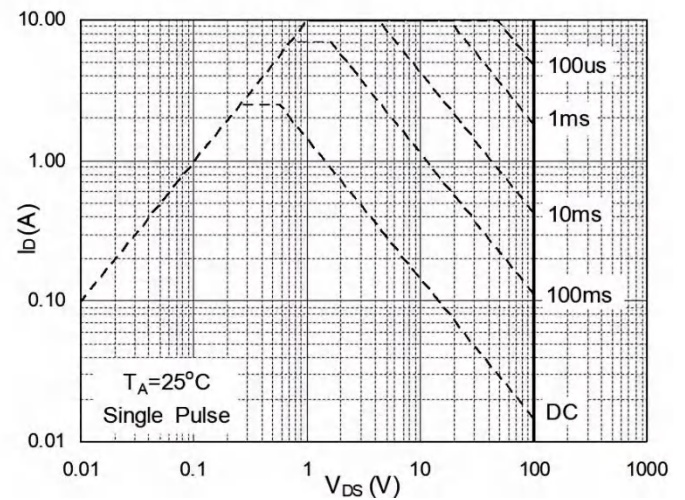


Fig.8 Safe Operating Area

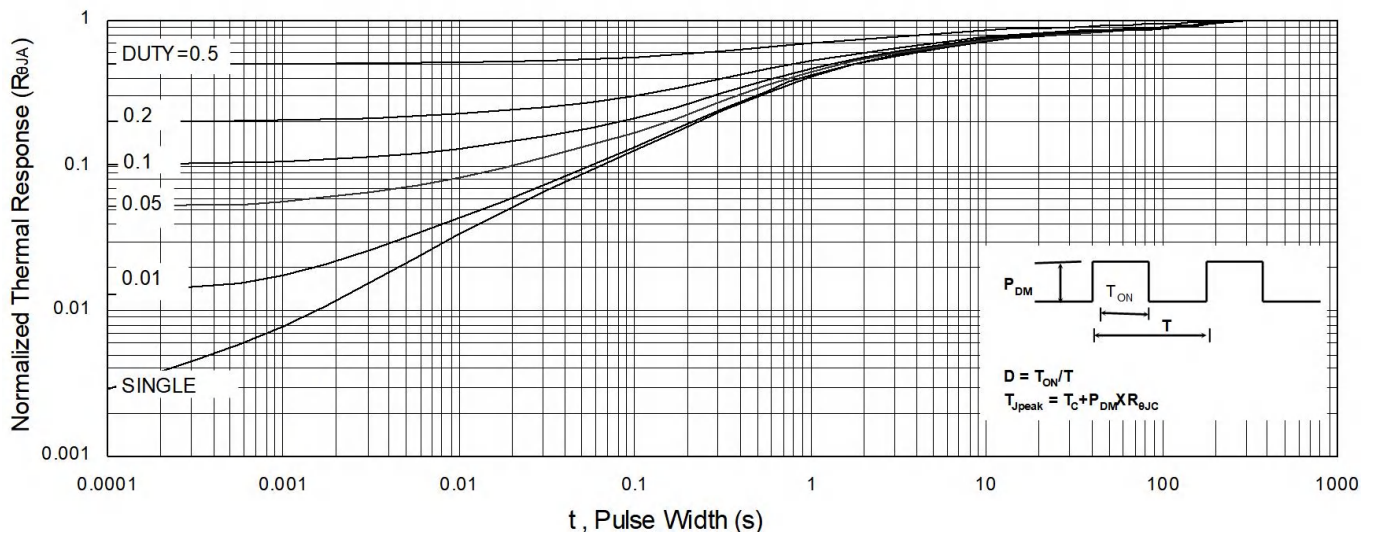


Fig.9 Normalized Maximum Transient Thermal Impedance

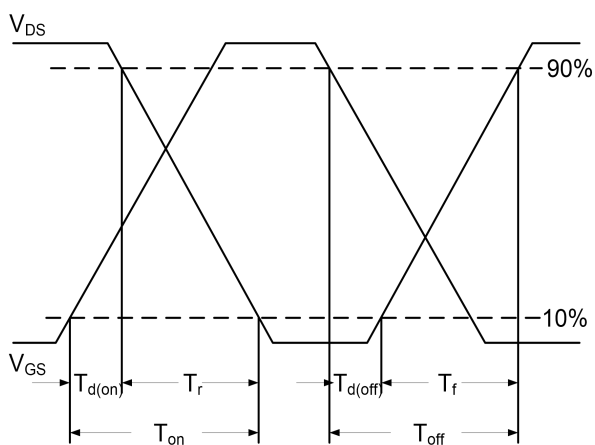


Fig.10 Switching Time Waveform

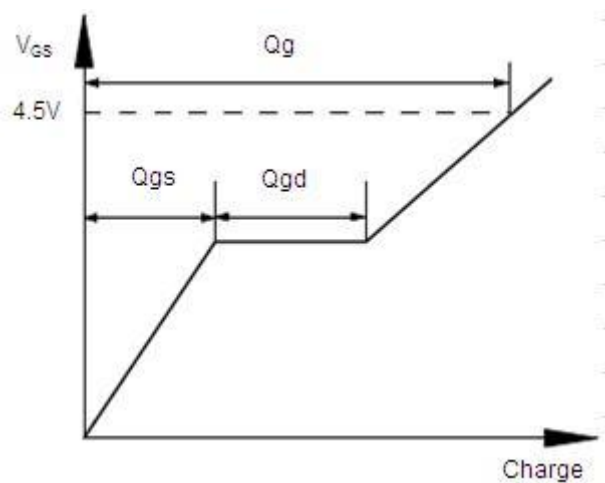
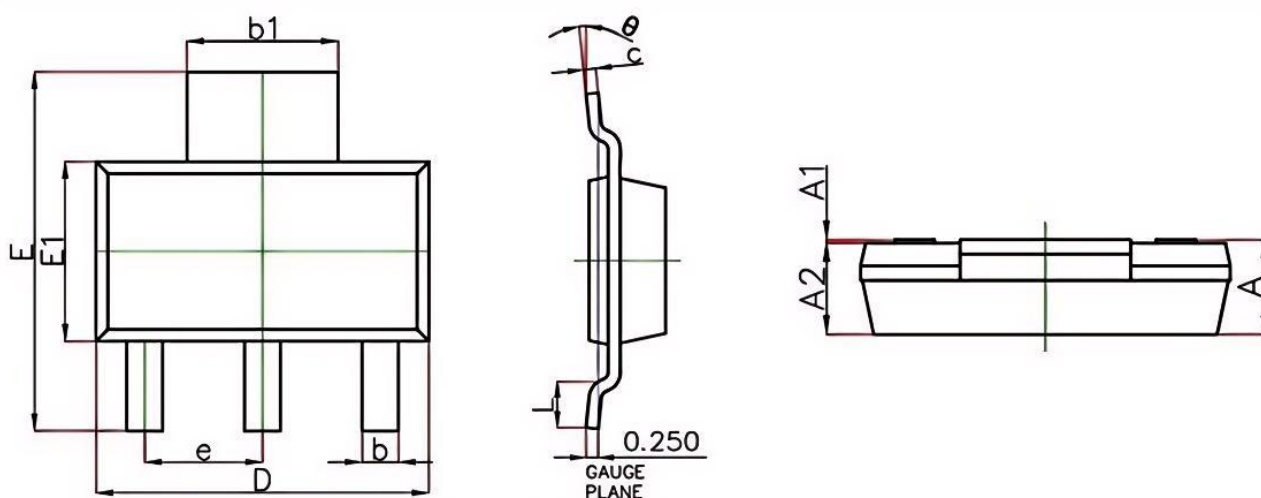


Fig.11 Gate Charge Waveform

Ordering Information

Part Number	Package code	Packaging
HSL0004	SOT-223	3000/Tape&Reel

SOT-223 Package Outline



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	-	1.800	-	0.071
A1	0.020	0.100	0.001	0.004
A2	1.450	1.750	0.057	0.069
b	0.660	0.840	0.026	0.033
b1	2.900	3.100	0.114	0.122
C	0.230	0.350	0.009	0.014
D	6.300	6.700	0.248	0.264
E	6.700	7.300	0.264	0.287
E1	3.300	3.700	0.130	0.146
e	2.300(BSC)		0.091(BSC)	
L	0.750	-	0.030	-
θ	0°	10°	0°	10°

HSL0004 Marking:

