

Description

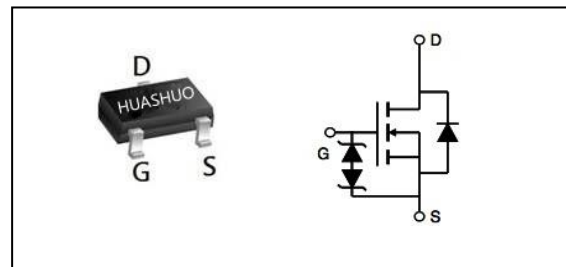
The HSS3416E is the high cell density trenched N-ch MOSFETs, which provides excellent R_{DS(ON)} and efficiency for most of the small power switching and load switch applications.

The HSS3416E meet the RoHS and Green Product requirement with full function reliability approved.

- Green Device Available
- Super Low Gate Charge
- Excellent C_{dv/dt} effect decline
- Advanced high cell density Trench technology
- ESD Protected 2KV

Product Summary

V _{DS}	20	V
R _{DS(ON),TYP}	20	mΩ
I _D	6	A

SOT23 Pin Configuration

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V _{DS}	Drain-Source Voltage	20	V
V _{GS}	Gate-Source Voltage	±12	V
I _D @T _A =25°C	Continuous Drain Current, V _{GS} @ 4.5V ₁	6.0	A
I _D @T _A =70°C	Continuous Drain Current, V _{GS} @ 4.5V ₁	5.0	A
I _{DM}	Pulsed Drain Current ₂	22	A
P _D @T _A =25°C	Total Power Dissipation ₃	1	W
P _D @T _A =70°C	Total Power Dissipation ₃	0.66	W
T _{STG}	Storage Temperature Range	-55 to 150	°C
T _J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Max.	Unit
R _{θJA}	Thermal Resistance Junction-ambient ₁	120	°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	20	---	---	V
ΔBV _{DSS} /ΔT _J	BVDSS Temperature Coefficient	Reference to 25°C, I _D =1mA	---	0.018	---	V/°C
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =4.5V, I _D =4A	---	20	25	mΩ
		V _{GS} =2.5V, I _D =3A	---	26	33	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	0.6	0.8	1.0	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	-3.1	---	mV/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =16V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =16V, V _{GS} =0V, T _J =55°C	---	---	5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±12V, V _{DS} =0V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =5V, I _D =4A	---	30	---	S
Q _g	Total Gate Charge (4.5V)	V _{DS} =15V, V _{GS} =4.5V, I _D =4A	---	8.6	---	nC
Q _{gs}	Gate-Source Charge		---	1.37	---	
Q _{gd}	Gate-Drain Charge		---	2.3	---	
T _{d(on)}	Turn-On Delay Time	V _{DS} =10V, V _{GS} =4.5V, R _G =3.3Ω I _D =4A	---	5.2	---	ns
T _r	Rise Time		---	34	---	
T _{d(off)}	Turn-Off Delay Time		---	23	---	
T _f	Fall Time		---	9.2	---	
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1MHz	---	670	---	pF
C _{oss}	Output Capacitance		---	75	---	
C _{rss}	Reverse Transfer Capacitance		---	68	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current ^{1,4}	V _G =V _D =0V, Force Current	---	---	6	A
I _{SM}	Pulsed Source Current ^{2,4}		---	---	17	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 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

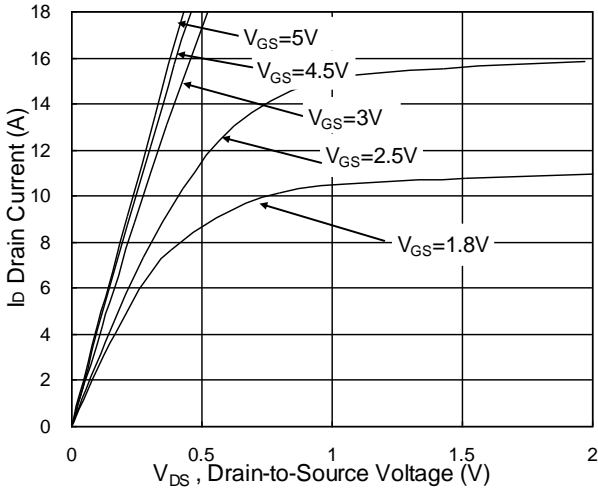


Fig.1 Typical Output Characteristics

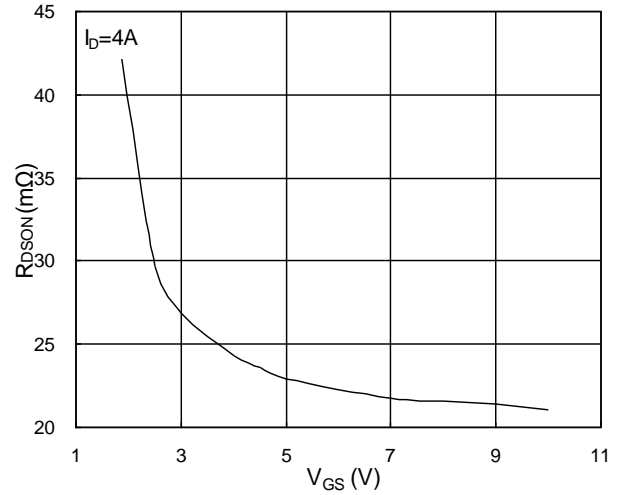


Fig.2 On-Resistance vs. Gate-Source

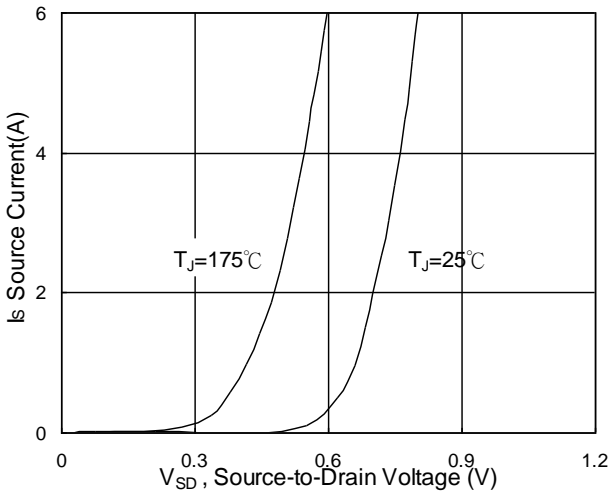


Fig.3 Forward Characteristics Of Reverse

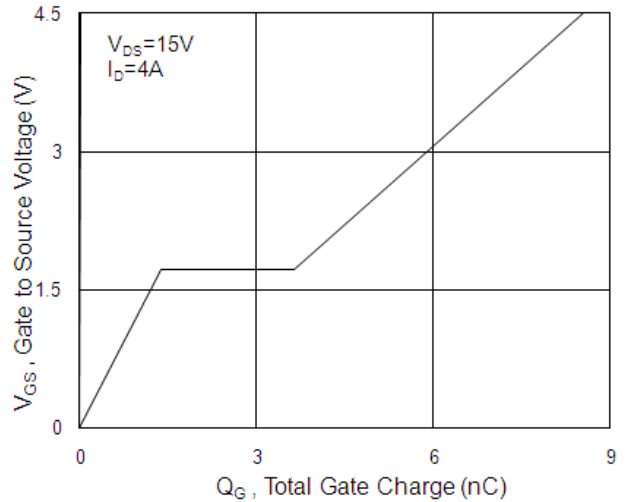


Fig.4 Gate-Charge Characteristics

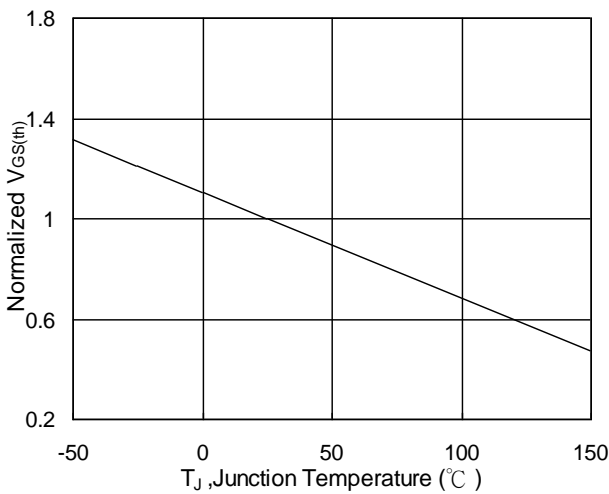


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

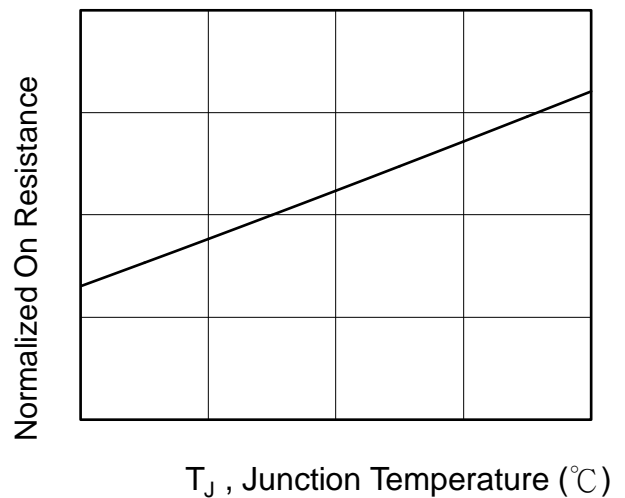


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

N-Ch 20V Fast Switching MOSFETs

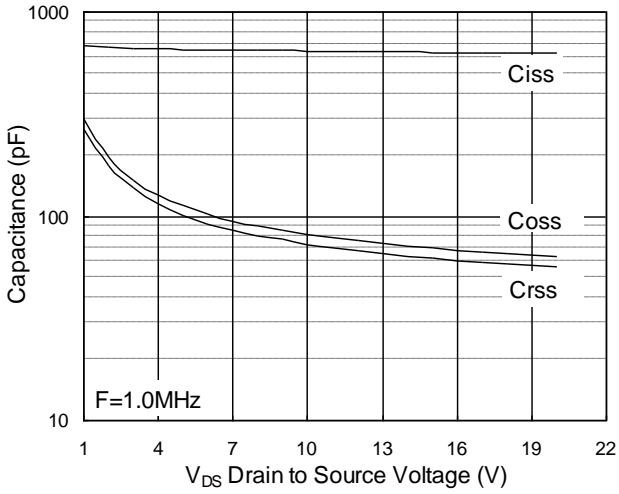


Fig.7 Capacitance

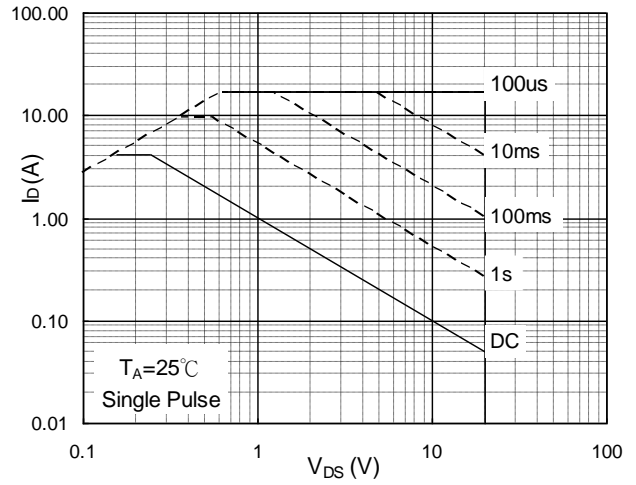


Fig.8 Safe Operating Area

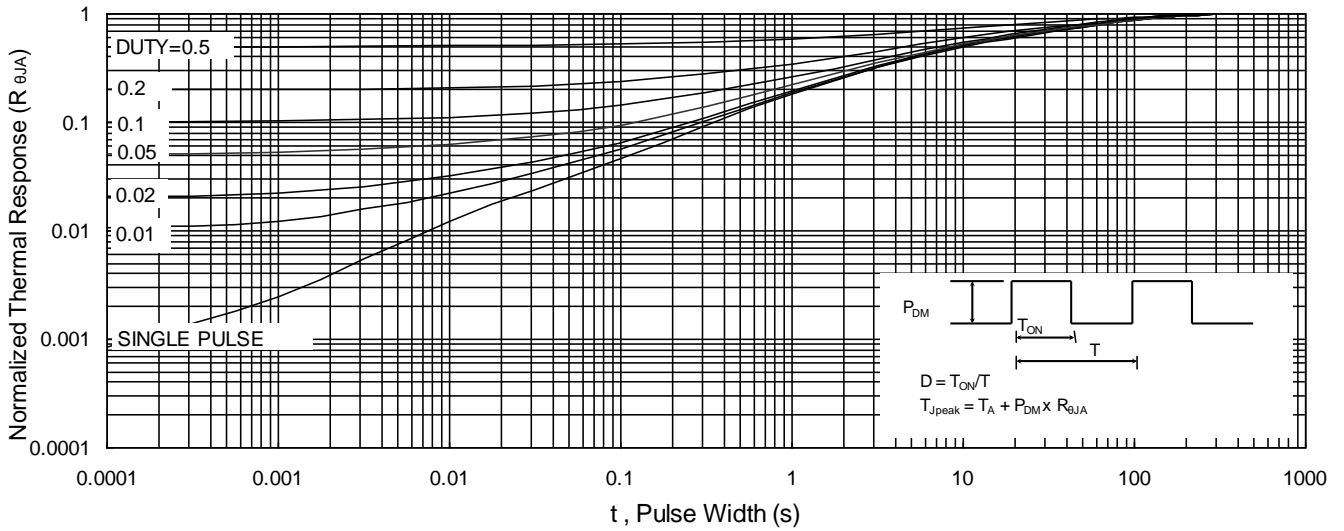


Fig.9 Normalized Maximum Transient Thermal Impedance

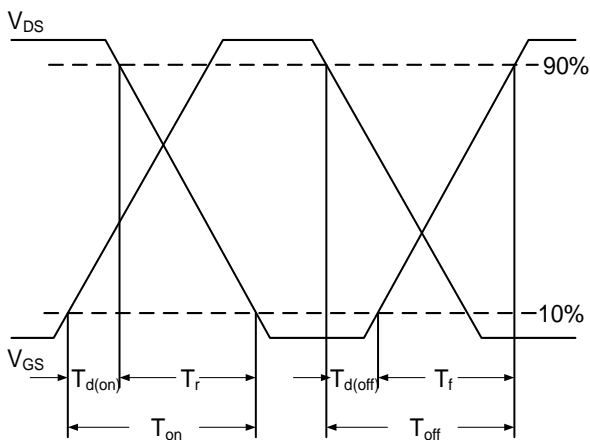


Fig.10 Switching Time Waveform

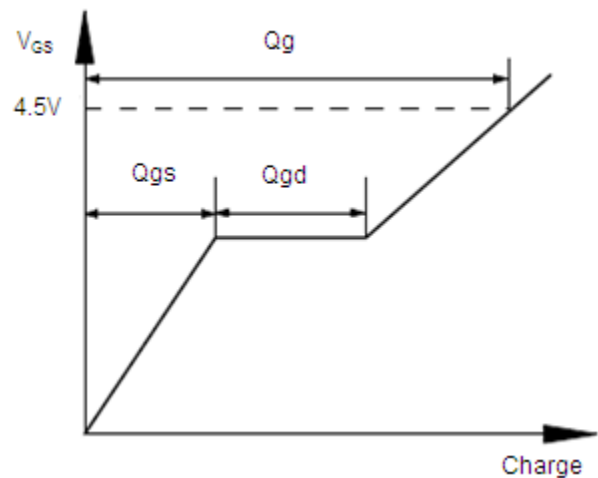
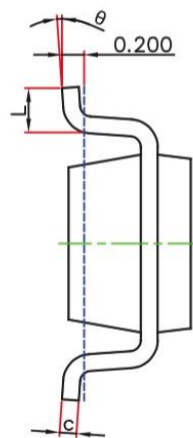
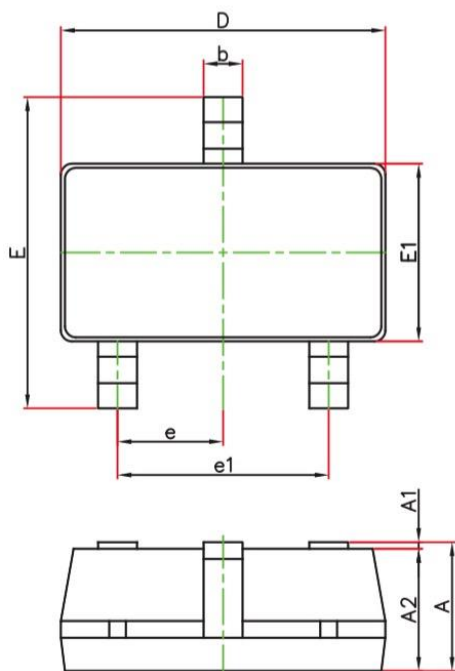


Fig.11 Gate Charge Waveform

Ordering Information

Part Number	Package code	Packaging
HSS3416E	SOT-23L	3000/Tape&Reel



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E1	1.500	1.700	0.059	0.067
E	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°