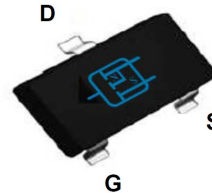
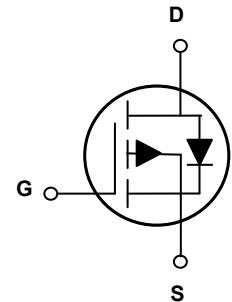


Main Product Characteristics

$V_{(BR)DSS}$	-60V
$R_{DS(ON)}$	128mΩ(typ.)
I_D	-2A



SOT-23



Schematic Diagram

Features and Benefits

- Standard Turbo MOSFET process technology.
- Optimized the cell structure.
- Low on-resistance and low gate charge.
- Featuring low switching and drive losses.
- Fast switching and reverse body recovery.
- High ruggedness and robustness.



Description

The ST series products utilizes Norsem's outstanding standard turbo process and packaging techniques to achieve ultral low on-resistance and low gate charge and to provide the industry's best-in-class performance.

These features make this series products extremely efficient, temperature characteristics and reliable for use in power management, synchronous rectification, battery protection, load switch and a wide variety of other applications.

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-60	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current – Continuous ($T_C=25^{\circ}\text{C}$)	I_D	-2	A
Drain Current – Continuous ($T_C=100^{\circ}\text{C}$)		-1.25	A
Drain Current – Pulsed ¹	I_{DM}	-8	A
Power Dissipation ($T_C=25^{\circ}\text{C}$)	P_D	1.56	W
Power Dissipation – Derate above 25°C	P_D	0.012	W/ $^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-50 to +150	$^{\circ}\text{C}$
Operating Junction Temperature Range	T_J	-50 to +150	$^{\circ}\text{C}$

Thermal Characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	---	80	$^{\circ}\text{C/W}$

Electrical Characteristics (T_J=25°C unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =-250uA	-60	---	---	V
BV _{DSS} Temperature Coefficient	△BV _{DSS} /△T _J	Reference to 25°C, I _D =-1mA	---	-0.05	---	V/°C
Drain-Source Leakage Current	I _{DSS}	V _{DS} =-60V, V _{GS} =0V, T _J =25°C	---	---	-1	uA
		V _{DS} =-48V, V _{GS} =0V, T _J =125°C	---	---	-10	uA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	---	---	±100	uA
On Characteristics						
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =-10V, I _D =-1.8A	---	128	189	mΩ
		V _{GS} =-4.5V, I _D =-1.2A	---	160	239	
Gate Threshold Voltage	V _{GS(th)}	V _{GS} =V _{DS} , I _D =-250uA	-1.2	-1.9	-2.5	V
V _{GS(th)} Temperature Coefficient	△V _{GS(th)}		---	5	---	mV/°C
Forward Transconductance	g _{fs}	V _{DS} =-10V, I _S =-2A	---	3.5	---	S
Dynamic and Switching Characteristics						
Total Gate Charge ^{2, 3}	Q _g	V _{DS} =-30V, V _{GS} =-10V, I _D =-2A	---	8.2	12	nC
Gate-Source Charge ^{2, 3}	Q _{gs}		---	1.8	3.6	
Gate-Drain Charge ^{2, 3}	Q _{gd}		---	1.5	3	
Turn-On Delay Time ^{2, 3}	T _{d(on)}	V _{DD} =-30V, V _{GS} =-10V, R _G =6Ω, I _D =-1A	---	5.2	10	nS
Rise Time ^{2, 3}	T _r		---	19	36	
Turn-Off Delay Time ^{2, 3}	T _{d(off)}		---	35	67	
Fall Time ^{2, 3}	T _f		---	10.6	20	
Input Capacitance	C _{iss}	V _{DS} =-30V, V _{GS} =0V, F=1MHz	---	425	615	pF
Output Capacitance	C _{oss}		---	35	50	
Reverse Transfer Capacitance	C _{rss}		---	20	30	
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current	I _S	V _G =V _D =0V , Force Current	---	---	-2	A
Pulsed Source Current	I _{SM}		---	---	-4	A
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =-1A, T _J =25°C	---	-0.81	-1	V

Notes:

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 Electrical and Thermal Characteristic Curves

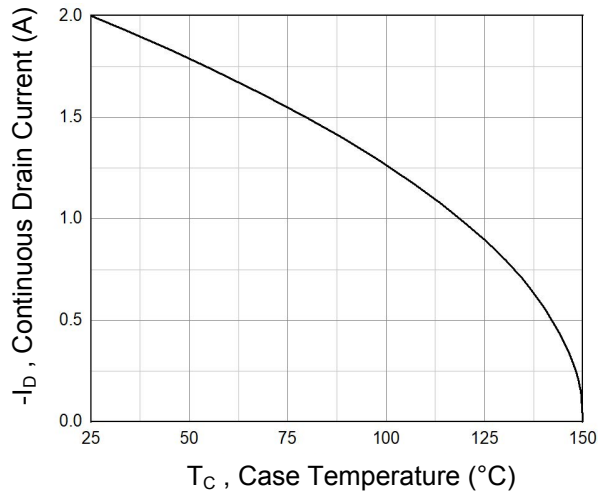


Fig.1 Continuous Drain Current vs. T_C

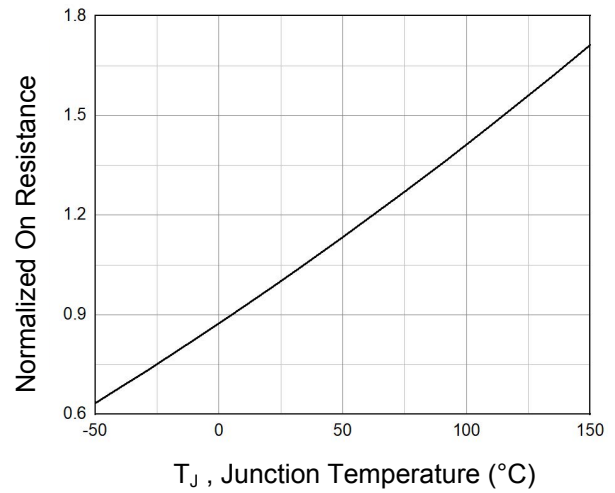


Fig.2 Normalized $R_{DS(ON)}$ vs. T_J

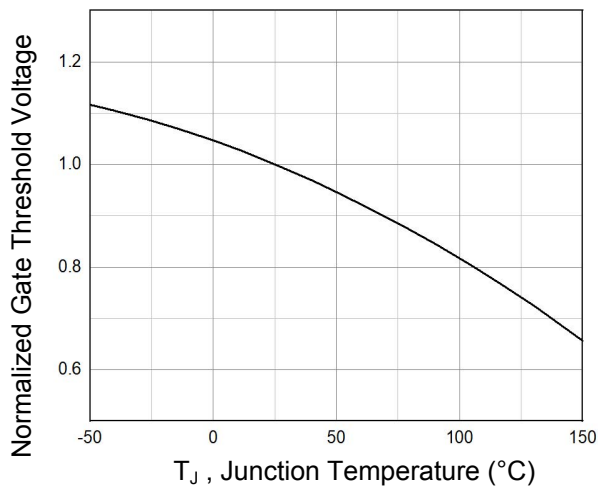


Fig.3 Normalized V_{th} vs. T_J

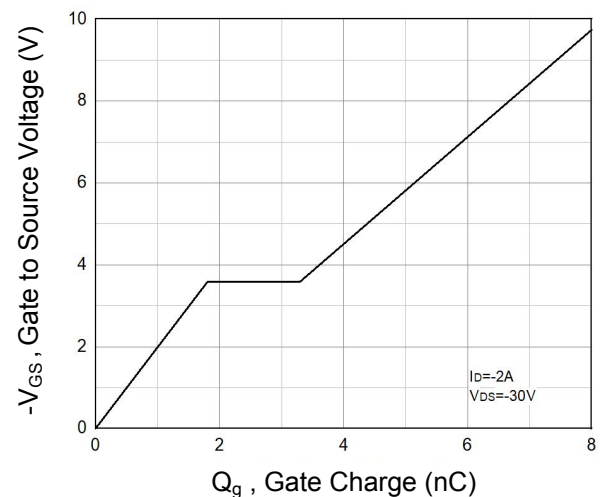


Fig.4 Gate Charge Waveform

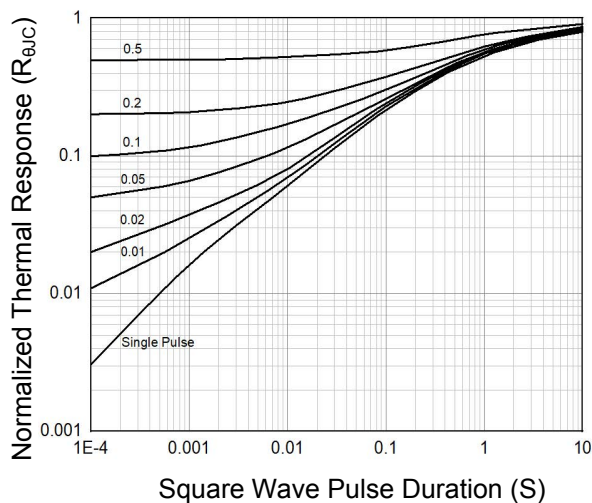


Fig.5 Normalized Transient Impedance

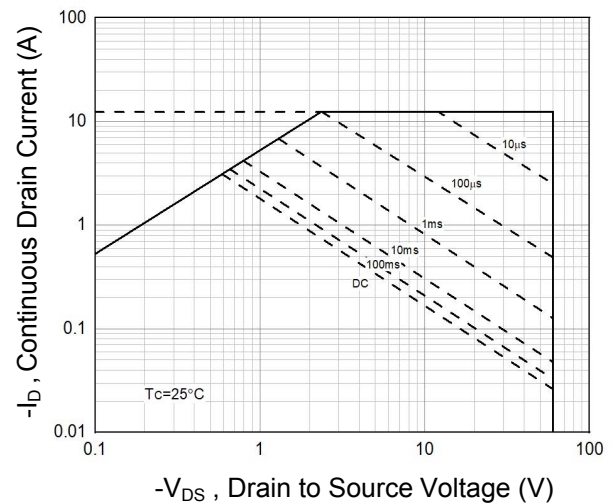


Fig.6 Maximum Safe Operation Area

Typical Electrical and Thermal Characteristic Curves

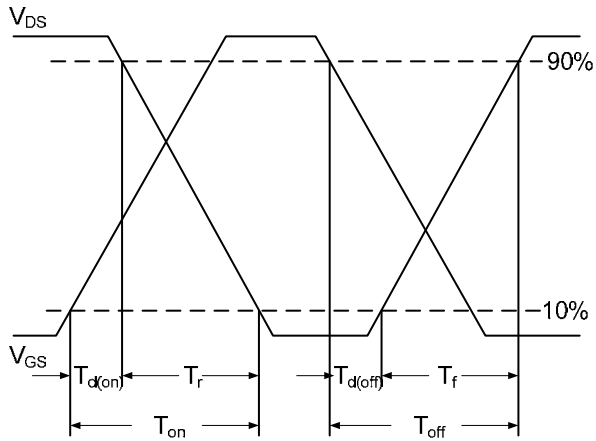


Fig.7 Switching Time Waveform

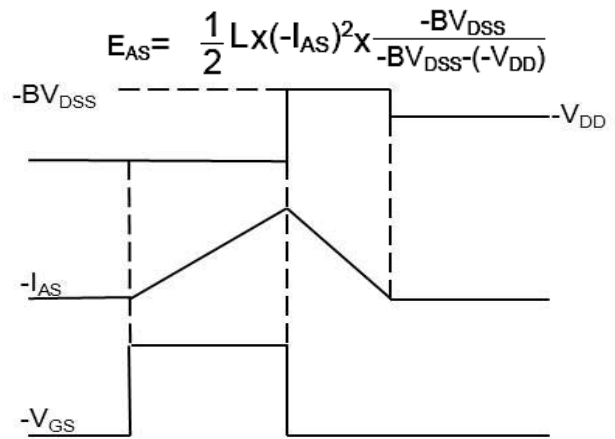
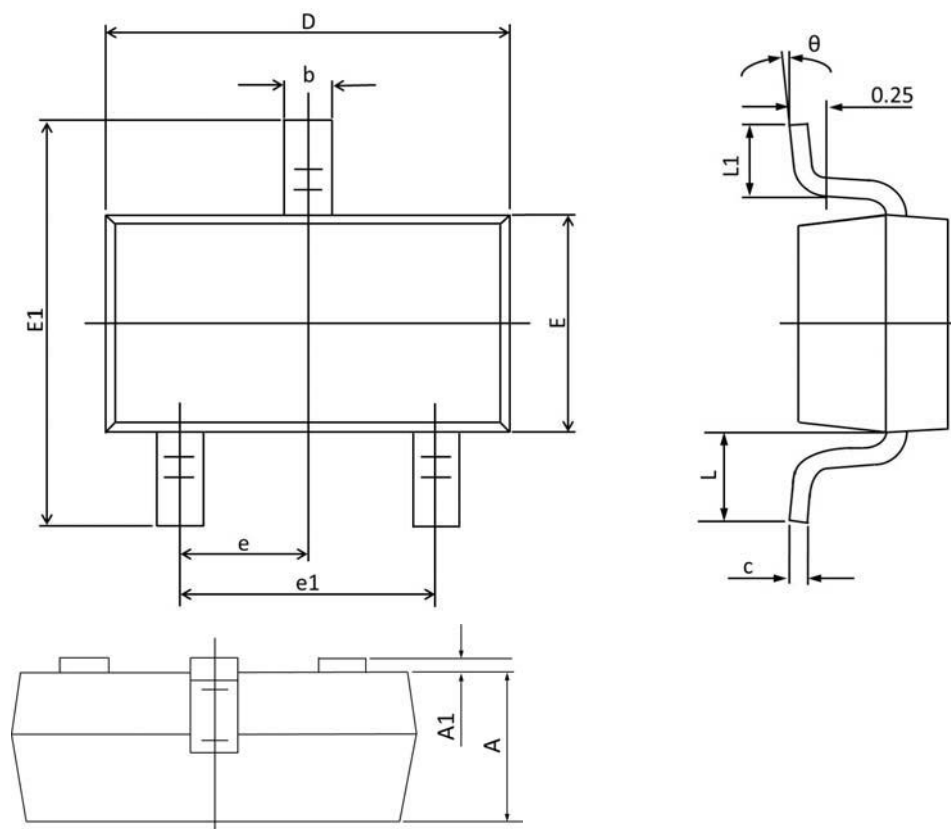


Fig.8 E_{AS} Waveform

Package Outline Dimensions

SOT-23



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.000	0.035	0.039
A1	0.000	0.100	0.000	0.004
b	0.300	0.500	0.012	0.020
c	0.090	0.110	0.003	0.004
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.550 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020
θ	1°	7°	1°	7°