

## SOT-23 Plastic-Encapsulate MOSFETS

### 20V N-Channel Enhancement Mode MOSFET

**VDS= 20V**

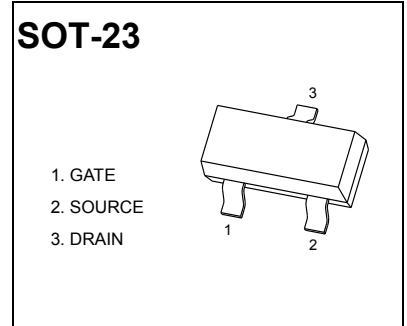
**RDS(ON), Vgs@ 4.5V, Ids@ 2.3A < 4.8mΩ**

**RDS(ON), Vgs@ 3.3V, Ids@ 2.3A < 5.5mΩ**

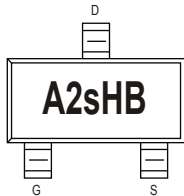
#### Features

Advanced trench process technology

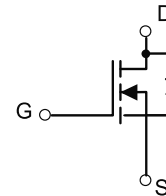
High Density Cell Design For Ultra Low On-Resistance



#### MARKING



#### Equivalent circuit



#### PACKAGE SPECIFICATIONS

Package	Reel Size	Reel DIA. (mm)	Q'TY/Reel (pcs)	Box Size (mm)	QTY/Box (pcs)	Carton Size (mm)	Q'TY/Carton (pcs)
SOT-23	7'	178	3000	203×203×195	45000	438×438×220	180000

#### Maximum Ratings and Thermal Characteristics (TA = 25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	V <sub>DS</sub>	20	V	
Gate-Source Voltage	V <sub>GS</sub>	±10		
Continuous Drain Current	I <sub>D</sub>	TA=25°C	2.3	A
		TA=70°C	1.8	
Maximum Power Dissipation <sup>2)</sup>	P <sub>D</sub>	TA=25°C	1.0	W
		TA=70°C	0.8	
Pulsed Drain Current <sup>1)</sup>	I <sub>DM</sub>	9	A	
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-55 to 150	°C	
Thermal Resistance Junction-Ambient	R <sub>θJA</sub>	125	°C/W	

#### Notes

- 1) Pulse width limited by maximum junction temperature.  
2) Surface Mounted on FR4 Board, t ≤ 5 sec.

The above data are for reference only.



**MOSFET ELECTRICAL CHARACTERISTICS**

**T<sub>a</sub>=25 °C unless otherwise specified**

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250uA	20			V
Drain-Source On-State Resistance <sup>1)</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 2.0A		48	60	mΩ
		V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 1.0A		66	80	
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250uA	0.4	0.6	1.0	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V			1	uA
Gate Body Leakage	I <sub>GSS</sub>	V <sub>GS</sub> =12V, V <sub>DS</sub> = 0V			100	nA
Forward Transconductance <sup>1)</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 5V, I <sub>D</sub> = 2.3A		10	—	S
<b>Dynamic</b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = 10V, I <sub>D</sub> = 2.3A V <sub>GS</sub> = 4.5V		5.4		nC
Gate-Source Charge	Q <sub>gs</sub>			0.65		
Gate-Drain Charge	Q <sub>gd</sub>			1.6		
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = 10V, R <sub>L</sub> =5.5Ω I <sub>D</sub> ≅ 2.3A, V <sub>GEN</sub> = 4.5V R <sub>G</sub> = 6Ω		12		ns
Turn-On Rise Time	t <sub>r</sub>			36		
Turn-Off Delay Time	t <sub>d(off)</sub>			34		
Turn-Off Fall Time	t <sub>f</sub>			10		
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 10V, V <sub>GS</sub> = 0V f = 1.0 MHz		160		pF
Output Capacitance	C <sub>oss</sub>			30		
Reverse Transfer Capacitance	C <sub>rss</sub>			25		
Source drain current(Body Diode)	I <sub>SD</sub>				1.5	A
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> = 1.0A, V <sub>GS</sub> = 0V		0.8	1.2	V

<sup>1)</sup> Pulse test: pulse width <= 300us, duty cycle<= 2%

Typical Characteristics

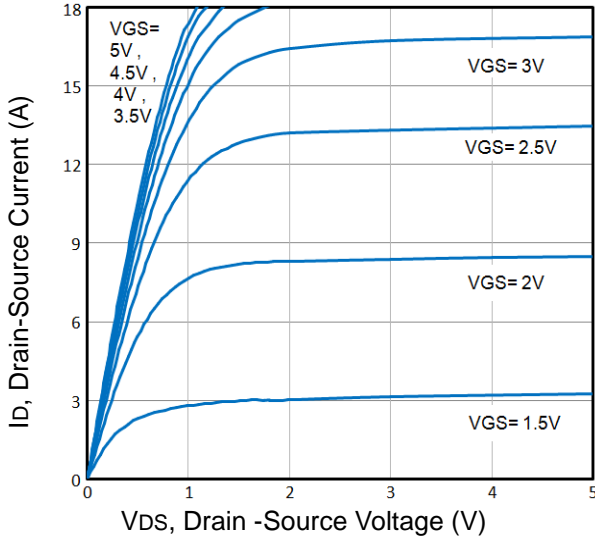


Fig1. Typical Output Characteristics

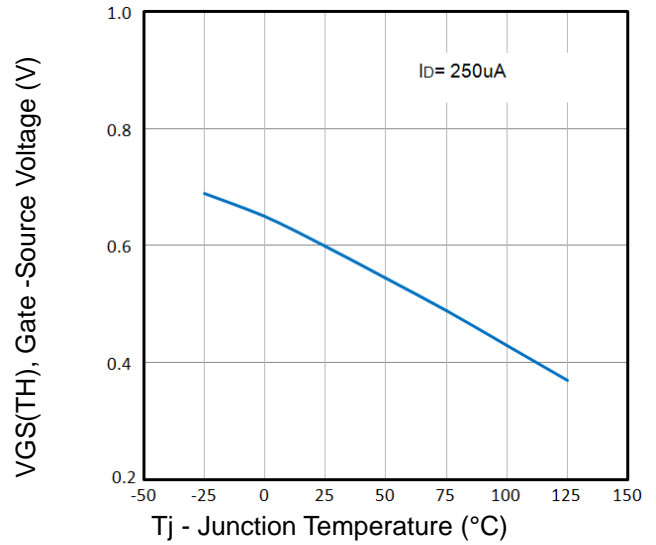


Fig2. Normalized Threshold Voltage Vs. Temperature

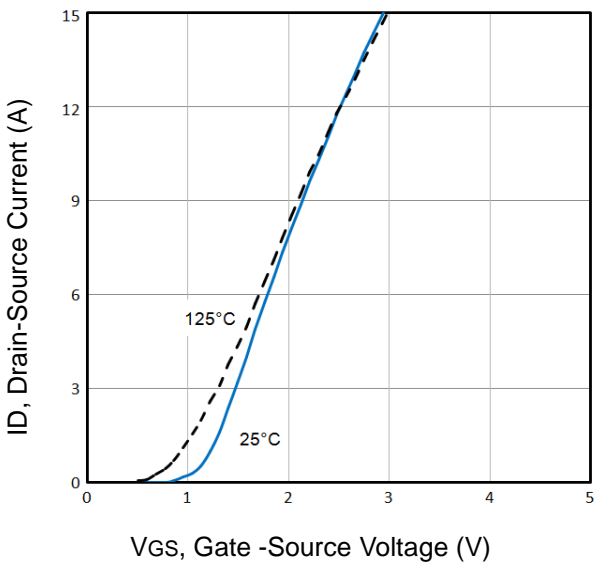


Fig3. Typical Transfer Characteristics

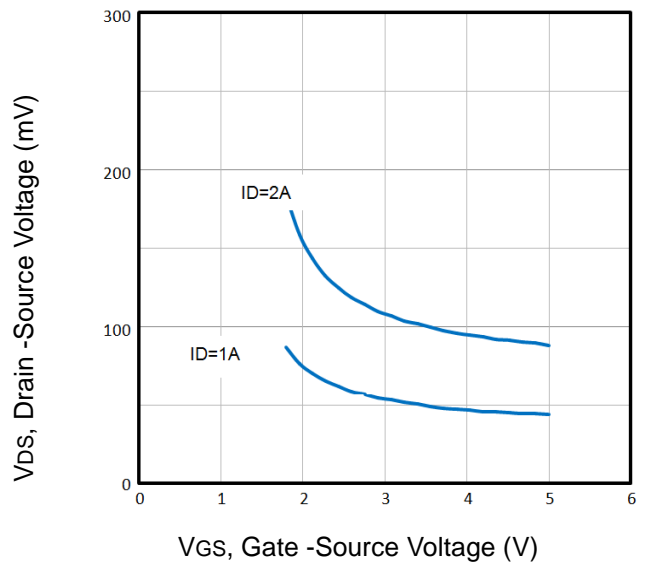


Fig4. Drain-Source Voltage vs Gate-Source Voltage

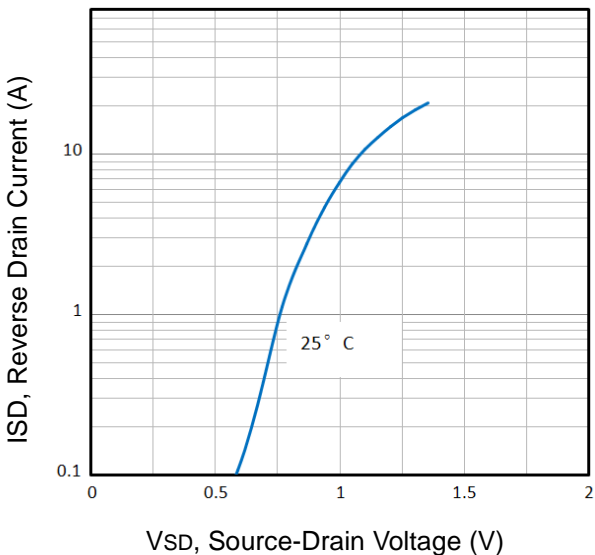


Fig5. Typical Source-Drain Diode Forward Voltage

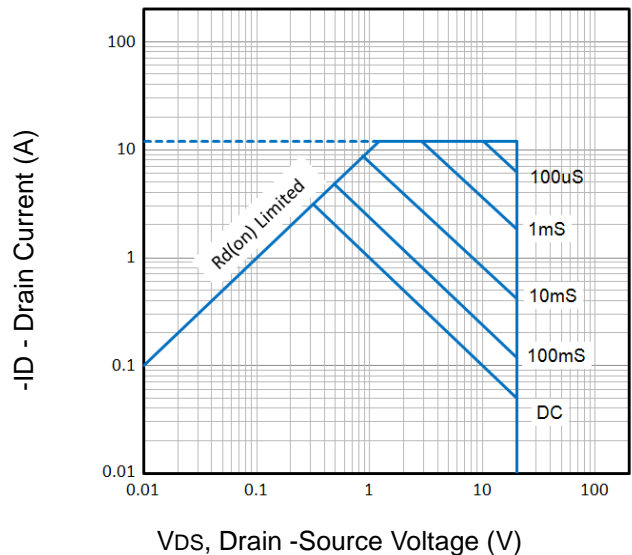


Fig6. Maximum Safe Operating Area

Typical Characteristics

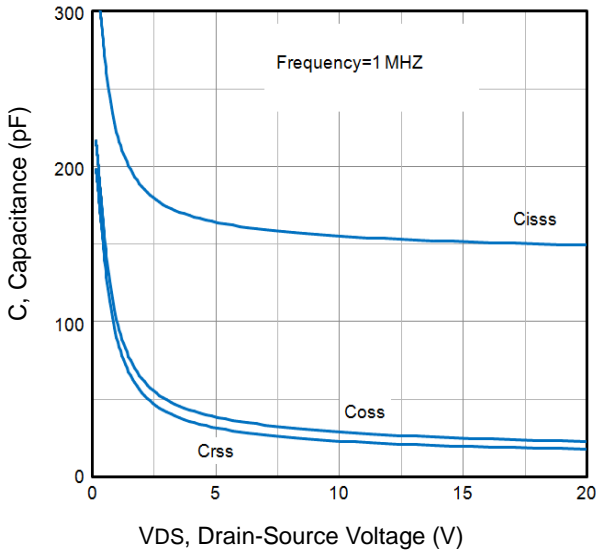


Fig7. Typical Capacitance Vs. Drain-Source Voltage

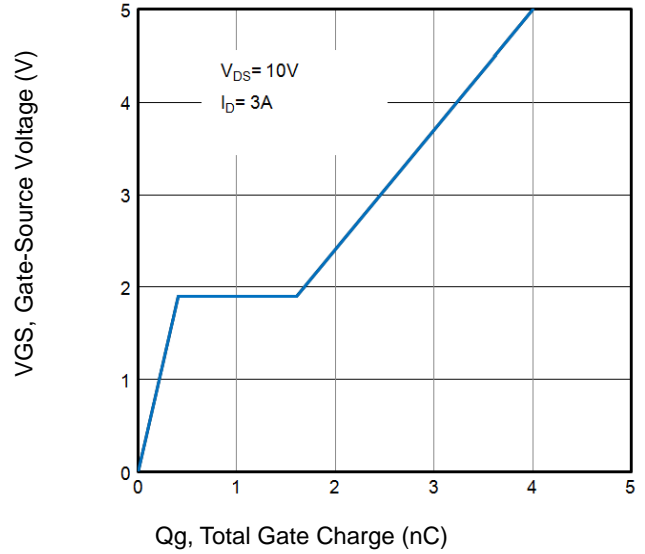


Fig8. Typical Gate Charge Vs. Gate-Source Voltage

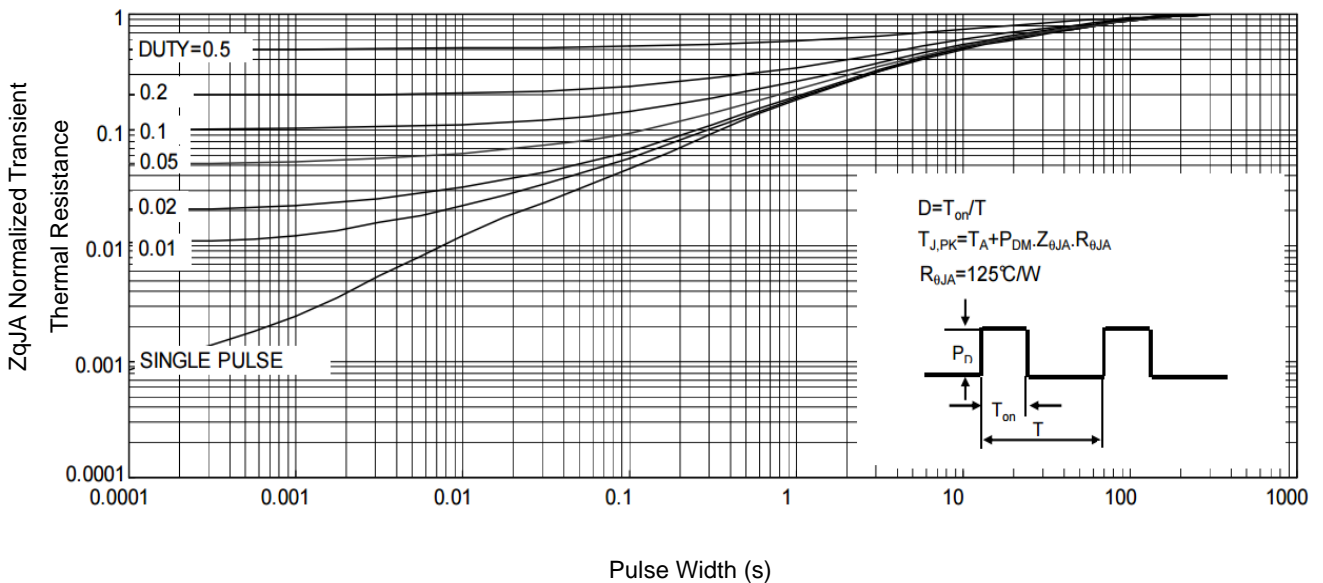


Fig9. Normalized Maximum Transient Thermal Impedance

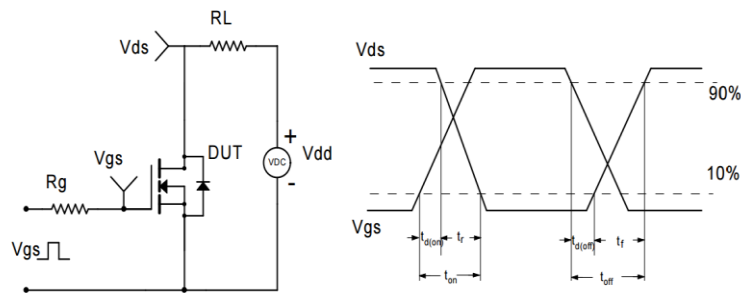
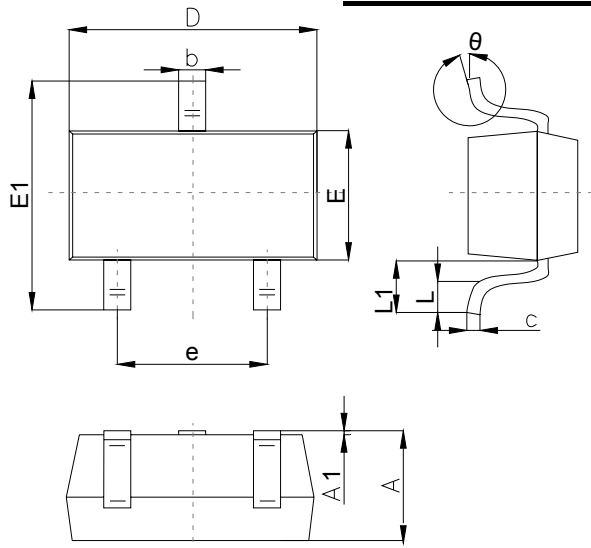


Fig10. Switching Time Test Circuit and waveforms

The curve above is for reference only.

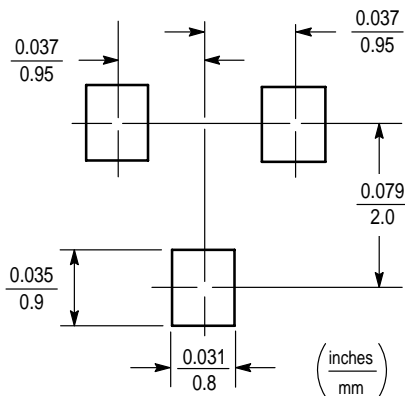
## Outlitne Drawing

### SOT-23 Package Outline Dimensions



Symbol	Dimensions In Millimeters		
	Min	Typ	Max
A	1.00		1.40
A1			0.10
b	0.35		0.50
c	0.10		0.20
D	2.70	2.90	3.10
E	1.40		1.60
E1	2.4		2.80
e		1.90	
L	0.10		0.30
L1	0.4		
$\theta$	0°		10°

### Suggested Pad Layout



**Note:**

1. Controlling dimension: in/millimeters.
2. General tolerance:  $\pm 0.05$ mm.
3. The pad layout is for reference purposes only.

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