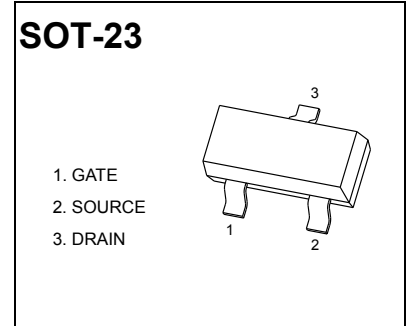


## SOT-23 Plastic-Encapsulate MOSFETS

### 20V N-Channel Advanced Power MOSFET

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	$I_D$
20V	19.4mΩ @ 4.5V	6.2A
	21.5mΩ @ 3.3V	



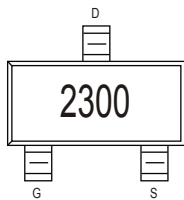
#### FEATURE

- Low  $R_{DS(on)}$  @  $V_{GS}=4.5V$
- 3.3V Logic Level Control

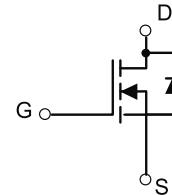
#### APPLICATION

- Load Switch
- DC/DC Converter
- Switching Circuits
- Power Management

#### 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 ( $T_a=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	$V_{(BR)DSS}$	20	V	
Gate-Source Voltage	$V_{GS}$	±10		
Continuous Drain Current	$I_D$	$T_A=25^\circ C$	6.2	A
		$T_A=70^\circ C$	4.3	
Maximum Power Dissipation <sup>2)</sup>	$P_D$	$T_A=25^\circ C$	1.56	W
		$T_A=70^\circ C$	0.9	
Pulsed Drain Current <sup>1)</sup>	$I_{DM}$	24.8	A	
Maximum Junction Temperature	$T_J$	150	$^\circ C$	
Storage Temperature Range	$T_{stg}$	-50 to 150	$^\circ C$	
Thermal Resistance Junction-Ambient	$R_{\theta JA}$	80	$^\circ C/W$	

Notes

1) Pulse width limited by maximum junction temperature.

2) Surface Mounted on FR4 Board,  $t \leq 5$  sec.



**MOSFET ELECTRICAL CHARACTERISTICS**

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

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
<b>Off characteristics</b>						
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> =250μA	20			V
Gate-body leakage	I <sub>GSS</sub>	V <sub>GS</sub> =±10V, V <sub>DS</sub> =0V			±100	nA
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> =16V, V <sub>GS</sub> =0V			1	μA
		V <sub>DS</sub> =16V, V <sub>GS</sub> =0V			100	μA
<b>On characteristics</b>						
Gate-threshold voltage (note 1)	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	0.45	0.6	1.0	V
Static drain-source on-resistance (note 1)	R <sub>DS(on)</sub>	V <sub>GS</sub> =4.5V, I <sub>D</sub> =4A		19.4	25	mΩ
		V <sub>GS</sub> =3.3V, I <sub>D</sub> =3A		21.5	28	
Forward transconductance (note 1)	g <sub>FS</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =0.25A	100			mS
<b>Dynamic characteristics (note 2)</b>						
Gate Resistance	R <sub>g</sub>	f=1MHz		7.8		Ω
Total Gate C harge	Q <sub>g</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =4A, V <sub>GS</sub> =4.5V		6.6		nC
Gate-Source Charge	Q <sub>gs</sub>			0.4		
Gate-Drain Charge	Q <sub>gd</sub>			2		
Input capacitance	C <sub>iss</sub>			457		
Output capacitance	C <sub>oss</sub>	V <sub>DS</sub> =10V, V <sub>GS</sub> =0V, f=1MHz		71		
Reverse transfer capacitance	C <sub>rss</sub>			66		
<b>Switching characteristics</b>						
Turn-on delay time (note 1,2)	t <sub>d(on)</sub>	V <sub>DD</sub> =10V, V <sub>GS</sub> =4.5V, I <sub>D</sub> =1A, R <sub>G</sub> =3.3Ω		4.1		ns
Rise time (note 1,2)	t <sub>r</sub>			11.6		
Turn-off delay time (note 1,2)	t <sub>d(off)</sub>			24		
Fall time (note 1,2)	t <sub>f</sub>			7.6		
<b>Drain-source body diode characteristics</b>						
Source drain current(Body Diode)	I <sub>SD</sub>				0.2	A
Body diode forward voltage (note 1)	V <sub>SD</sub>	I <sub>SD</sub> =4A, V <sub>GS</sub> = 0V		0.79	1.2	V

**Notes :**

1. Pulse Test : Pulse Width ≤ 300μs, Duty Cycle 2%.
2. These parameters have no way to verify.

Typical Characteristics

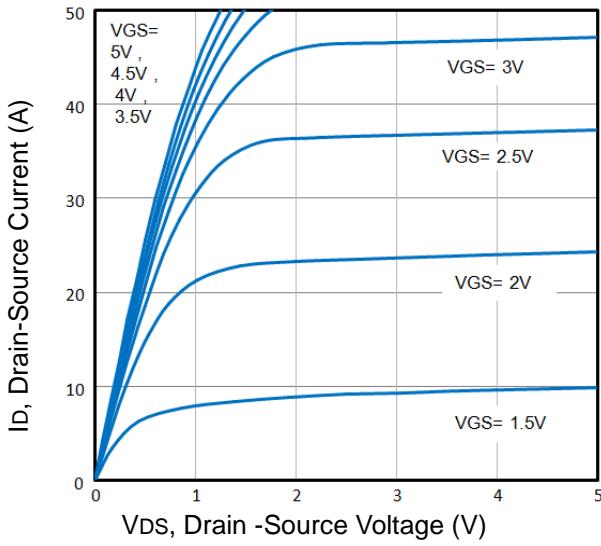


Fig1. Typical Output Characteristics

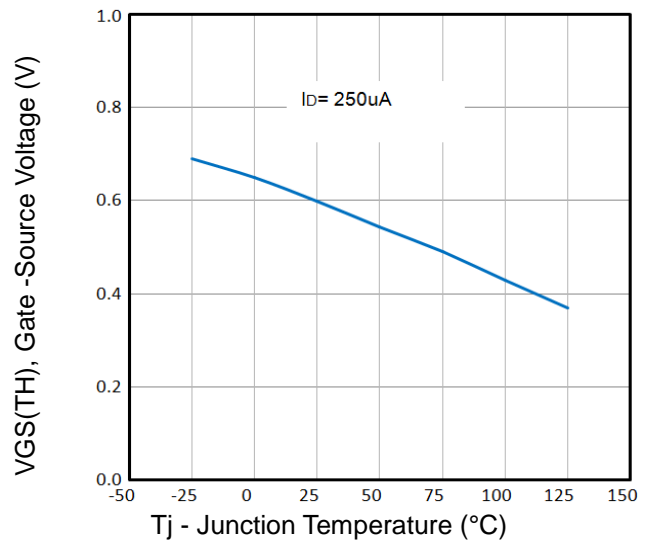


Fig2. VGS(TH) Voltage Vs. Temperature

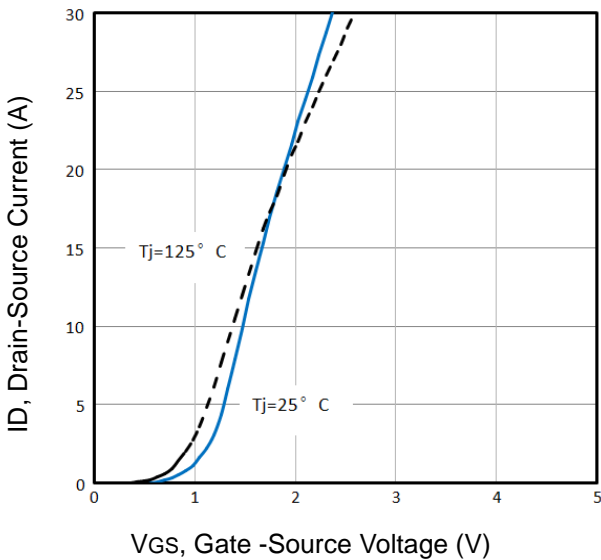


Fig3. Typical Transfer Characteristics

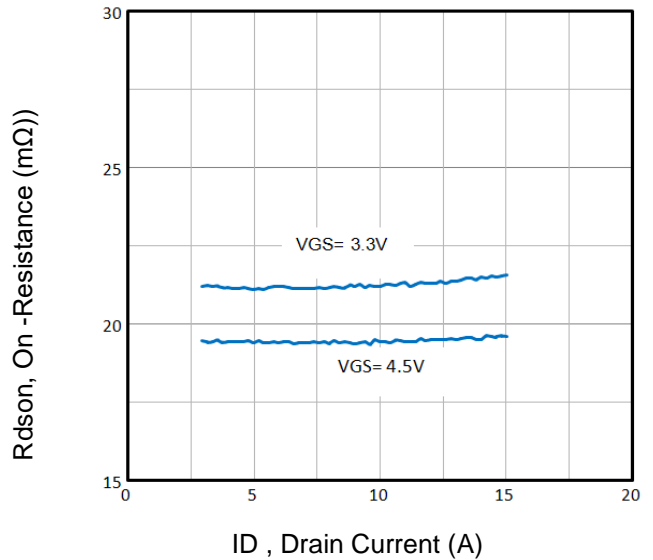


Fig4. On-Resistance vs. Drain Current and Gate

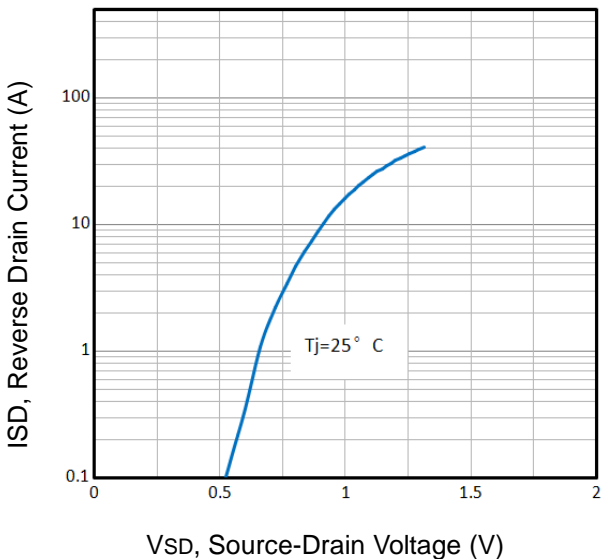


Fig5. Typical Source-Drain Diode Forward Voltage

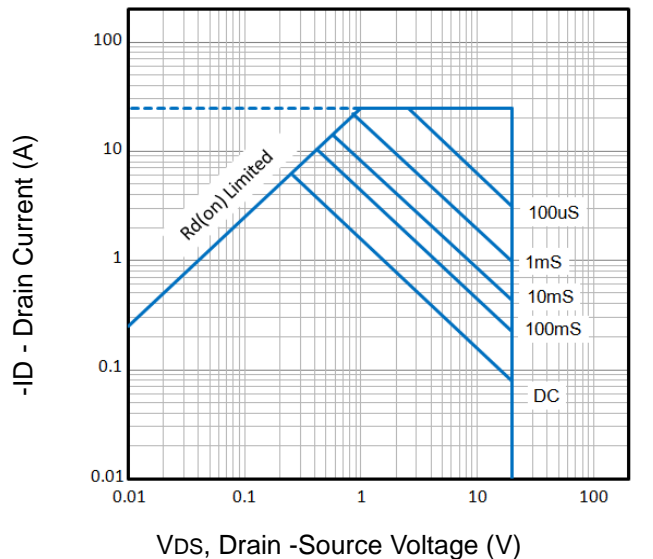


Fig6. Maximum Safe Operating Area

The curve above is for reference only.

Typical Characteristics

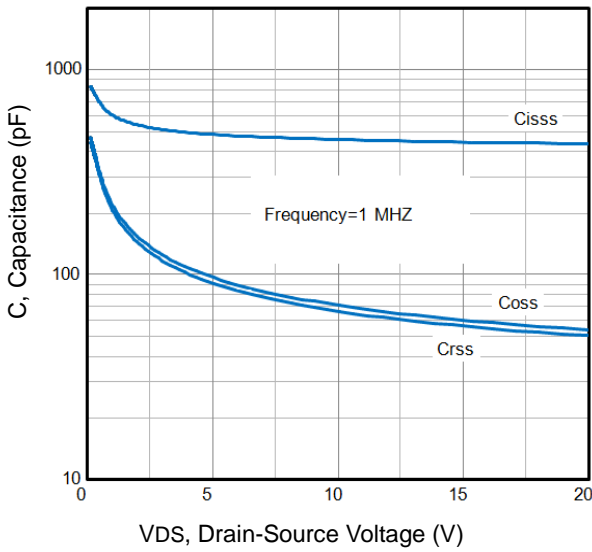


Fig7. Typical Capacitance Vs. Drain-Source Voltage

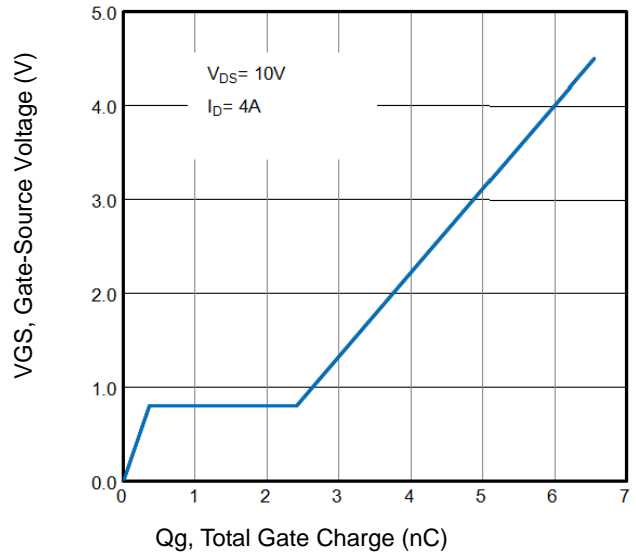


Fig8. Typical Gate Charge Vs. Gate-Source Voltage

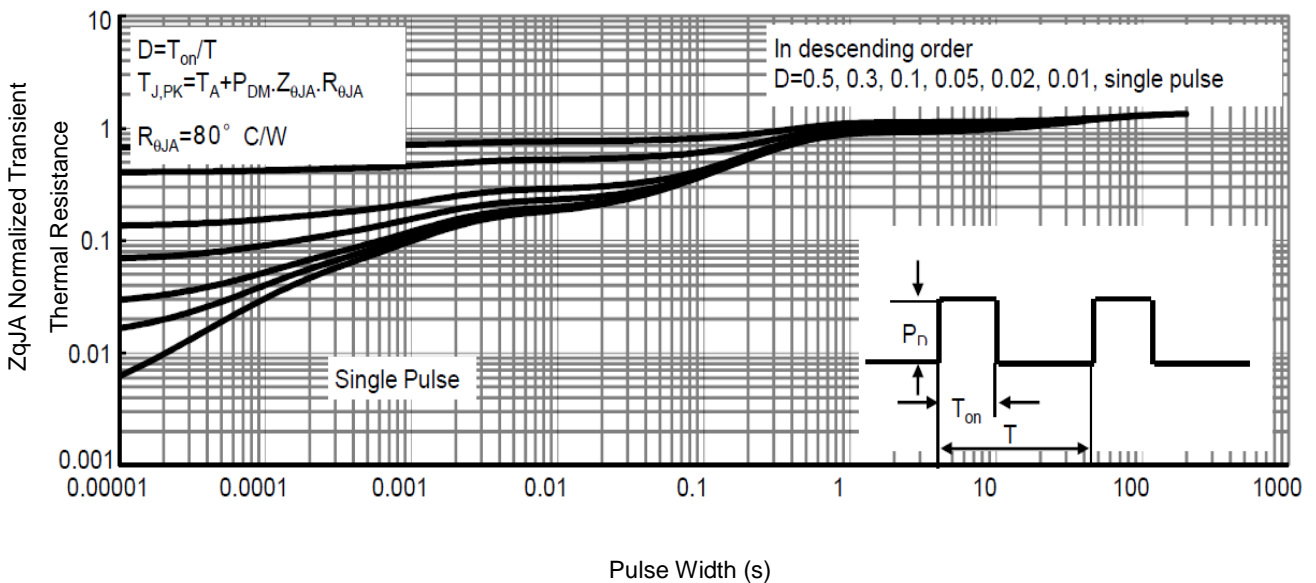


Fig9. Normalized Maximum Transient Thermal Impedance

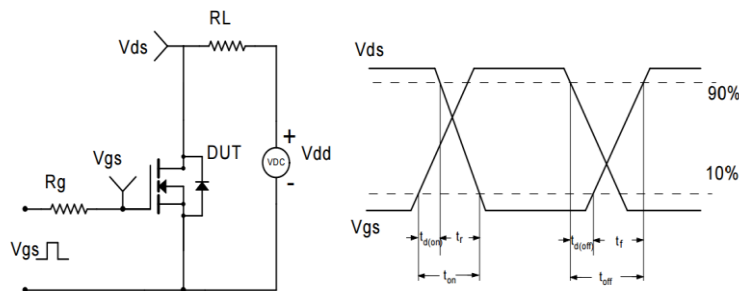
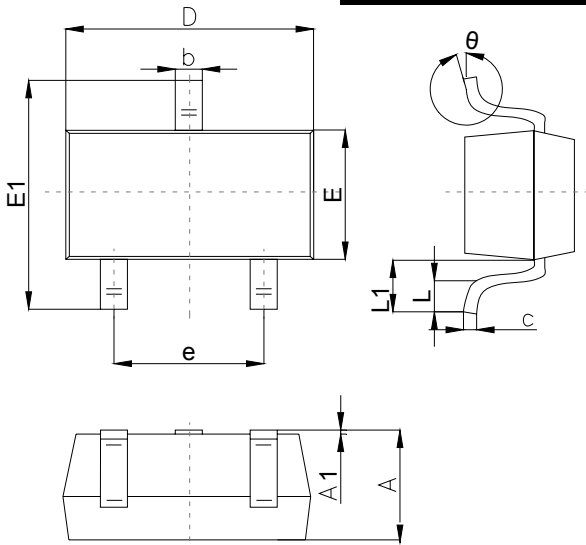
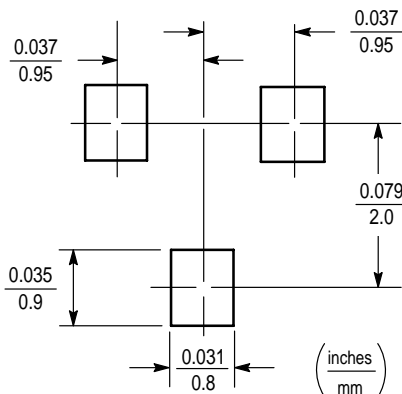


Fig10. Switching Time Test Circuit and waveforms

The curve above is for reference only.

**Outline 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:  $\pm 0.05\text{mm}$ .
3. The pad layout is for reference purposes only.

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