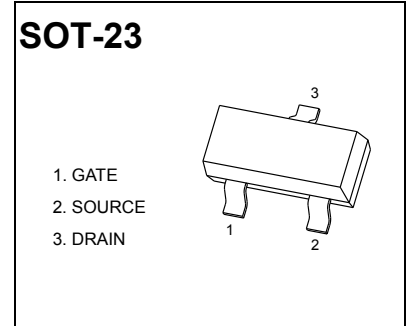


SOT-23 Plastic-Encapsulate MOSFETS

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	



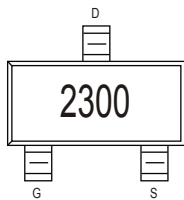
FEATURE

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

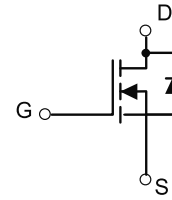
APPLICATION

- 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 ²⁾	P_D	$T_A=25^\circ C$	1.56	W
		$T_A=70^\circ C$	0.9	
Pulsed Drain Current ¹⁾	I_{DM}	24.8	A	
Maximum Junction Temperature	T_J	150	°C	
Storage Temperature Range	T_{stg}	-50 to 150	°C	
Thermal Resistance Junction-Ambient	$R_{\theta JA}$	80	°C/W	

Notes

1) Pulse width limited by maximum junction temperature.

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



MOSFET ELECTRICAL CHARACTERISTICS

$T_a=25^{\circ}\text{C}$ unless otherwise specified

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
Off characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D=250\mu A$	20			V
Gate-body leakage	I_{GSS}	$V_{GS}=\pm 10V, V_{DS}=0V$			± 100	nA
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 16V, V_{GS} = 0V$			1	μA
		$V_{DS} = 16V, V_{GS} = 0V$			100	μA
On characteristics						
Gate-threshold voltage (note 1)	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	0.45	0.6	1.0	V
Static drain-source on-resistance (note 1)	$R_{DS(on)}$	$V_{GS} = 4.5V, I_D = 4A$		19.4	25	m Ω
		$V_{GS} = 3.3V, I_D = 3A$		21.5	28	
Forward transconductance (note 1)	g_{FS}	$V_{DS} = 10V, I_D = 0.25A$	100			mS
Dynamic characteristics (note 2)						
Gate Resistance	R_g	$f=1\text{MHz}$		7.8		Ω
Total Gate C harge	Q_g	$V_{DS} = 10V, I_D=4A, V_{GS} = 4.5V$		6.6		nC
Gate-Source Charge	Q_{gs}			0.4		
Gate-Drain Charge	Q_{gd}			2		
Input capacitance	C_{iss}			457		
Output capacitance	C_{oss}	$V_{DS} = 10V, V_{GS} = 0V, f=1\text{MHz}$		71		
Reverse transfer capacitance	C_{rss}			66		
Switching characteristics						
Turn-on delay time (note 1,2)	$t_{d(on)}$	$V_{DD}=10V, V_{GS}=4.5V,$ $I_D = 1A, R_G=3.3\Omega$		4.1		ns
Rise time (note 1,2)	t_r			11.6		
Turn-off delay time (note 1,2)	$t_{d(off)}$			24		
Fall time (note 1,2)	t_f			7.6		
Drain-source body diode characteristics						
Source drain current(Body Diode)	I_{SD}				0.2	A
Body diode forward voltage (note 1)	V_{SD}	$I_{SD}=4A, V_{GS} = 0V$		0.79	1.2	V

Notes :

1. Pulse Test : Pulse Width $\leq 300\mu s$, Duty Cycle 2%.
2. These parameters have no way to verify.

Typical Characteristics

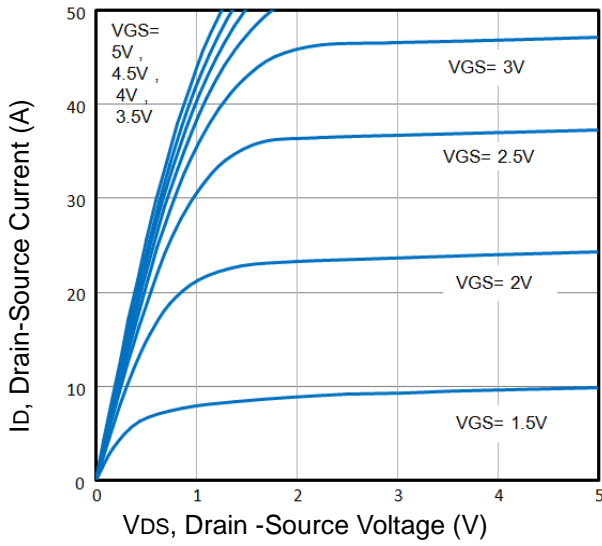


Fig1. Typical Output Characteristics

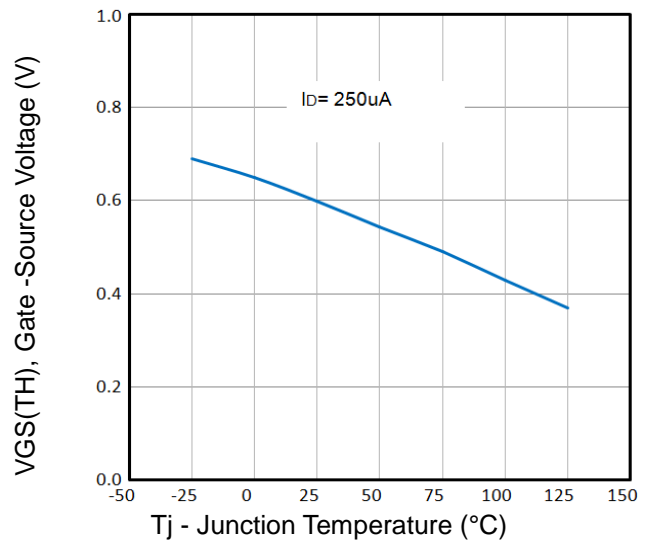


Fig2. VGS(TH) Voltage Vs. Temperature

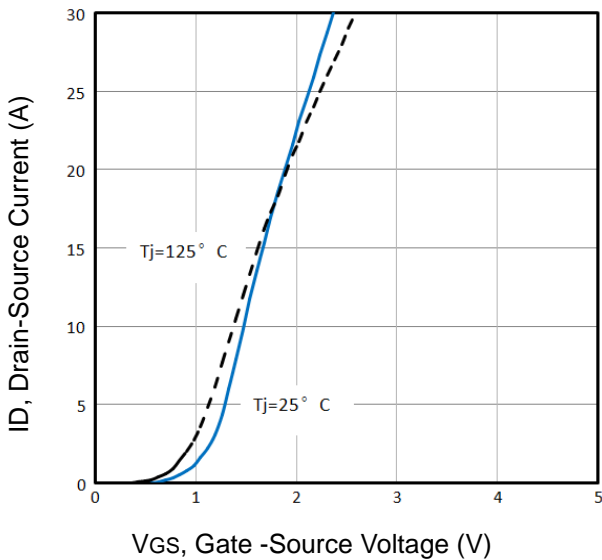


Fig3. Typical Transfer Characteristics

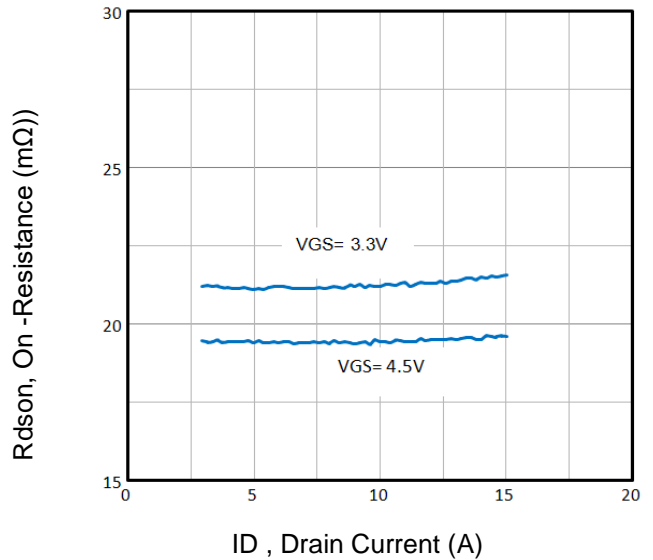


Fig4. On-Resistance vs. Drain Current and Gate

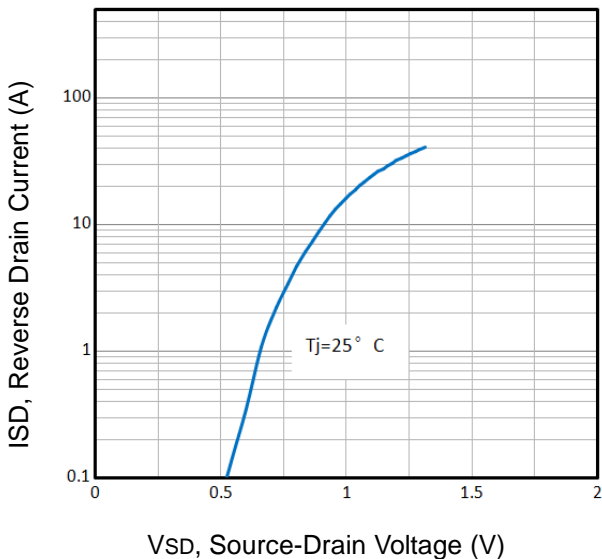


Fig5. Typical Source-Drain Diode Forward Voltage

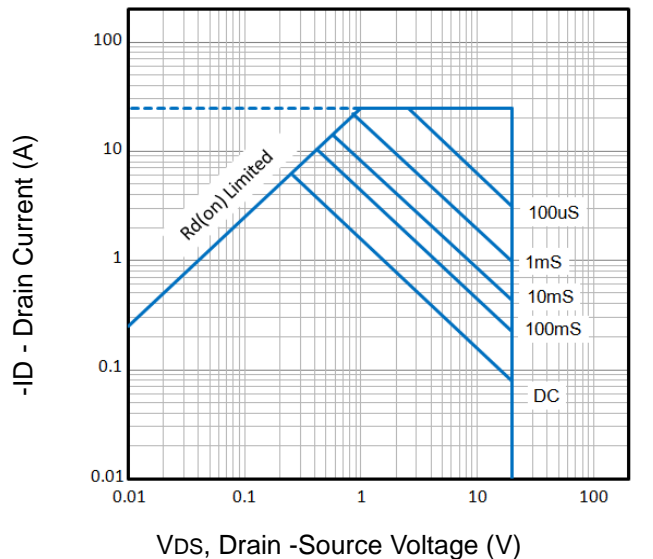


Fig6. Maximum Safe Operating Area

The curve above is for reference only.

Typical Characteristics

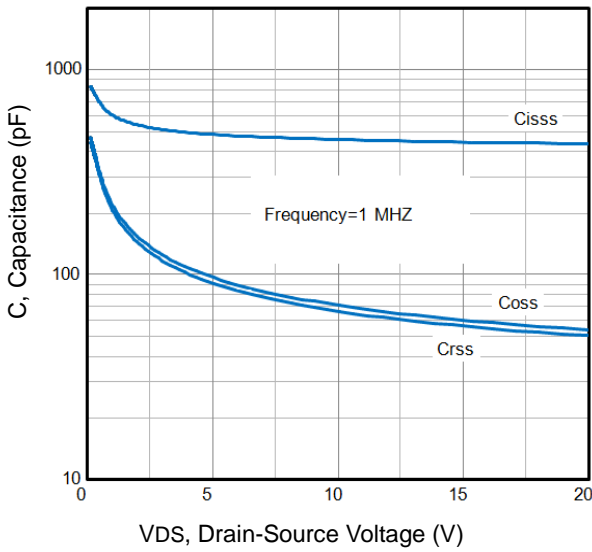


Fig7. Typical Capacitance Vs. Drain-Source Voltage

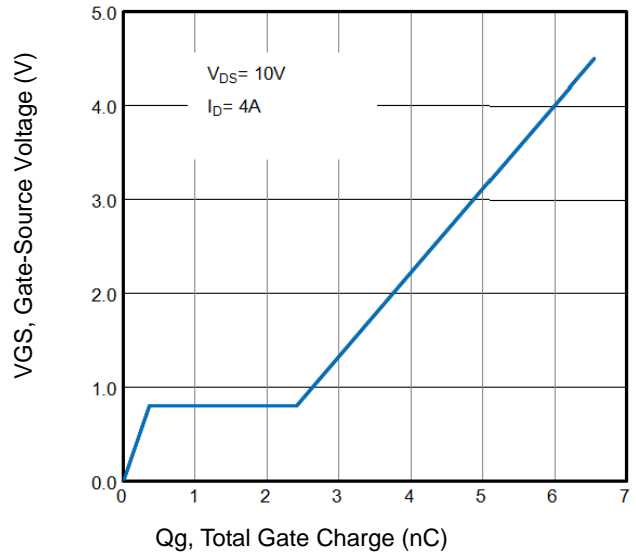


Fig8. Typical Gate Charge Vs. Gate-Source Voltage

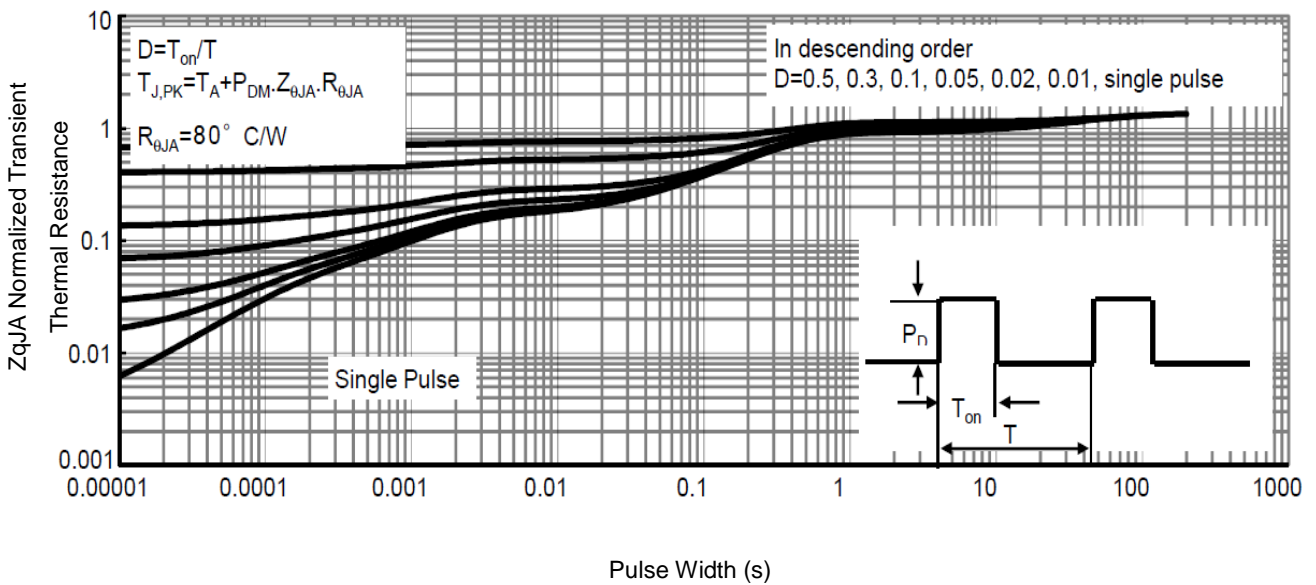


Fig9. Normalized Maximum Transient Thermal Impedance

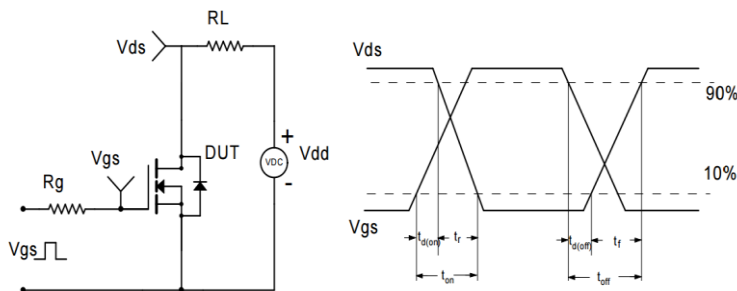
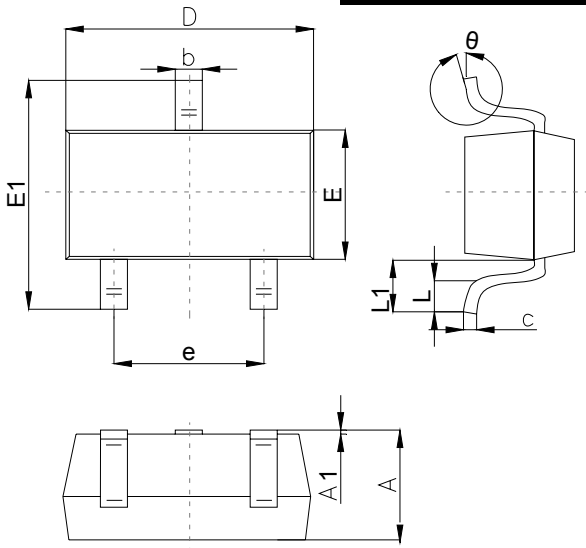
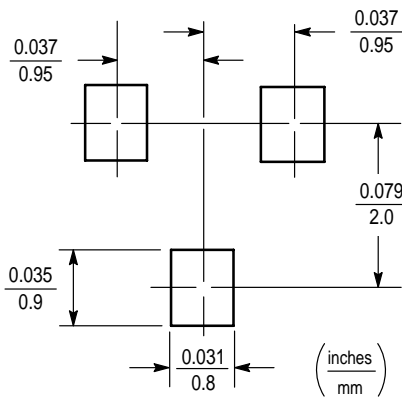


Fig10. Switching Time Test Circuit and waveforms

The curve above is for reference only.

Outline Drawing
SOT-23 Package Outline Dimensions


Symbol	Dimensions In Millimeters		
	Min	Typ	Max
A	0.90		1.40
A1	0.00		0.10
b	0.30		0.50
c	0.08		0.20
D	2.80	2.90	3.10
E	1.20		1.60
E1	2.25		2.80
e	1.80	1.90	2.00
L	0.10		0.50
L1	0.4		0.55
θ	0°		10°

Suggested Pad Layout

Note:

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