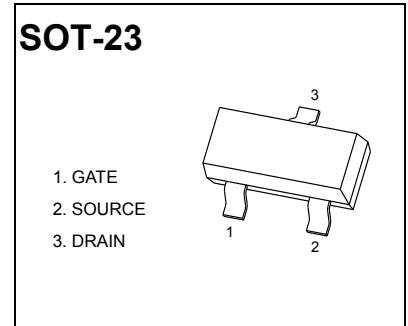


SOT-23 Plastic-Encapsulate MOSFETS

50V N-Channel Enhancement Mode MOSFET

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
50V	0.9Ω@10V	500mA
	1.1Ω@4.5V	



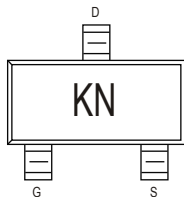
FEATURE

- High density cell design for low $R_{DS(ON)}$
- Rugged and Reliable
- Voltage controlled small signal switch
- High saturation current capability
- HMB ESD protected (2000V)

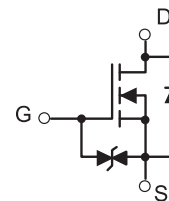
APPLICATION

- Direct Logic-Level Interface: TTL/CMOS
- Drivers: Relays, Solenoids, Lamps, Hammers, Display, Memories, Transistors, etc.
- Battery Operated Systems
- Solid-State Relays

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 ($T_a=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	V_{DS}	50	V	
Gate-Source Voltage	V_{GS}	±12		
Continuous Drain Current	I_D	$T_A=25^\circ\text{C}$	0.5	A
		$T_A=70^\circ\text{C}$	0.4	
Maximum Power Dissipation ²⁾	P_D	$T_A=25^\circ\text{C}$	0.3	W
		$T_A=70^\circ\text{C}$	0.2	
Pulsed Drain Current ¹⁾	I_{DM}	1.8	A	
Operating Junction and Storage Temperature Range	T_J	150	°C	
Storage Temperature Range	T_{stg}	-50 to 150	°C	
Thermal Resistance Junction-Ambient	$R_{\theta JA}$	400	°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	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D=250\mu A$	50			V
Gate-body leakage	I_{GSS}	$V_{GS}=\pm 12V, V_{DS}=0V$			± 10	μA
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 50V, V_{GS} = 0V$			1	μA
		$V_{DS} = 40V, V_{GS} = 0V$			100	μA
On characteristics						
Gate-threshold voltage (note 1)	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	0.60	1.0	1.5	V
Static drain-source on-resistance (note 1)	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 0.5A$		0.9	2	Ω
		$V_{GS} = 4.5V, I_D = 0.3A$		1.1	2.5	
		$V_{GS} = 3.3V, I_D = 0.2A$		1.5	4	
Forward transconductance (note 1)	g_{FS}	$V_{DS} = 10V, I_D = 0.25A$	100			mS
Dynamic characteristics (note 2)						
Total Gate C harge	Q_g	$V_{DS} = 30V, I_D = 0.5A, V_{GS} = 10V$		0.93		nC
Gate-Source Charge	Q_{gs}			0.18		
Gate-Drain Charge	Q_{gd}			0.31		
Input capacitance	C_{iss}	$V_{DS} = 30V, V_{GS} = 0V, f = 1MHz$		23.8		pF
Output capacitance	C_{oss}			3.9		
Reverse transfer capacitance	C_{rss}			1.5		
Switching characteristics						
Turn-on delay time (note 1,2)	$t_{d(on)}$	$V_{DD}=30V, V_{GS}=10V,$ $I_D = 0.3A, R_{GEN}=3.3\Omega$		6		ns
Rise time (note 1,2)	t_r			3.5		
Turn-off delay time (note 1,2)	$t_{d(off)}$			20		
Fall time (note 1,2)	t_f			5.9		
Drain-source body diode characteristics						
Source drain current(Body Diode)	I_{SD}				0.2	A
Body diode forward voltage (note 1)	V_{SD}	$I_S=0.5A, V_{GS} = 0V$		0.78	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

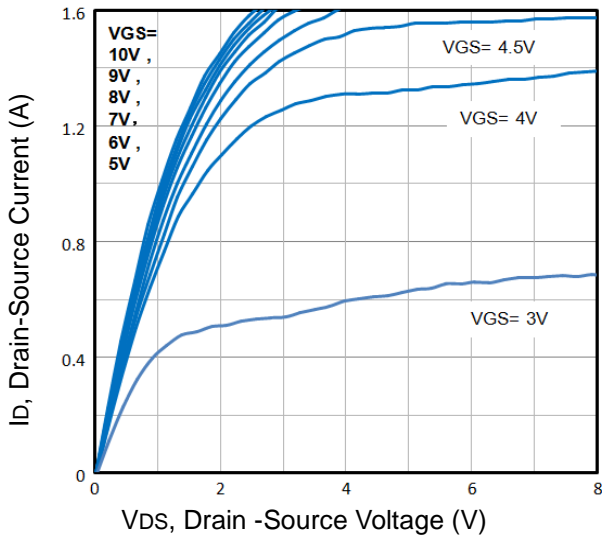


Fig1. Typical Output Characteristics

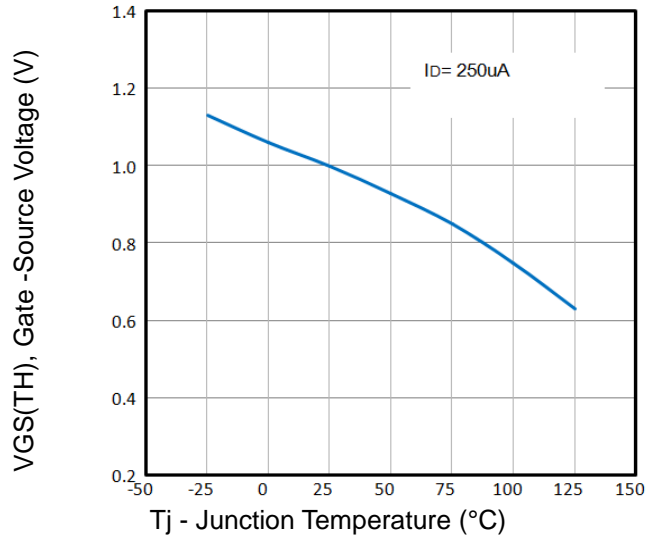


Fig2. Normalized Threshold Voltage Vs. Temperature

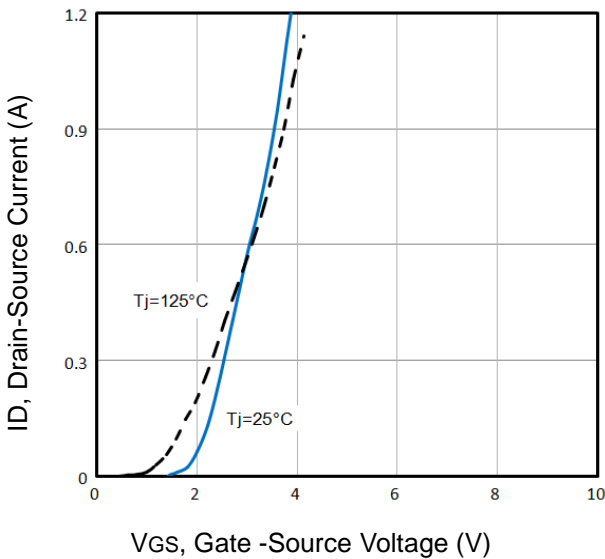


Fig3. Typical Transfer Characteristics

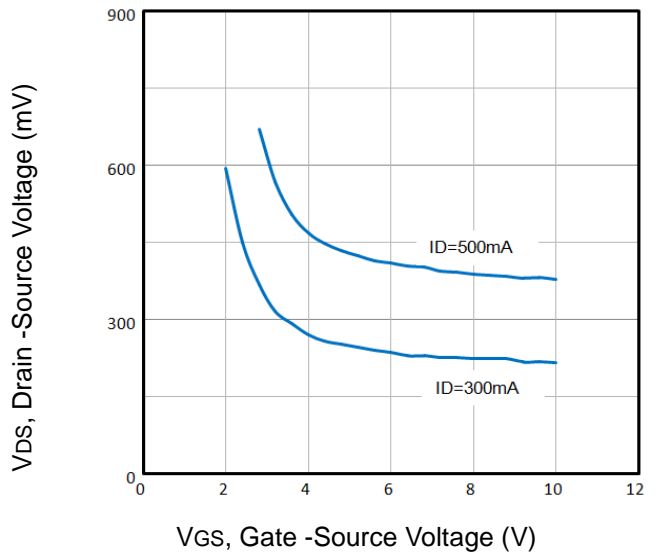


Fig4. Drain-Source Voltage vs Gate-Source Voltage

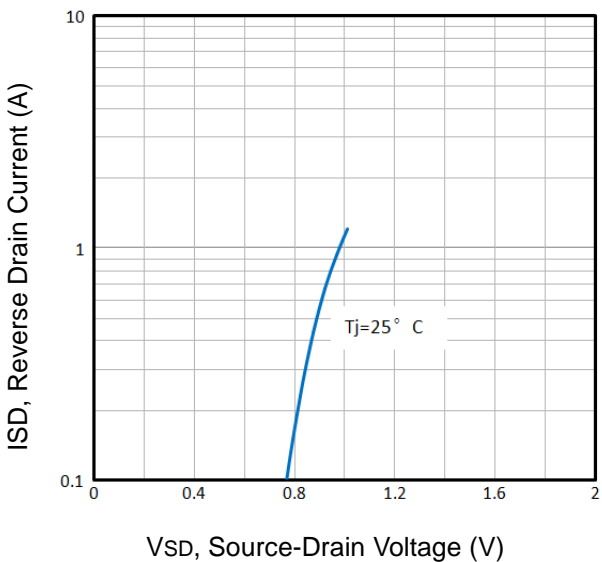


Fig5. Typical Source-Drain Diode Forward Voltage

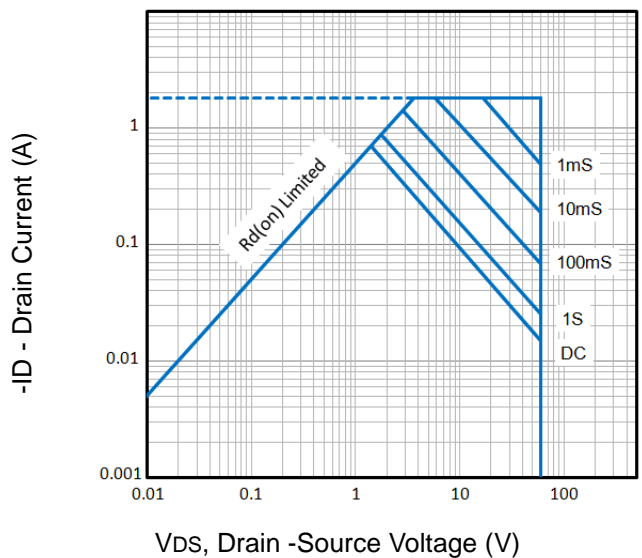


Fig6. Maximum Safe Operating Area

The curve above is for reference only.

Typical Characteristics

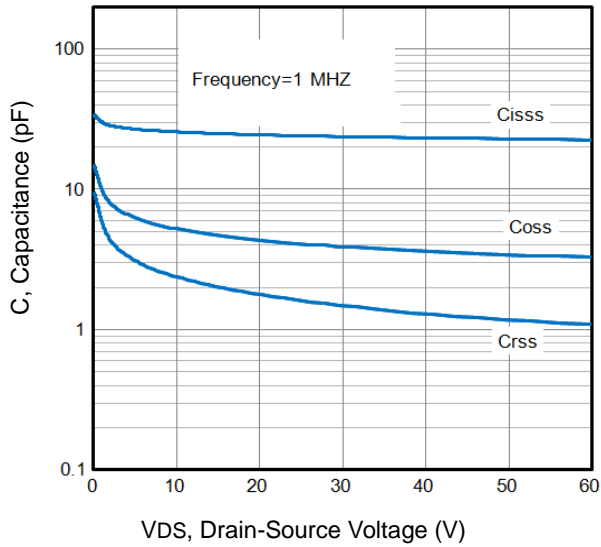


Fig7. Typical Capacitance Vs. Drain-Source Voltage

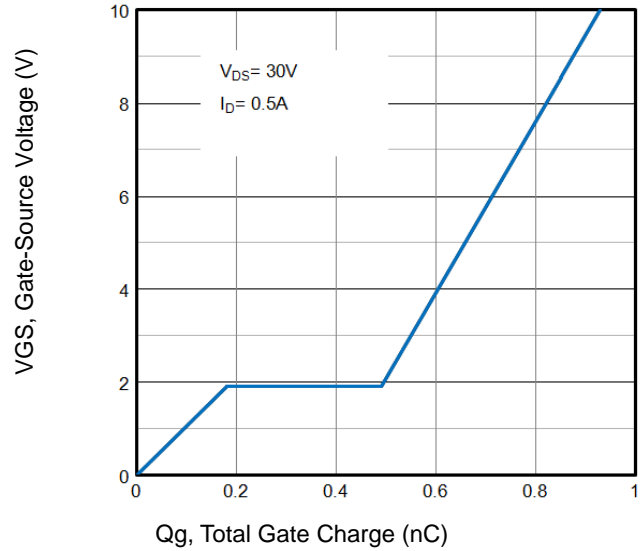


Fig8. Typical Gate Charge Vs. Gate-Source Voltage

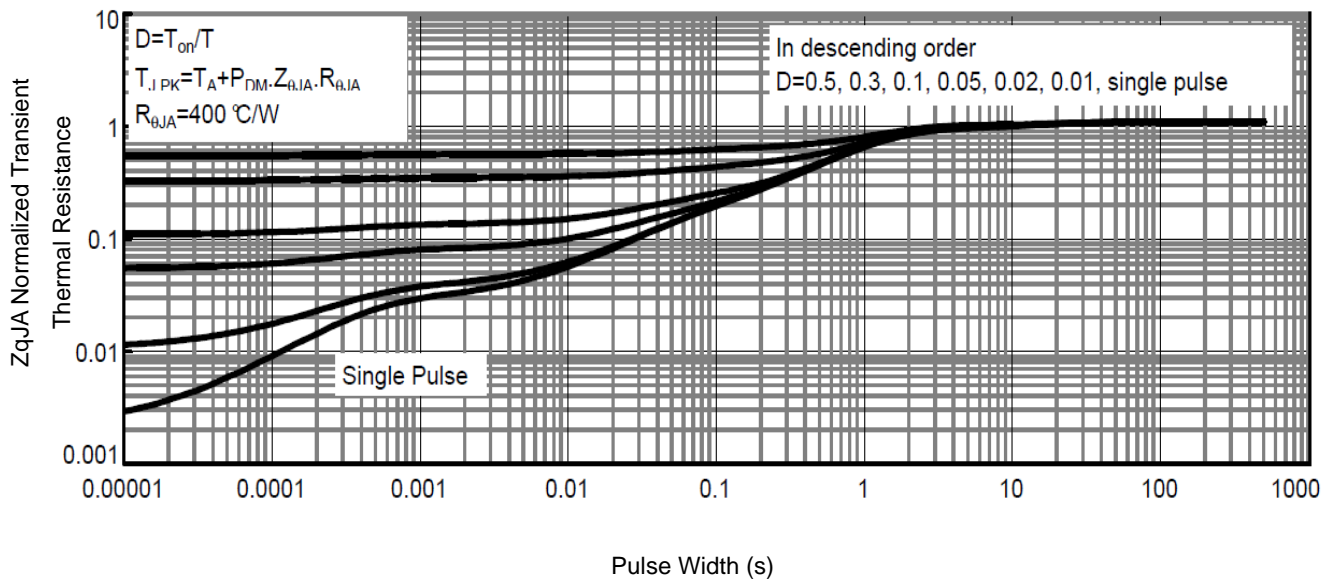


Fig9. Normalized Maximum Transient Thermal Impedance

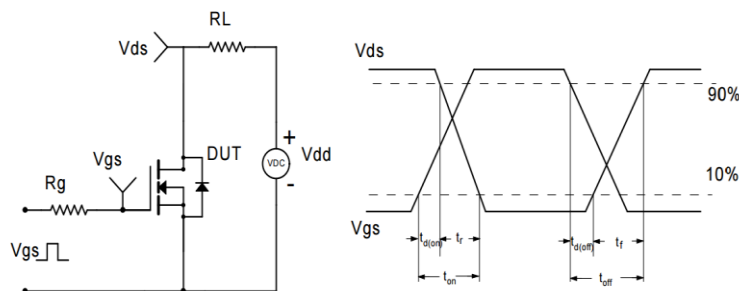
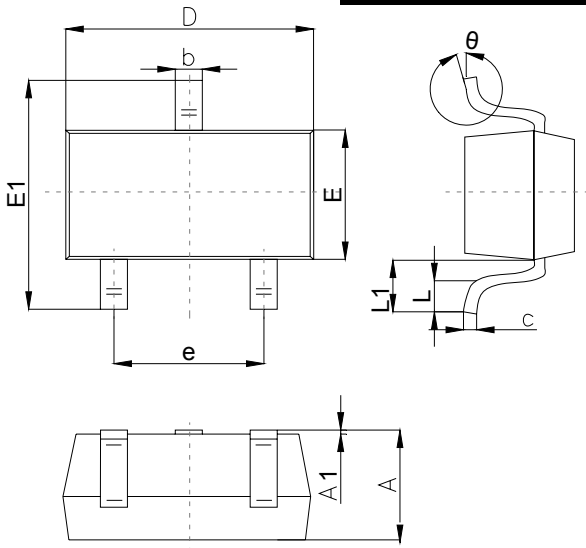


Fig10. Switching Time Test Circuit and waveforms

The curve above is for reference only.

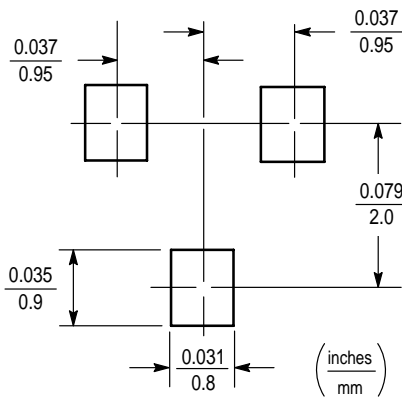
Outline Drawing

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		
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.

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