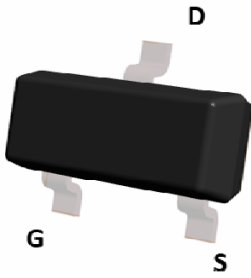
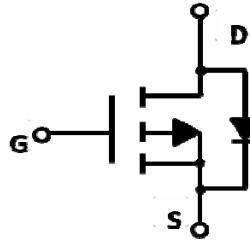
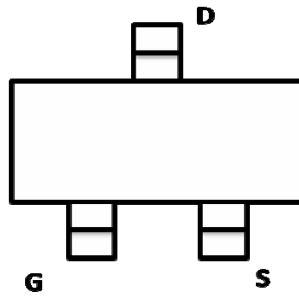


## P-Channel Enhancement Mode Field Effect Transistor



Top View

SOT-523



### Product Summary

- $V_{DS}$  -20V
- $I_D$  -2.3A
- $R_{DS(ON)}$ ( at  $V_{GS}=-4.5V$ ) < 180 mohm
- $R_{DS(ON)}$ ( at  $V_{GS}=-2.5V$ ) < 250 mohm

### General Description

- Trench Power LV MOSFET technology
- Low  $R_{DS(ON)}$
- Low Gate Charge

### Applications

- Video monitor
- Power management

Marking:S1

### ■ Absolute Maximum Ratings ( $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Maximum	Unit
Drain-source Voltage	$V_{DS}$	-20	V
Gate-source Voltage	$V_{GS}$	$\pm 10$	V
Drain Current	$I_D$	$T_A=25^\circ\text{C}$ @ Steady State	-2.3
		$T_A=70^\circ\text{C}$ @ Steady State	-1.6
Pulsed Drain Current <sup>A</sup>	$I_{DM}$	-8	A
Total Power Dissipation @ $T_A=25^\circ\text{C}$	$P_D$	0.7	W
Thermal Resistance Junction-to-Ambient <sup>B</sup>	$R_{\theta JA}$	178	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55~+150	$^\circ\text{C}$

## ■ Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
<b>Static Parameter</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> =-250μA	-20			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V, T <sub>C</sub> =25°C			-1	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±10V, V <sub>DS</sub> =0V			±100	nA
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =-250μA	-0.4	-0.62	-1.0	V
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = -4.5V, I <sub>D</sub> =-2.3A		130	180	mΩ
		V <sub>GS</sub> = -2.5V, I <sub>D</sub> =-1.5A		160	250	
		V <sub>GS</sub> = -1.8V, I <sub>D</sub> =-1.5A		210		
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =-2.3A, V <sub>GS</sub> =0V		-0.8	-1.2	V
Maximum Body-Diode Continuous Current	I <sub>S</sub>				-2.3	A
<b>Dynamic Parameters</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =-10V, V <sub>GS</sub> =0V, f=1MHZ		290		pF
Output Capacitance	C <sub>oss</sub>			47		
Reverse Transfer Capacitance	C <sub>rss</sub>			29		
<b>Switching Parameters</b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>GS</sub> =-4.5V, V <sub>DS</sub> =-10V, I <sub>D</sub> =-2.3A		3.9		nC
Gate Source Charge	Q <sub>gs</sub>			0.7		
Gate Drain Charge	Q <sub>gd</sub>			0.9		
Turn-on Delay Time	t <sub>D(on)</sub>	V <sub>GS</sub> =-4.5V, V <sub>DD</sub> =-10V, I <sub>D</sub> =-1A, R <sub>GEN</sub> =2.5Ω		12		ns
Turn-on Rise Time	t <sub>r</sub>			54		
Turn-off Delay Time	t <sub>D(off)</sub>			15		
Turn-off Fall Time	t <sub>f</sub>			9		

A. A.Pulse Test: Pulse Width ≤ 300us, Duty cycle ≤ 2%.

B. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch.

## Typical Performance Characteristics

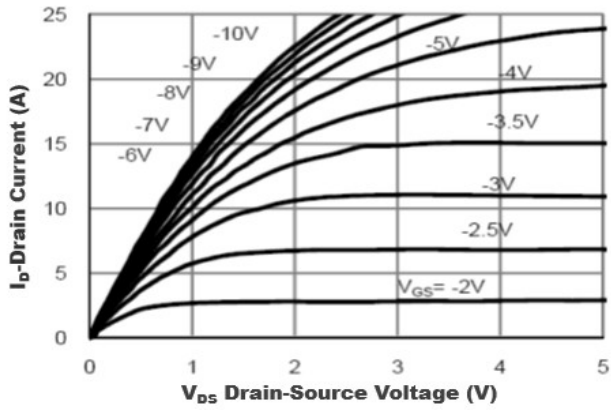


Figure1. Output Characteristics

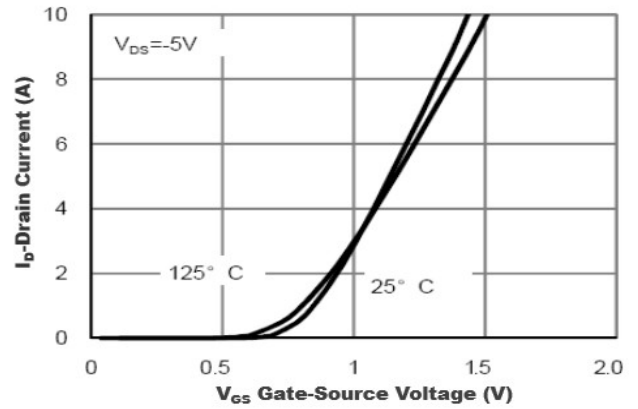


Figure2. Transfer Characteristics

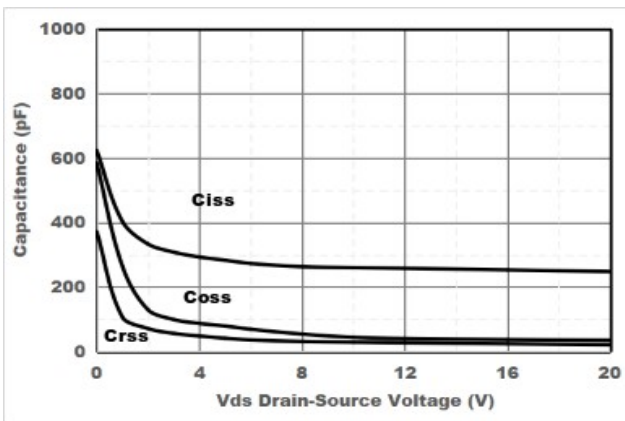


Figure3. Capacitance Characteristics

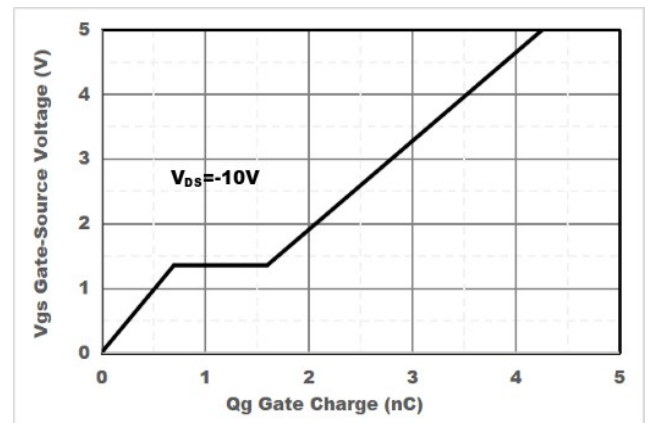


Figure4. Gate Charge

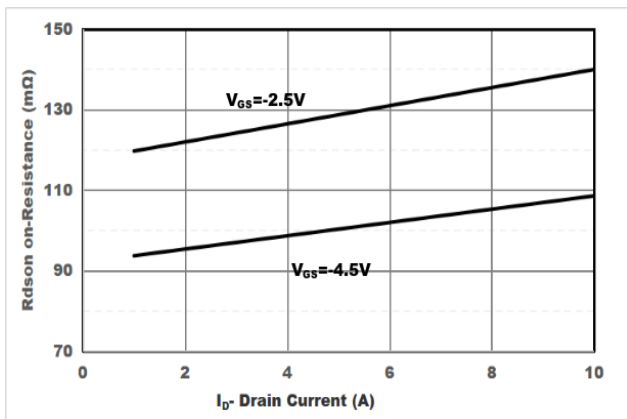


Figure5. Drain-Source on Resistance

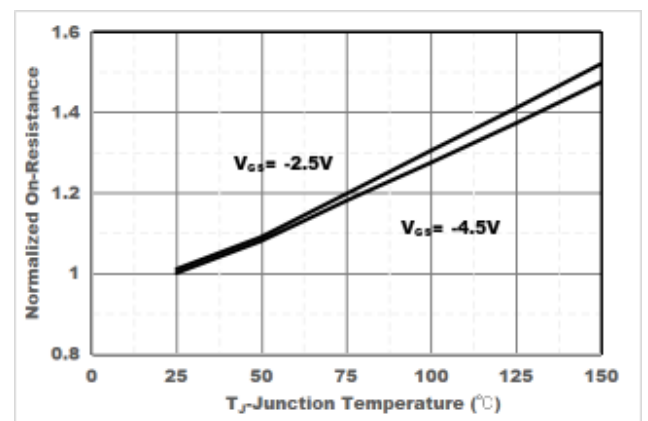


Figure6. Drain-Source on Resistance

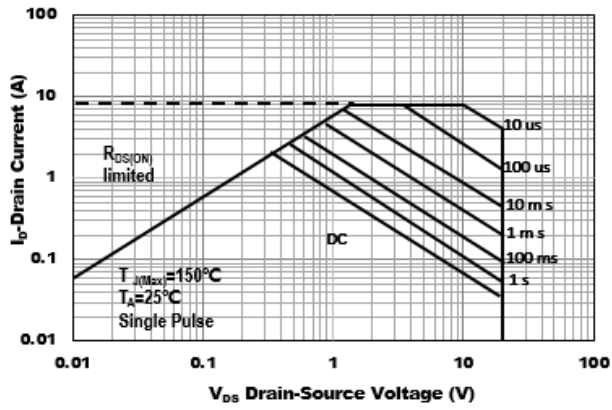


Figure7. Safe Operation Area

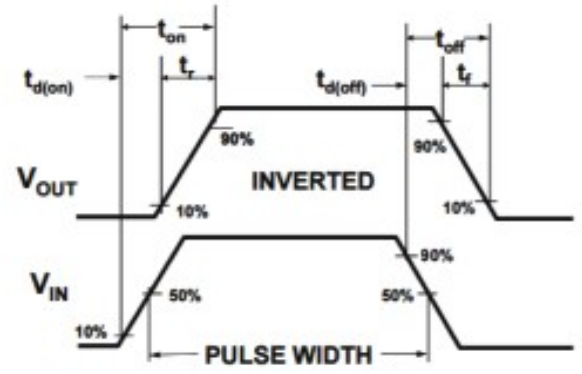
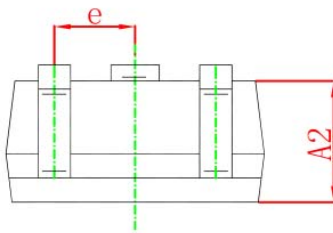
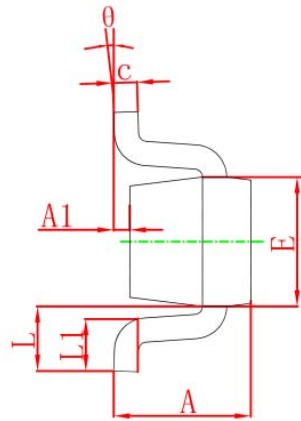
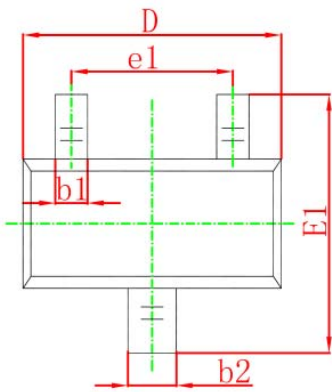


Figure8. Switching wave

## ■SOT-523 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.700	0.900	0.028	0.035
A1	0.000	0.100	0.000	0.004
A2	0.700	0.800	0.028	0.031
b1	0.150	0.250	0.006	0.010
b2	0.250	0.350	0.010	0.014
c	0.100	0.200	0.004	0.008
D	1.500	1.700	0.059	0.067
E	0.700	0.900	0.028	0.035
E1	1.450	1.750	0.057	0.069
e	0.500 TYP.		0.020 TYP.	
e1	0.900	1.100	0.035	0.043
L	0.400 REF.		0.016 REF.	
L1	0.260	0.460	0.010	0.018
$\theta$	0°	8°	0°	8°