



# TSM2311

## 20V P-Channel Enhancement Mode MOSFET

SOT-23



Pin assignment:

1. Gate
2. Source
3. Drain

$V_{DS} = -20V$

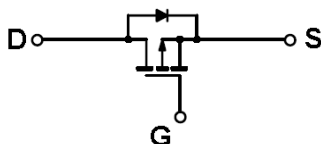
$R_{DS(on)}, V_{GS} @ -4.5V, I_{DS} @ -4.0A = 55m\Omega$

$R_{DS(on)}, V_{GS} @ -2.5V, I_{DS} @ -2.5A = 85m\Omega$

### Features

- ◇ Advanced trench process technology
- ◇ High density cell design for ultra low on-resistance
- ◇ Excellent thermal and electrical capabilities
- ◇ Compact and low profile SOT-23 package

### Block Diagram



### Ordering Information

Part No.	Packing	Package
TSM2311CX	Tape & Reel	SOT-23

### Absolute Maximum Rating (Ta = 25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	$V_{DS}$	-20V	V	
Gate-Source Voltage	$V_{GS}$	±8	V	
Continuous Drain Current	$I_D$	-4	A	
Pulsed Drain Current	$I_{DM}$	-20	A	
Maximum Power Dissipation		Ta = 25°C	1.25	W
		Ta = 75°C	0.8	
Operating Junction Temperature	$T_J$	+150	°C	
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	°C	

### Thermal Performance

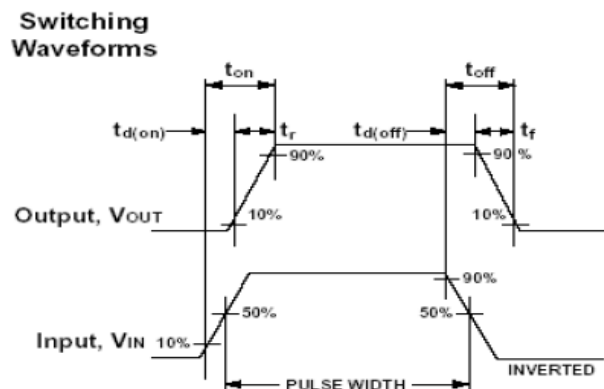
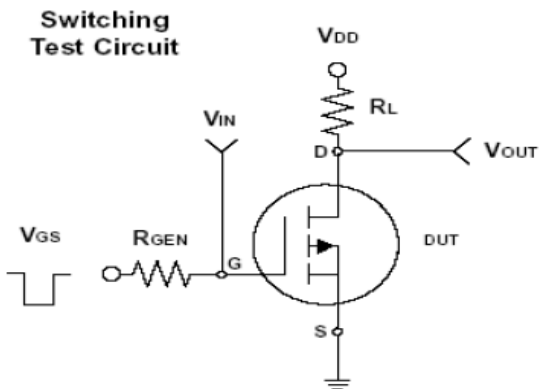
Parameter	Symbol	Limit	Unit
Lead Temperature (1/8" from case)	$T_L$	5	S
Junction to Ambient Thermal Resistance (PCB mounted)	$R_{\theta ja}$	100	°C/W

Note: Surface mounted on FR4 board  $t \leq 5\text{sec}$ .

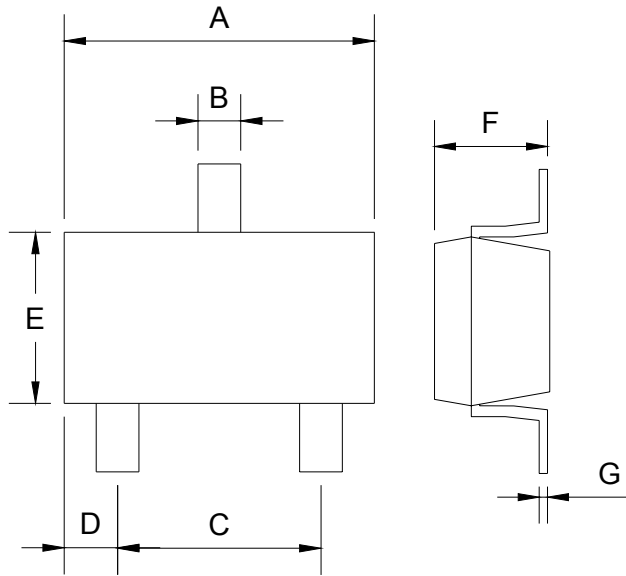


Electrical Characteristics						
Ta = 25 °C, unless otherwise noted						
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = -250\mu A$	$BV_{DSS}$	- 20	--	--	V
Drain-Source On-State Resistance	$V_{GS} = -4.5V, I_D = -4.0A$	$R_{DS(ON)}$	--	45	55	mΩ
Drain-Source On-State Resistance	$V_{GS} = -2.5V, I_D = -2.5A$	$R_{DS(ON)}$	--	75	85	
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = -250\mu A$	$V_{GS(TH)}$	- 0.45	--	--	V
Zero Gate Voltage Drain Current	$V_{DS} = -16V, V_{GS} = 0V$	$I_{DSS}$	--	--	- 1.0	uA
Gate Body Leakage	$V_{GS} = \pm 8V, V_{DS} = 0V$	$I_{GSS}$	--	--	$\pm 100$	nA
On-State Drain Current	$V_{DS} \geq -10V, V_{GS} = -4.5V$	$I_{D(ON)}$	- 6	--	--	A
Forward Transconductance	$V_{DS} = -5V, I_D = -4.0A$	$g_{fs}$	--	9	--	S
<b>Dynamic</b>						
Total Gate Charge	$V_{DS} = -6V, I_D = -4.0A,$ $V_{GS} = -4.5V$	$Q_g$	--	8.5	12	nC
Gate-Source Charge		$Q_{gs}$	--	1.5	--	
Gate-Drain Charge		$Q_{gd}$	--	2.1	--	
Turn-On Delay Time	$V_{DD} = -4V, R_L = 4\Omega,$ $I_D = -1A, V_{GEN} = -4.5V,$ $R_G = 6\Omega$	$t_{d(on)}$	--	18	--	nS
Turn-On Rise Time		$t_r$	--	45	--	
Turn-Off Delay Time		$t_{d(off)}$	--	95	--	
Turn-Off Fall Time		$t_f$	--	65	--	
Input Capacitance	$V_{DS} = -6V, V_{GS} = 0V,$ $f = 1.0MHz$	$C_{iss}$	--	970	--	pF
Output Capacitance		$C_{oss}$	--	485	--	
Reverse Transfer Capacitance		$C_{rss}$	--	160	--	
<b>Source-Drain Diode</b>						
Max. Diode Forward Current		$I_S$	--	--	- 1.6	A
Diode Forward Voltage	$I_S = -1.6A, V_{GS} = 0V$	$V_{SD}$	--	- 0.8	- 1.2	V

Note : pulse test: pulse width  $\leq 300\mu S$ , duty cycle  $\leq 2\%$



### SOT-23 Mechanical Drawing



SOT-23 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.88	2.91	0.113	0.115
B	0.39	0.42	0.015	0.017
C	1.78	2.03	0.070	0.080
D	0.51	0.61	0.020	0.024
E	1.59	1.66	0.063	0.065
F	1.04	1.08	0.041	0.043
G	0.07	0.09	0.003	0.004