TSM2301

20V P-Channel Enhancement Mode MOSFET

SOT-23

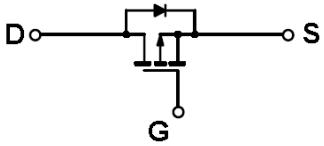
Pin assignment:
1. Gate
2. Source
3. Drain

V_{DS} = - 20V
$R_{DS\ (on)}$, Vgs @ - 4.5V, Ids @ - 2.8A =130mΩ
$R_{DS\ (on)}$, Vgs @ - 2.5V, Ids @ - 2.0A =190mΩ

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
TSM2301CX	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	- 2.3	A
Pulsed Drain Current		I_{DM}	- 10	A
Maximum Power Dissipation	Ta = 25 °C	P_D	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)	Rθja	100	°C/W

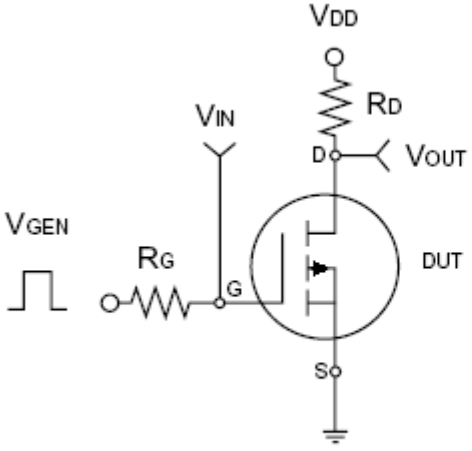
Note: Surface mounted on FR4 board t<=5sec.

Electrical Characteristics

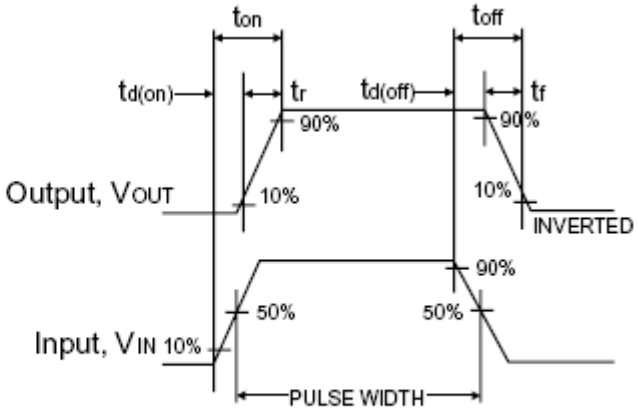
Ta = 25 °C, unless otherwise noted

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = - 250uA	BV_{DSS}	- 20	--	--	V
Drain-Source On-State Resistance	V_{GS} = - 4.5V, I_D = -2.8A	$R_{DS(ON)}$	--	95	130	mΩ
Drain-Source On-State Resistance	V_{GS} = - 2.5V, I_D = -2.0A	$R_{DS(ON)}$	--	122	190	
Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = - 250uA	$V_{GS(TH)}$	- 0.45	--	--	V
Zero Gate Voltage Drain Current	V_{DS} = - 16V, V_{GS} = 0V	I_{DSS}	--	--	- 1.0	uA
Gate Body Leakage	V_{GS} = ± 8V, V_{DS} = 0V	I_{GSS}	--	--	± 100	nA
On-State Drain Current	V_{DS} ≧- 10V, V_{GS} = -5V	$I_{D(ON)}$	- 6	--	--	A
Forward Transconductance	V_{DS} = - 5V, I_D = - 2.8A	g_{fs}	--	6.5	--	S
Dynamic						
Total Gate Charge	V_{DS} = - 6V, I_D = - 2.8A, V_{GS} = - 4.5V	Q_g	--	5.4	10	nC
Gate-Source Charge		Q_{gs}	--	0.8	--	
Gate-Drain Charge		Q_{gd}	--	1.1	--	
Turn-On Delay Time	V_{DD} = - 6V, R_L = 6Ω, I_D = - 1A, V_{GEN} = - 4.5V, R_G = 6Ω	$t_{d(on)}$	--	5	25	nS
Turn-On Rise Time		t_r	--	19	60	
Turn-Off Delay Time		$t_{d(off)}$	--	95	110	
Turn-Off Fall Time		t_f	--	65	80	
Input Capacitance	V_{DS} = - 6V, V_{GS} = 0V, f = 1.0MHz	C_{iss}	--	447	--	pF
Output Capacitance		C_{oss}	--	127	--	
Reverse Transfer Capacitance		C_{rss}	--	80	--	
Source-Drain Diode						
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 <=300uS, duty cycle <=2%



Switching Test Circuit

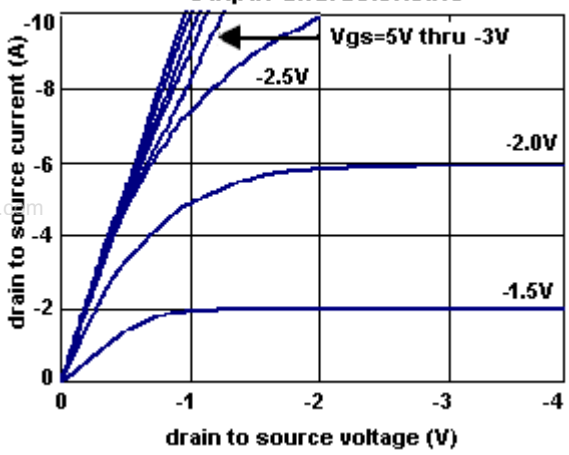


Switchin Waveforms

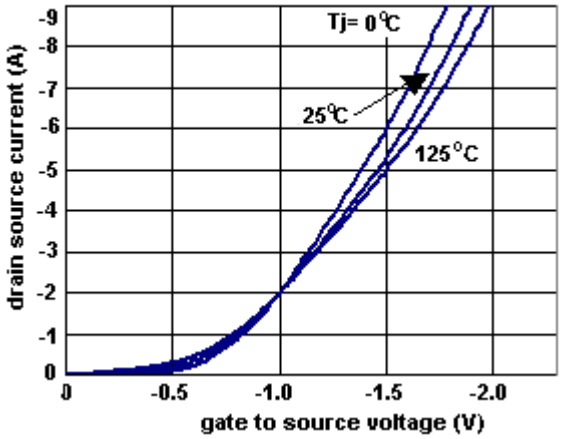
TSC

Typical Characteristics Curve (Ta = 25 °C unless otherwise noted)

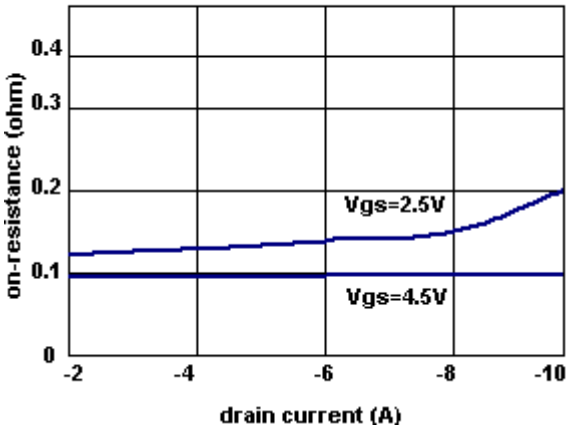
Output Characteristic



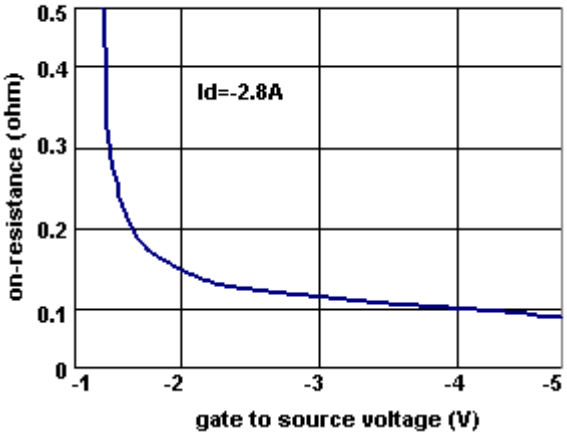
Transfer Characteristic



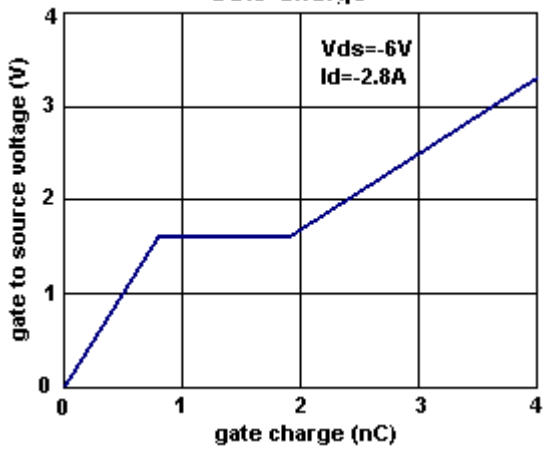
On Resistance vs Drain Current



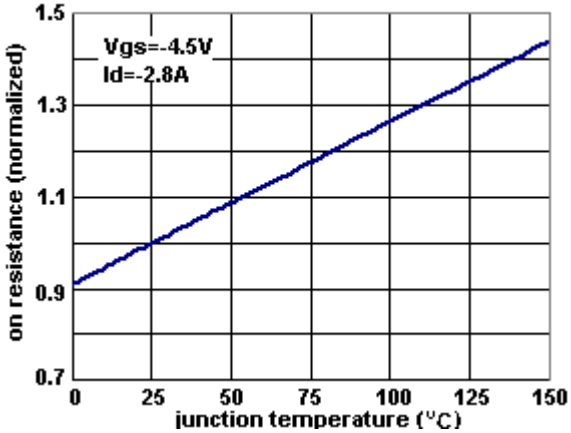
On Resistance vs Gate-Source



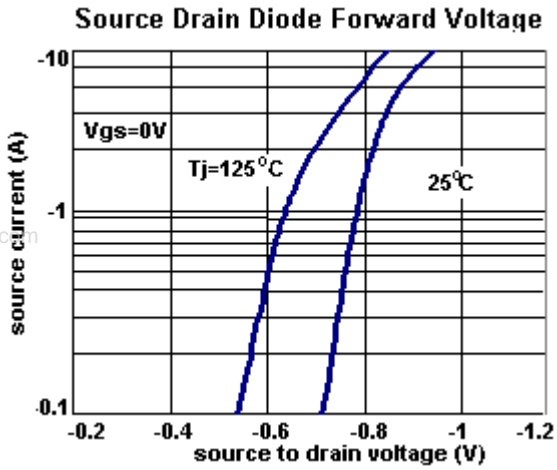
Gate Charge

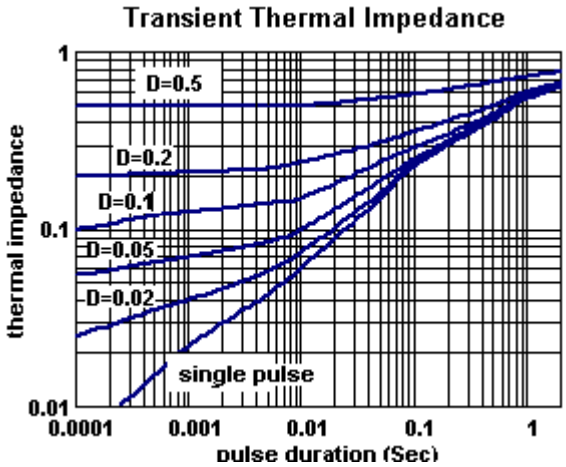


On Resistance vs Junction temp.

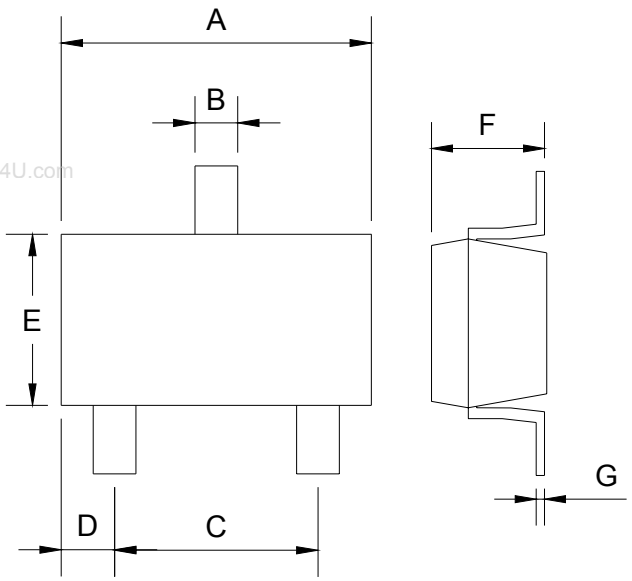


Typical Characteristics Curve (Ta = 25 °C unless otherwise noted)





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