



TSM2301

20V P-Channel Enhancement Mode MOSFET

SOT-23



Pin assignment:

1. Gate
2. Source
3. Drain

$V_{DS} = -20V$

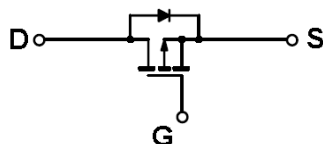
$R_{DS(on)}, V_{GS} @ -4.5V, I_{DS} @ -2.8A = 130m\Omega$

$R_{DS(on)}, V_{GS} @ -2.5V, I_{DS} @ -2.0A = 190m\Omega$

Features

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

Block Diagram



Ordering Information

Part No.	Packing	Package
TSM2301CX	Tape & Reel	SOT-23

Absolute Maximum Rating ($T_a = 25^\circ C$ 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	P_D	$T_a = 25^\circ C$	W
		$T_a = 75^\circ C$	
Operating Junction Temperature	T_J	+150	$^\circ C$
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ C$

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	$^\circ C/W$

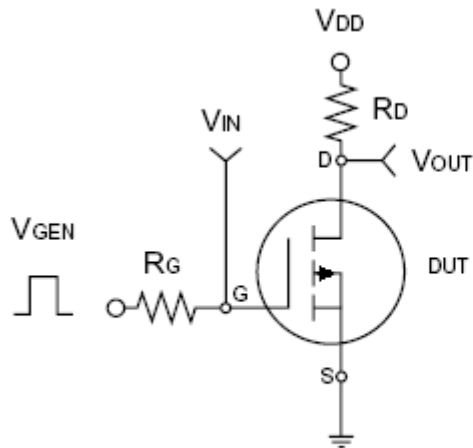
Note: Surface mounted on FR4 board $t \leq 5sec$.

Electrical Characteristics

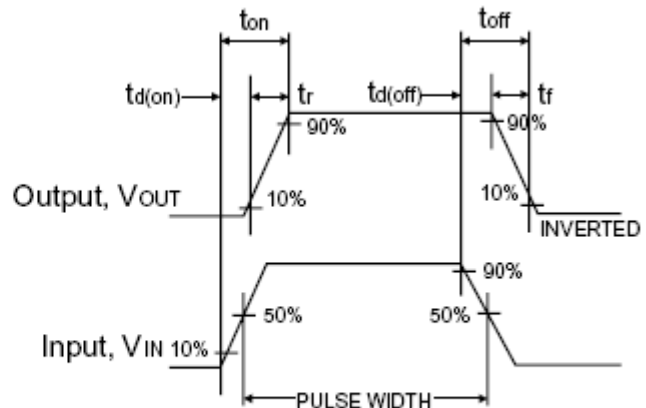
Ta = 25 °C, unless otherwise noted

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = -250\mu A$	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	$V_{DS} = V_{GS}, I_D = -250\mu A$	$V_{GS(TH)}$	- 0.45	--	--	V
Zero Gate Voltage Drain Current	$V_{DS} = -16V, V_{GS} = 0V$	I_{DSS}	--	--	- 1.0	μA
Gate Body Leakage	$V_{GS} = \pm 8V, V_{DS} = 0V$	I_{GSS}	--	--	± 100	nA
On-State Drain Current	$V_{DS} \geq -10V, V_{GS} = -5V$	$I_{D(ON)}$	- 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	$V_{DD} = -6V, R_L = 6\Omega,$ $I_D = -1A, V_{GEN} = -4.5V,$ $R_G = 6\Omega$	$t_{d(on)}$	--	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 $\leq 300\mu s$, duty cycle $\leq 2\%$

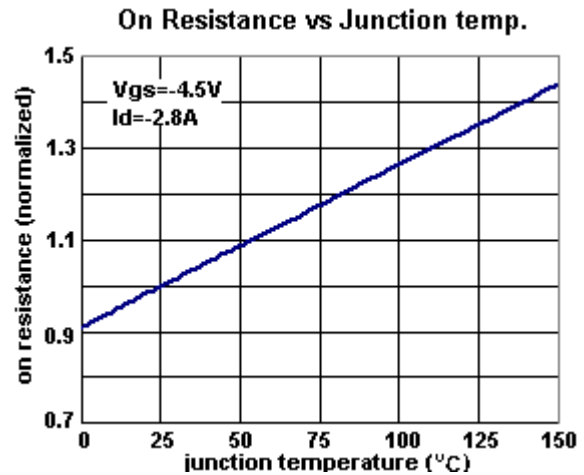
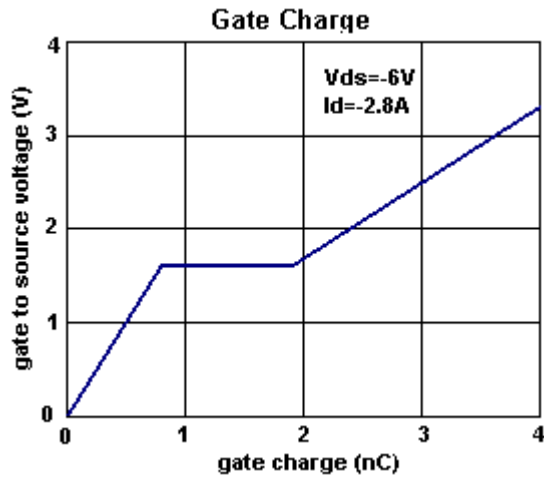
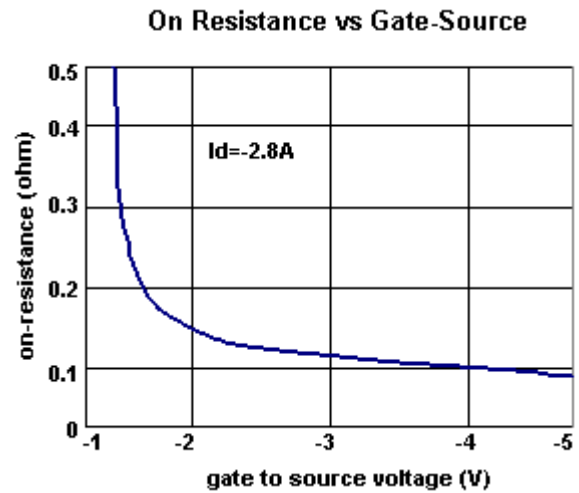
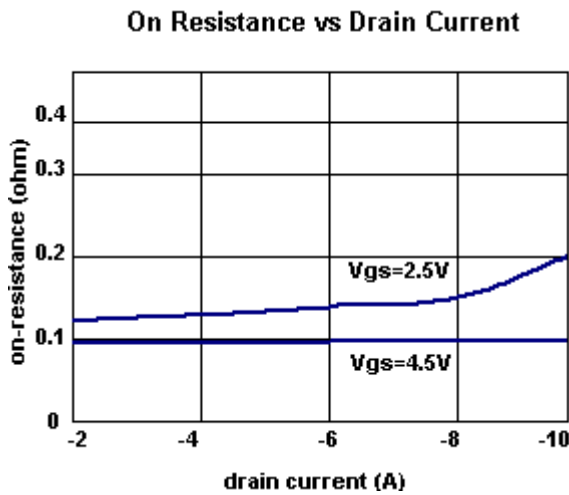
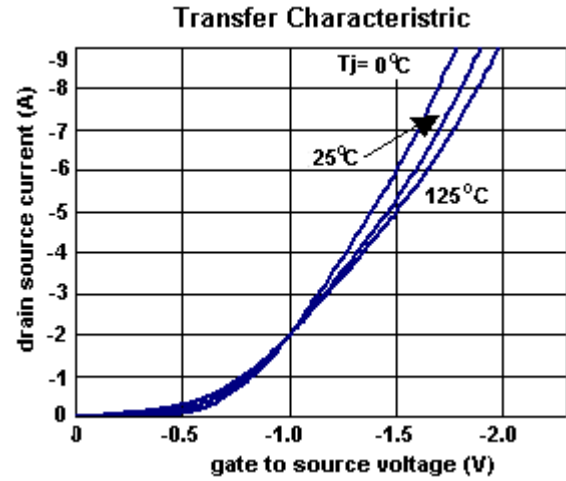
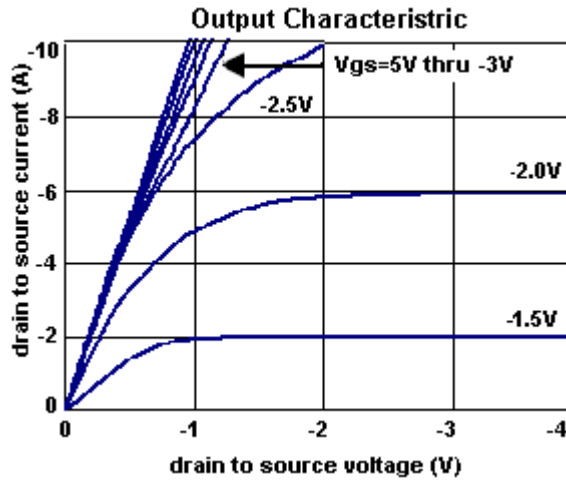


Switching Test Circuit

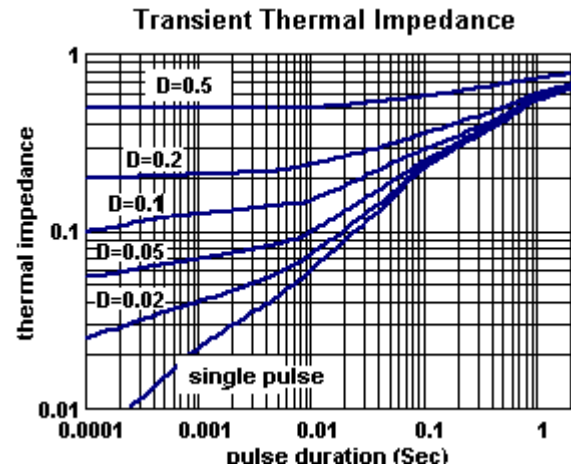
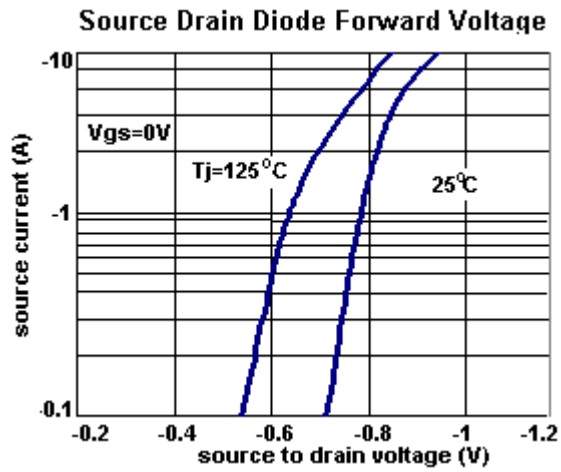


Switchin Waveforms

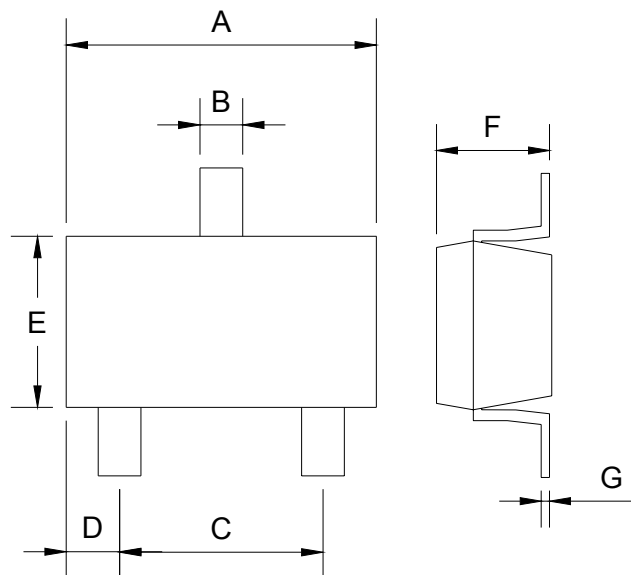
Typical Characteristics Curve ($T_a = 25^\circ\text{C}$ unless otherwise noted)



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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