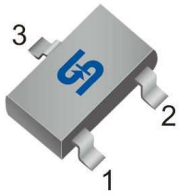
TSM2312

20V N-Channel MOSFET

SOT-23



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

Key Parameter Performance

Parameter		Value	Unit
V_{DS}		20	V
$R_{DS(on)}$ (max)	V_{GS} = 4.5V	33	mΩ
	V_{GS} = 2.5V	40	
	V_{GS} = 1.8V	51	
Q_g		11	nC

Features

- Advance Trench Process Technology
- High Density Cell Design for Ultra Low On-resistance

Application

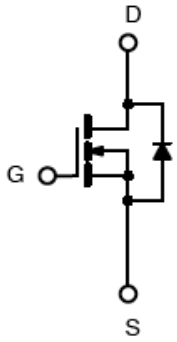
- Load Switch
- PA Switch

Ordering Information

Part No.	Package	Packing
TSM2312CX RFG	SOT-23	3,000pcs / 7" Reel

Note: "G" denotes for Halogen- and Antimony-free as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds

Block Diagram



N-Channel MOSFET

Absolute Maximum Ratings (T_C = 25°C, unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	±8	V
Continuous Drain Current		I_D	4.9	A
Pulsed Drain Current (Note 1)		I_{DM}	15	A
Continuous Source Current (Diode Conduction) (Note 2)		I_S	1.0	A
Maximum Power Dissipation	Ta = 25°C	P_D	0.75	W
	Ta = 75°C		0.48	
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Thermal Performance

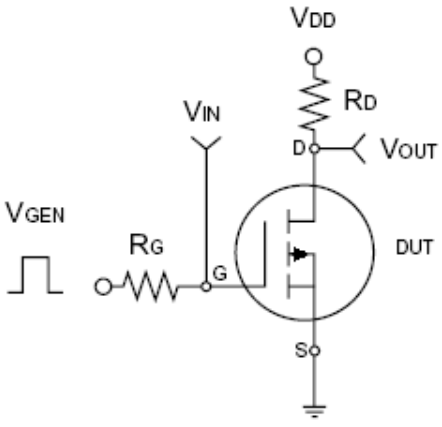
Parameter	Symbol	Limit	Unit
Thermal Resistance Junction to Lead	$R_{\Theta JL}$	75	°C/W
Thermal Resistance Junction to Ambient	$R_{\Theta JA}$	140	°C/W

Electrical Specifications

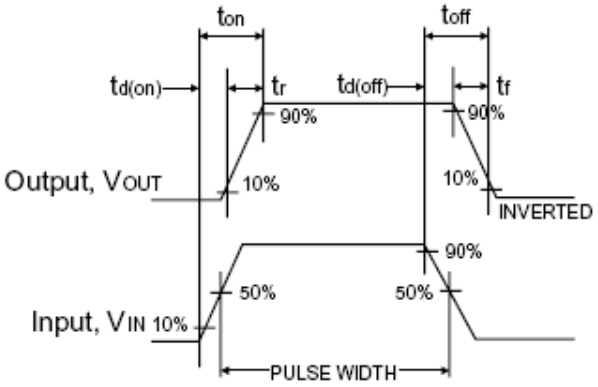
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static(Note 3)						
Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250uA	BV_{DSS}	20	--	--	V
Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250uA	$V_{GS(TH)}$	0.45	0.65	1.0	V
Gate Body Leakage	V_{GS} = ±8V, V_{DS} = 0V	I_{GSS}	--	--	±100	nA
Zero Gate Voltage Drain Current	V_{DS} = 16V, V_{GS} = 0V	I_{DSS}	--	--	1.0	μA
On-State Drain Current	V_{DS} =10V, V_{GS} = 4.5V	$I_{D(ON)}$	15	--	--	A
Drain-Source On-State Resistance	V_{GS} = 4.5V, I_D = 4.9A	$R_{DS(ON)}$	--	27	33	mΩ
	V_{GS} = 2.5V, I_D = 4.4A		--	33	40	
	V_{GS} = 1.8V, I_D = 3.9A		--	42	51	
Forward Transconductance	V_{DS} = 15V, I_D = 5.0A	g_{fs}	--	40	--	S
Diode Forward Voltage	I_S = 1.0A, V_{GS} = 0V	V_{SD}	--	0.8	1.2	V
Dynamic(Note 4)						
Total Gate Charge	V_{DS} = 10V, I_D = 5.0A, V_{GS} = 4.5V	Q_g	--	11	14	nC
Gate-Source Charge		Q_{gs}	--	1.5	--	
Gate-Drain Charge		Q_{gd}	--	2.1	--	
Input Capacitance	V_{DS} = 10V, V_{GS} = 0V, f = 1.0MHz	C_{iss}	--	500	--	pF
Output Capacitance		C_{oss}	--	300	--	
Reverse Transfer Capacitance		C_{rss}	--	140	--	
Switching(Note 5)						
Turn-On Delay Time	V_{DD} = 10V, R_L = 10Ω, I_D = 1A, V_{GEN} = 4.5V, R_G = 6Ω	$t_{d(on)}$	--	15	25	ns
Turn-On Rise Time		t_r	--	40	60	
Turn-Off Delay Time		$t_{d(off)}$	--	48	70	
Turn-Off Fall Time		t_f	--	31	45	

Notes:

1. Pulse width limited by the maximum junction temperature
2. Surface Mounted on FR4 Board t ≤ 5 sec.
3. Pulse test: PW ≤ 300μs, duty cycle ≤ 2%
4. For DESIGN AID ONLY, not subject to production testing.
5. Switching time is essentially independent of operating temperature.



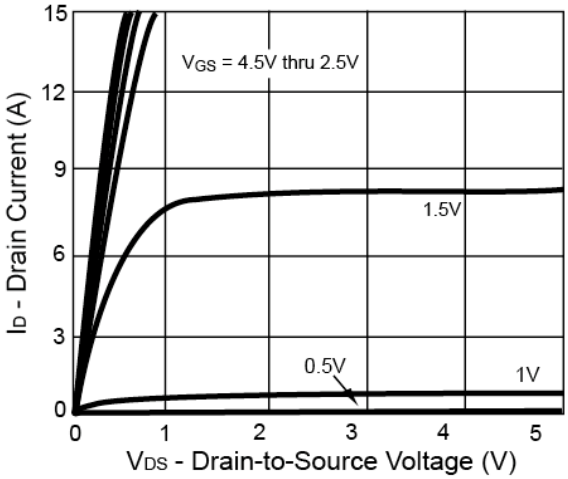
Switching Test Circuit



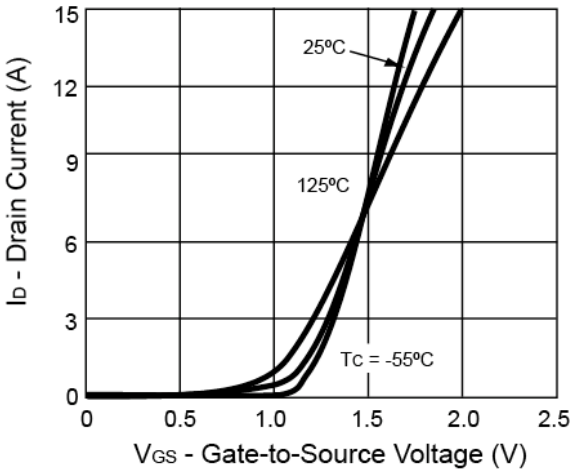
Switchin Waveforms

Electrical Characteristics Curve

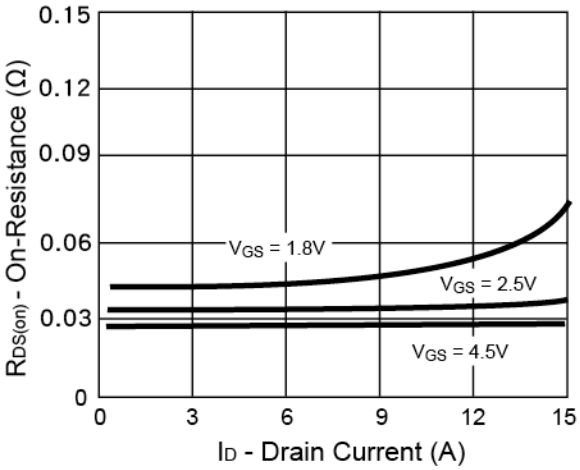
Output Characteristics



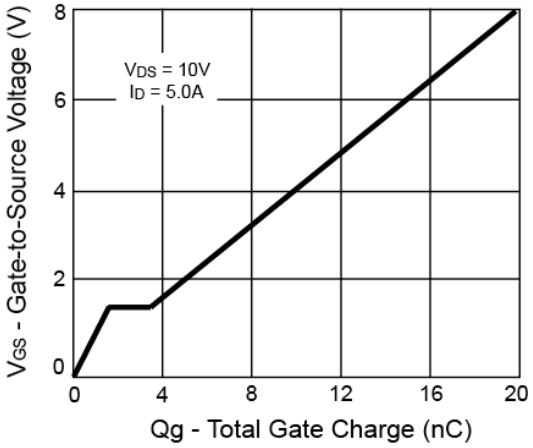
Transfer Characteristics



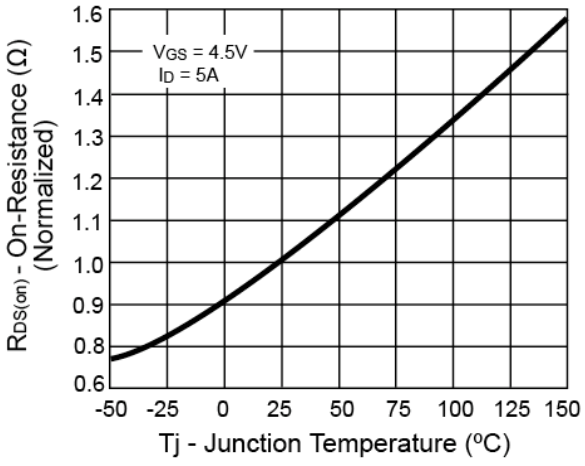
On-Resistance vs. Drain Current



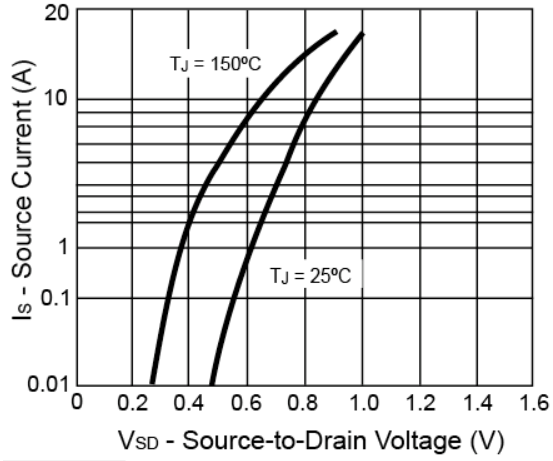
Gate Charge



On-Resistance vs. Junction Temperature



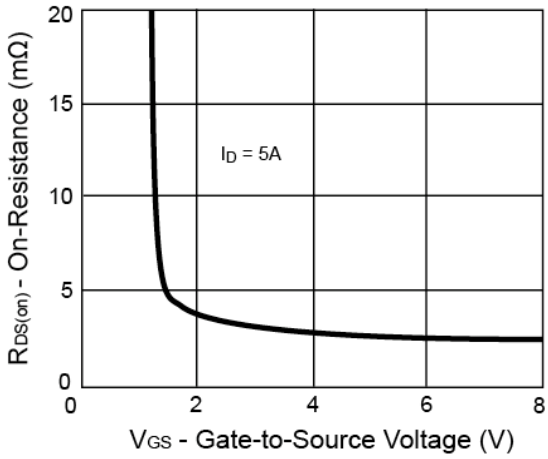
Source-Drain Diode Forward Voltage



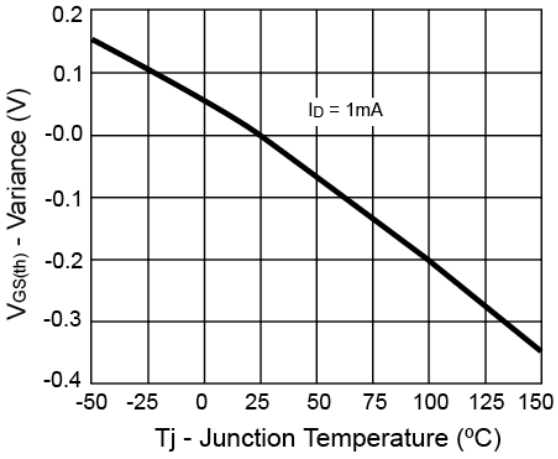
Pb-Free RoHS COMPLIANT

Electrical Characteristics Curve

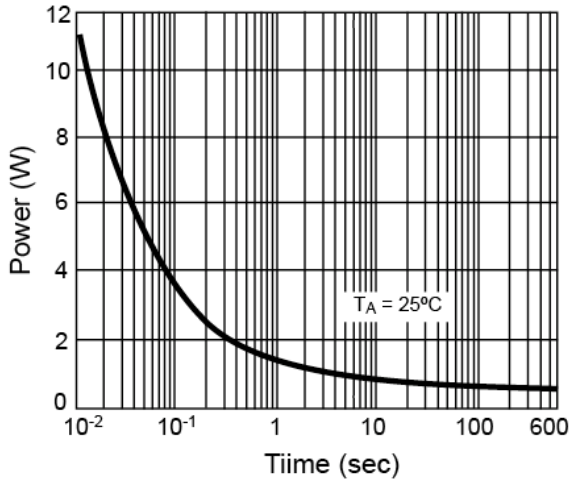
On-Resistance vs. Gate-Source Voltage



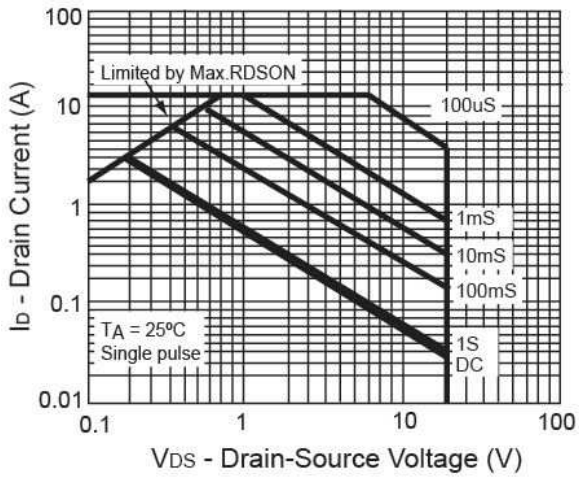
Threshold Voltage



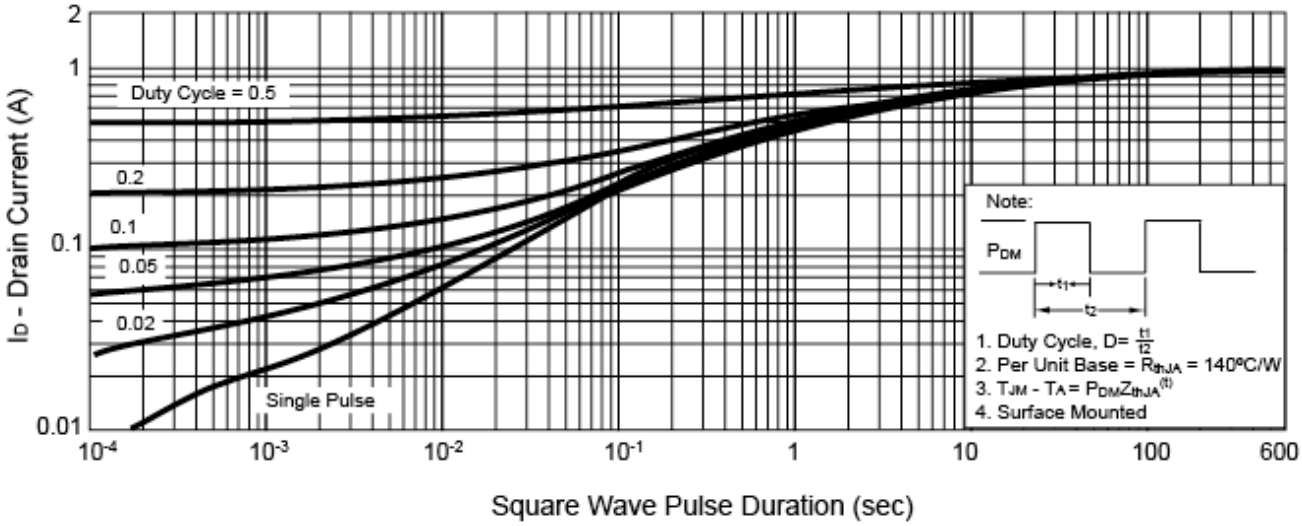
Single Pulse Power



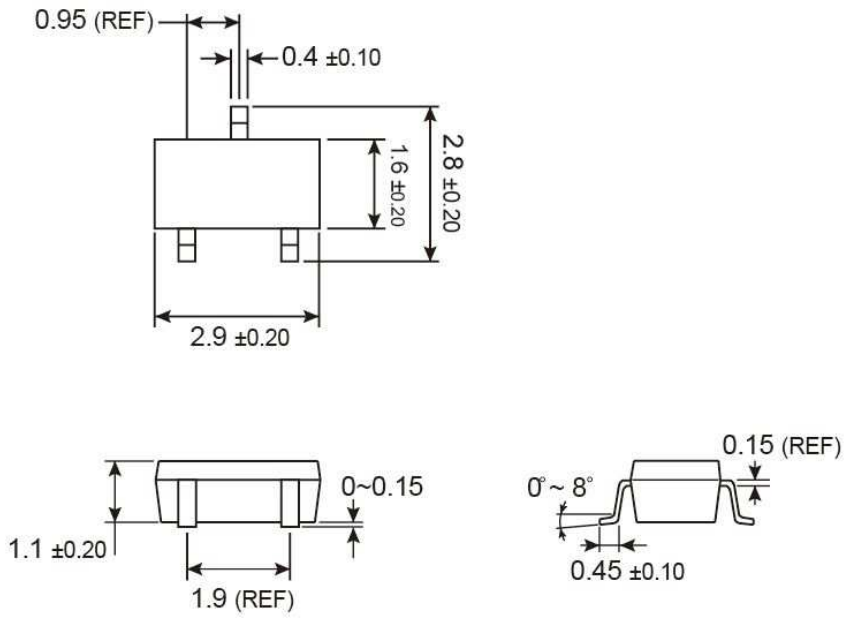
Safety Operation Area



Normalized Thermal Transient Impedance, Junction-to-Ambient

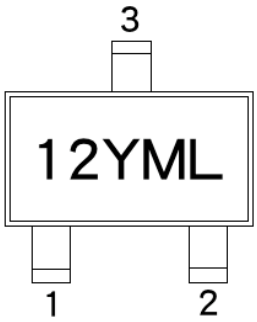


SOT-23 Mechanical Drawing



Unit: Millimeters

Marking Diagram



12 = Device Code
Y = Year Code
M = Month Code for Halogen Free Product

O	=Jan	**P**	=Feb	**Q**	=Mar	**R**	=Apr
S	=May	**T**	=Jun	**U**	=Jul	**V**	=Aug
W	=Sep	**X**	=Oct	**Y**	=Nov	**Z**	=Dec

L = Lot Code

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