

SOT-23



Pin Definition:

1. Gate
2. Source
3. Drain

Key Parameter Performance

Parameter	Value	Unit
V_{DS}	-20	V
$R_{DS(on)}$ (max)	$V_{GS} = -4.5V$	130
	$V_{GS} = -2.5V$	190
Q_g	7.2	nC

Features

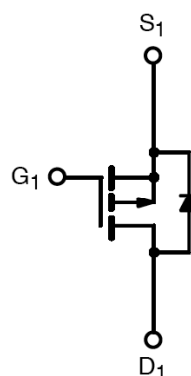
- Advance Trench Process Technology
- High Density Cell Design for Ultra Low On-resistance

Ordering Information

Part No.	Package	Packing
TSM2301ACX RFG	SOT-23	3kpcs / 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



P-Channel MOSFET

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current	I_D	-2.8	A
Pulsed Drain Current	I_{DM}	-10	A
Continuous Source Current (Diode Conduction) (Note 1,2)	I_S	-1	A
Maximum Power Dissipation	P_D	$T_A=25^{\circ}C$	0.7
		$T_A=70^{\circ}C$	0.45
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
Junction to Ambient Thermal Resistance (PCB mounted)	$R_{\theta JA}$	175	$^{\circ}C/W$

Electrical Specifications ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

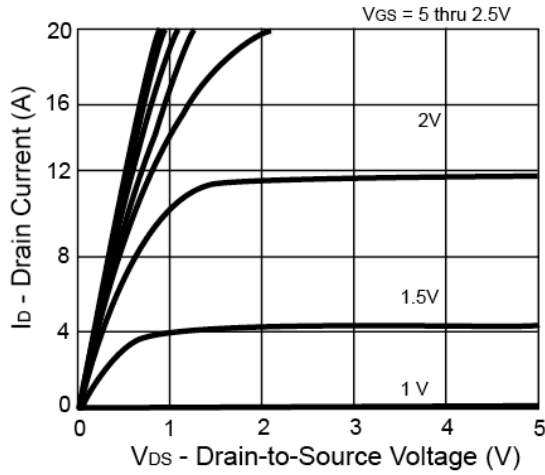
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static (Note 3)						
Drain-Source Breakdown Voltage	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$	BV_{DSS}	-20	--	--	V
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	$V_{GS(th)}$	-0.6	-0.7	-1	V
Gate Body Leakage	$V_{GS} = \pm 12\text{V}, V_{DS} = 0\text{V}$	I_{GSS}	--	--	± 100	nA
Zero Gate Voltage Drain Current	$V_{DS} = -20\text{V}, V_{GS} = 0\text{V}$	I_{DSS}	--	--	1.0	μA
Drain-Source On-State Resistance	$V_{GS} = -4.5\text{V}, I_D = -2.8\text{A}$	$R_{DS(on)}$	--	90	130	m Ω
	$V_{GS} = -2.5\text{V}, I_D = -2.0\text{A}$		--	120	190	
Diode Forward Voltage	$I_S = -1\text{A}, V_{GS} = 0\text{V}$	V_{SD}	--	-0.7	-1.3	V
Dynamic (Note 4,5)						
Gate Resistance	$V_{GS} = V_{DS} = 0\text{V}, f = 1\text{MHz}$	R_g	--	7.5	--	Ω
Total Gate Charge	$V_{DS} = -6\text{V}, I_D = -2.8\text{A},$ $V_{GS} = -4.5\text{V}$	Q_g	--	7.2	--	nC
Gate-Source Charge		Q_{gs}	--	2.2	--	
Gate-Drain Charge		Q_{gd}	--	1.2	--	
Input Capacitance	$V_{DS} = -15\text{V}, V_{GS} = 0\text{V},$ $f = 1.0\text{MHz}$	C_{iss}	--	480	--	pF
Output Capacitance		C_{oss}	--	460	--	
Reverse Transfer Capacitance		C_{rss}	--	10	--	
Switching (Note 4,5)						
Turn-On Delay Time	$V_{DD} = -6\text{V}, R_L = 6\Omega,$ $V_{GEN} = -4.5\text{V},$ $R_G = 6\Omega$	$t_{d(on)}$	--	38	--	ns
Turn-On Rise Time		t_r	--	25	--	
Turn-Off Delay Time		$t_{d(off)}$	--	43	--	
Turn-Off Fall Time		t_f	--	5	--	

Notes:

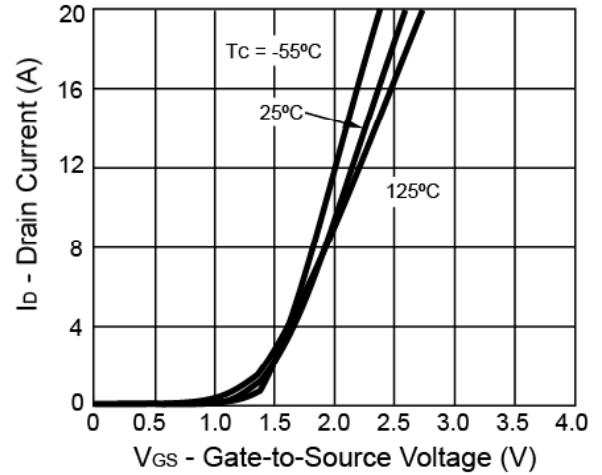
- Pulse width limited by the Maximum junction temperature
- Surface Mounted on a 1 in² pad of 2oz Cu, $t_s \leq 10$ sec.
- Pulse test: PW $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$
- For DESIGN AID ONLY, not subject to production testing.
- Switching time is essentially independent of operating temperature.

Electrical Characteristics Curve

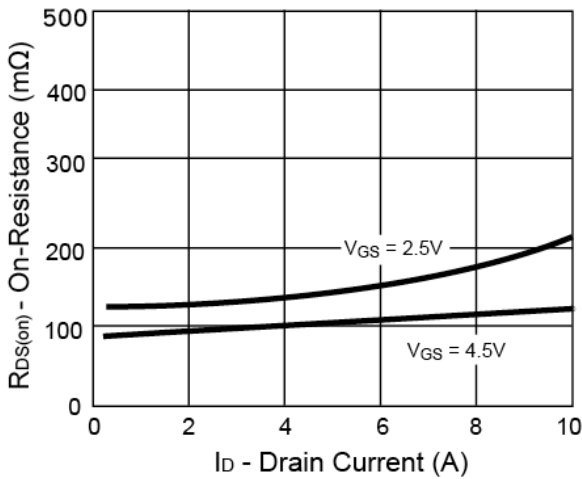
Output Characteristics



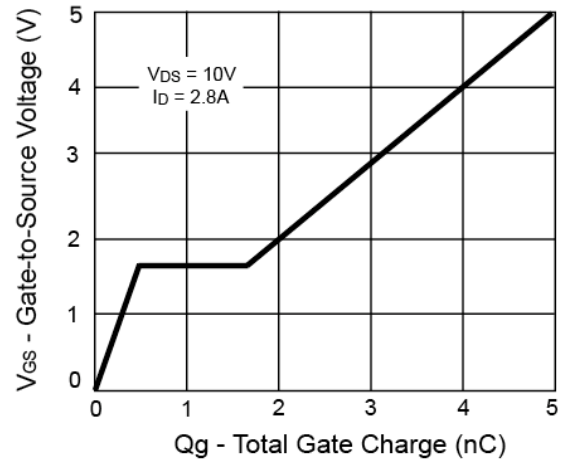
Transfer Characteristics



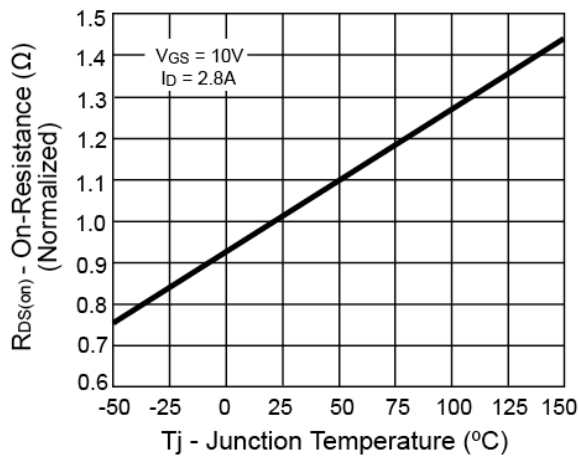
On-Resistance vs. Drain Current



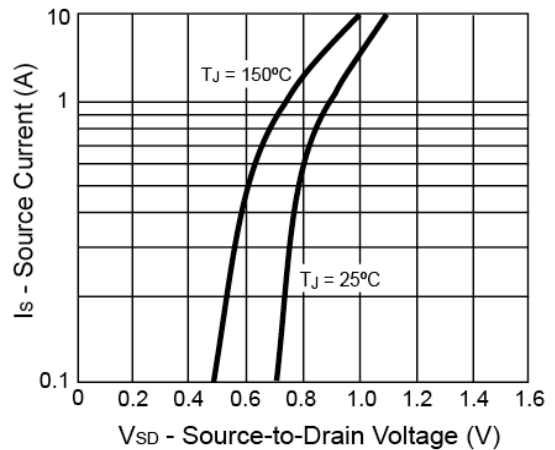
Gate Charge



On-Resistance vs. Junction Temperature

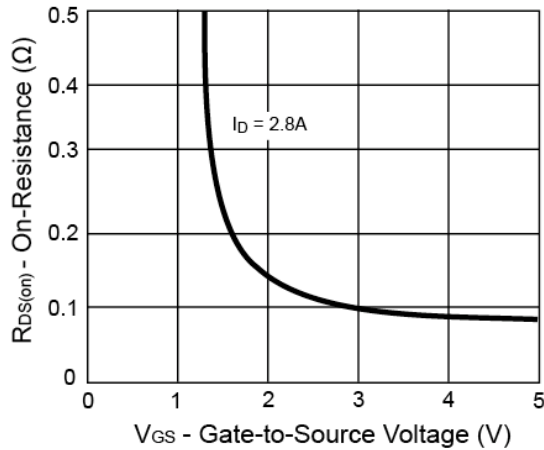


Source-Drain Diode Forward Voltage

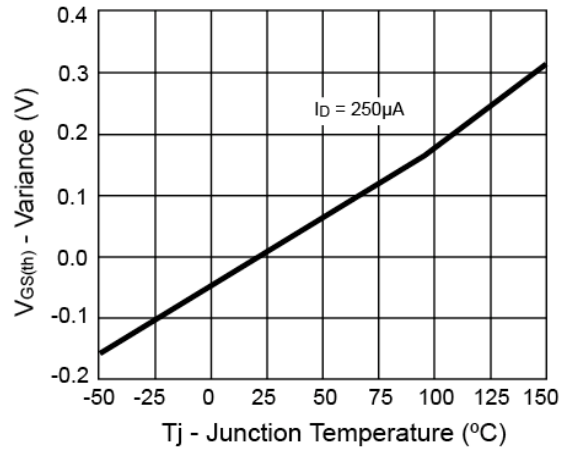


Electrical Characteristics Curve

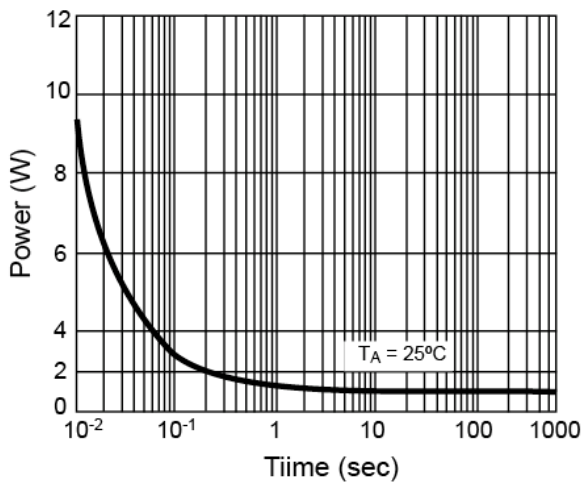
On-Resistance vs. Gate-Source Voltage



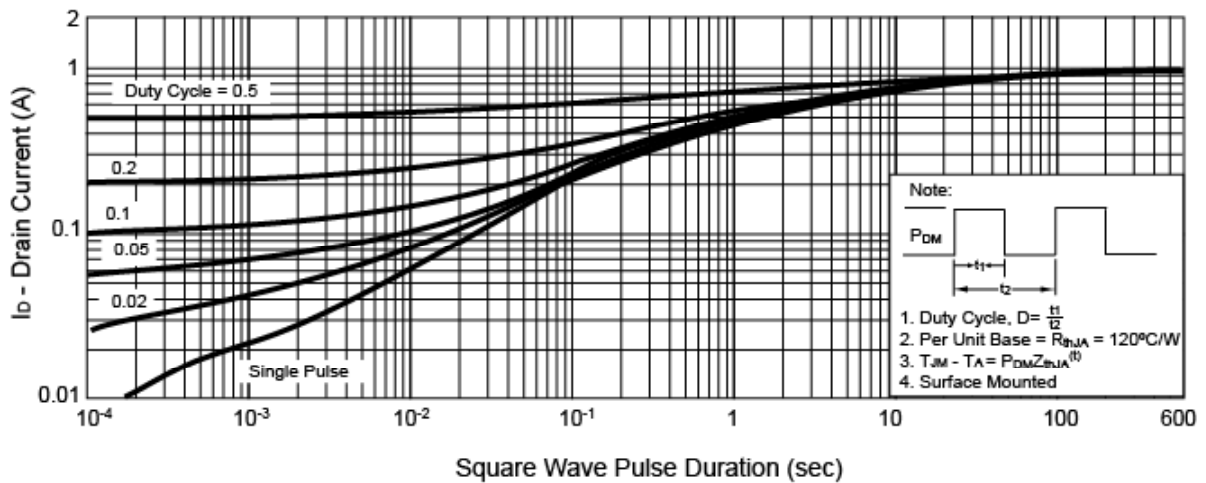
Threshold Voltage



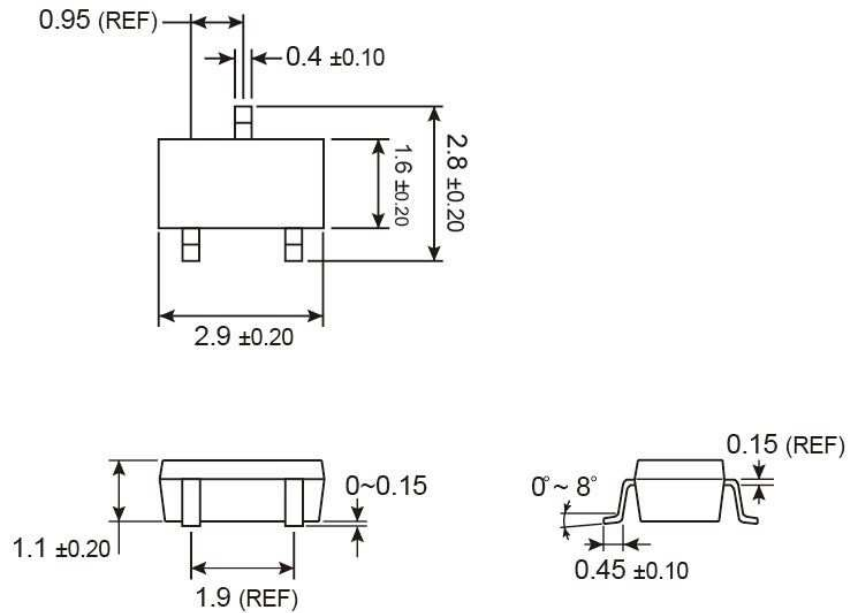
Single Pulse Power



Normalized Thermal Transient Impedance, Junction-to-Ambient

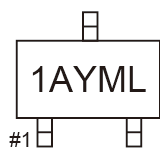


SOT-23 Mechanical Drawing



Unit: Millimeters

Marking Diagram



- 1A** = 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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