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### SOT-23



### Pin Definition:

1. Gate
2. Source
3. Drain

### Key Parameter Performance

Parameter	Value	Unit
$V_{DS}$	-30	V
$R_{DS(on)}$ (max)	$V_{GS} = -10V$	95
	$V_{GS} = -4.5V$	140
$Q_g$	10	nC

### Features

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

### Application

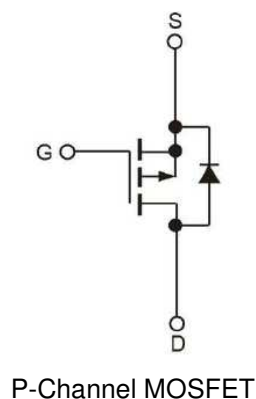
- Load Switch
- PA Switch

### Ordering Information

Part No.	Package	Packing
TSM2307CX 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



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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	-30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current <sup>(Note 1)</sup>	$I_D$	-3	A
Pulsed Drain Current <sup>(Note 2)</sup>	$I_{DM}$	-20	A
Continuous Source Current (Diode Conduction)	$I_S$	-1.7	A
Power Dissipation	$P_D$	$T_a = 25^\circ\text{C}$	1.25
		$T_a = 75^\circ\text{C}$	0.8
Operating Junction Temperature	$T_J$	+150	$^\circ\text{C}$
Storage Temperature Range	$T_{STG}$	-50 to +150	$^\circ\text{C}$

### Thermal Performance

Parameter	Symbol	Limit	Unit
Thermal Resistance - Junction to Case	$R_{\theta JC}$	75	$^{\circ}\text{C/W}$
Thermal Resistance - Junction to Ambient	$R_{\theta JA}$	130	$^{\circ}\text{C/W}$

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

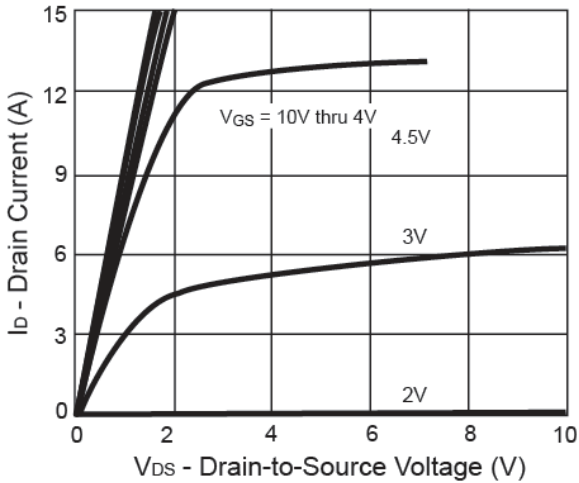
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{GS} = 0\text{V}, I_D = -250\mu\text{A}$	$BV_{DSS}$	-30	--	--	V
Drain-Source On-State Resistance	$V_{GS} = -10\text{V}, I_D = -3\text{A}$	$R_{DS(ON)}$	--	76	95	m $\Omega$
	$V_{GS} = -4.5\text{V}, I_D = -2\text{A}$		--	103	140	m $\Omega$
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$	$V_{GS(TH)}$	-1	--	-3	V
Zero Gate Voltage Drain Current	$V_{DS} = -30\text{V}, V_{GS} = 0\text{V}$	$I_{DSS}$	--	--	-1.0	$\mu\text{A}$
Gate Body Leakage	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$	$I_{GSS}$	--	--	$\pm 100$	nA
Forward Transconductance <sup>(Note 4)</sup>	$V_{DS} = -10\text{V}, I_D = -6\text{A}$	$g_{fs}$	--	5	--	S
Diode Forward Voltage	$I_S = -1.7\text{V}, V_{GS} = 0\text{V}$	$V_{SD}$			-1.2	V
<b>Dynamic</b>						
Total Gate Charge <sup>(Note 3,4)</sup>	$V_{DS} = -15\text{V}, I_D = -3\text{A}, V_{GS} = -10\text{V}$	$Q_g$	--	10	15	nC
Gate-Source Charge <sup>(Note 3,4)</sup>		$Q_{gs}$	--	1.9	--	
Gate-Drain Charge <sup>(Note 3,4)</sup>		$Q_{gd}$	--	2	--	
Input Capacitance	$V_{DS} = -30\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$	$C_{iss}$	--	565	--	pF
Output Capacitance		$C_{oss}$	--	126	--	
Reverse Transfer Capacitance		$C_{rss}$	--	75	--	
<b>Switching</b>						
Turn-On Delay Time <sup>(Note 3,4)</sup>	$V_{DD} = -15\text{V}, R_L = 15\Omega, I_D = -1\text{A}, V_{GEN} = -10\text{V}, R_G = 6\Omega$	$t_{d(on)}$	--	10	20	ns
Turn-On Rise Time <sup>(Note 3,4)</sup>		$t_r$	--	9	20	
Turn-Off Delay Time <sup>(Note 3,4)</sup>		$t_{d(off)}$	--	27	50	
Turn-Off Fall Time <sup>(Note 3,4)</sup>		$t_f$	--	7	16	

**Note:**

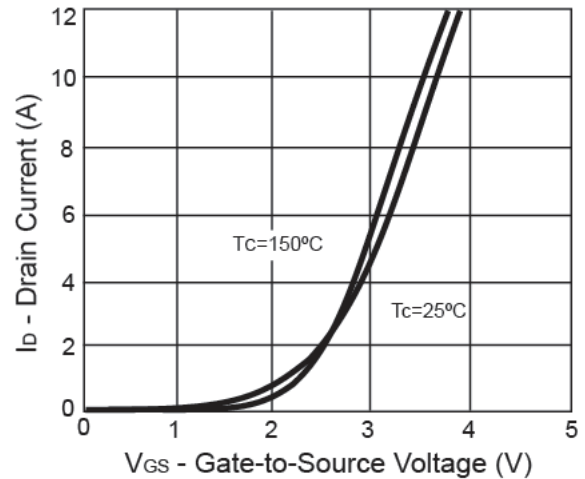
- Limited by maximum junction temperature
- Pulse width limited by safe operating area
- Pulse test: pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$
- Switching time is essentially independent of operating temperature.

### Electrical Characteristics Curve

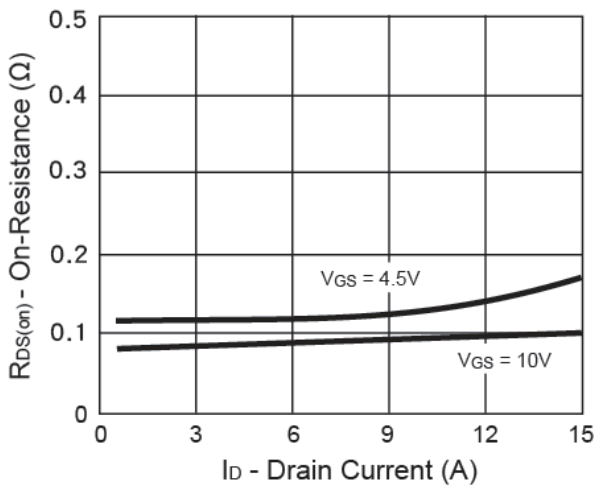
**Output Characteristics**



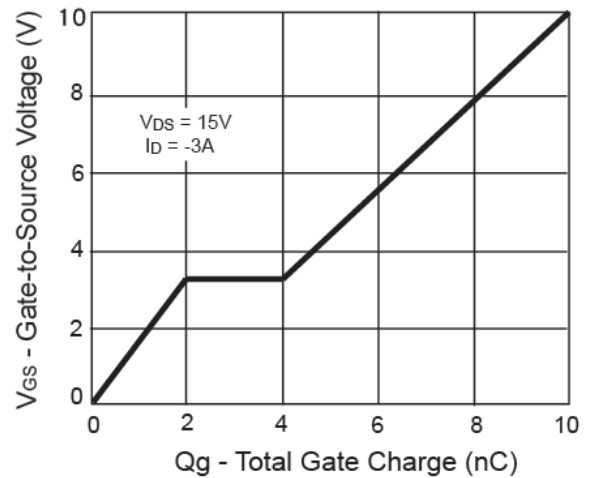
**Transfer Characteristics**



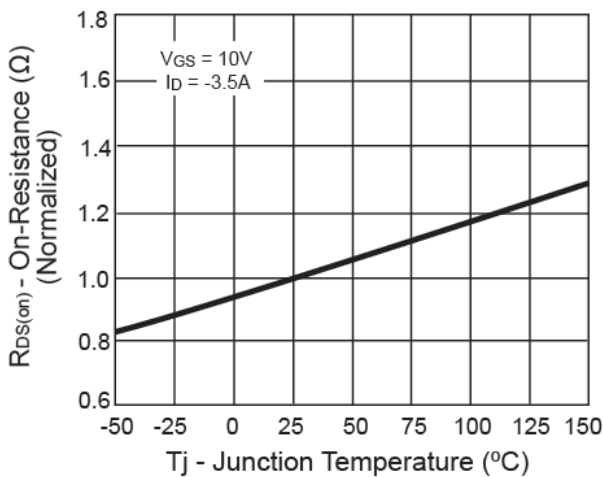
**On-Resistance vs. Drain Current**



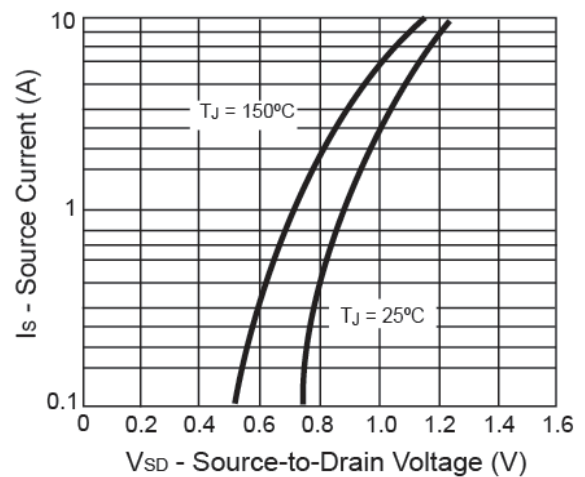
**Gate Charge**



**On-Resistance vs. Junction Temperature**

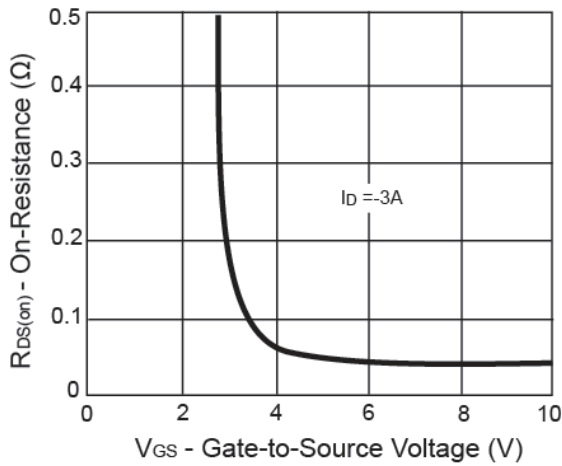


**Source-Drain Diode Forward Voltage**

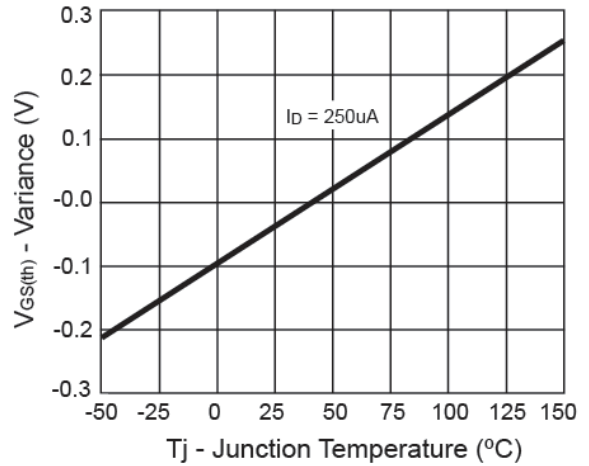


### Electrical Characteristics Curve

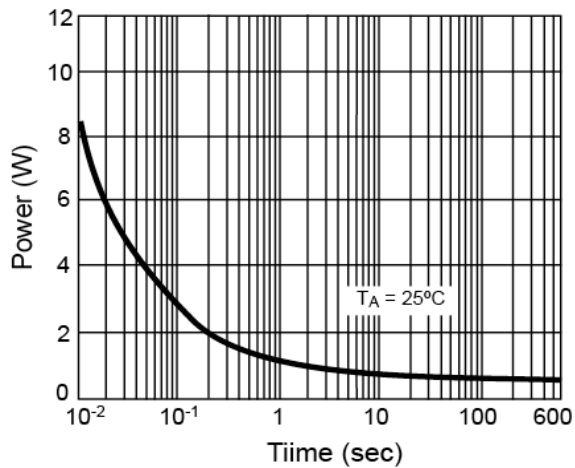
**On-Resistance vs. Gate-Source Voltage**



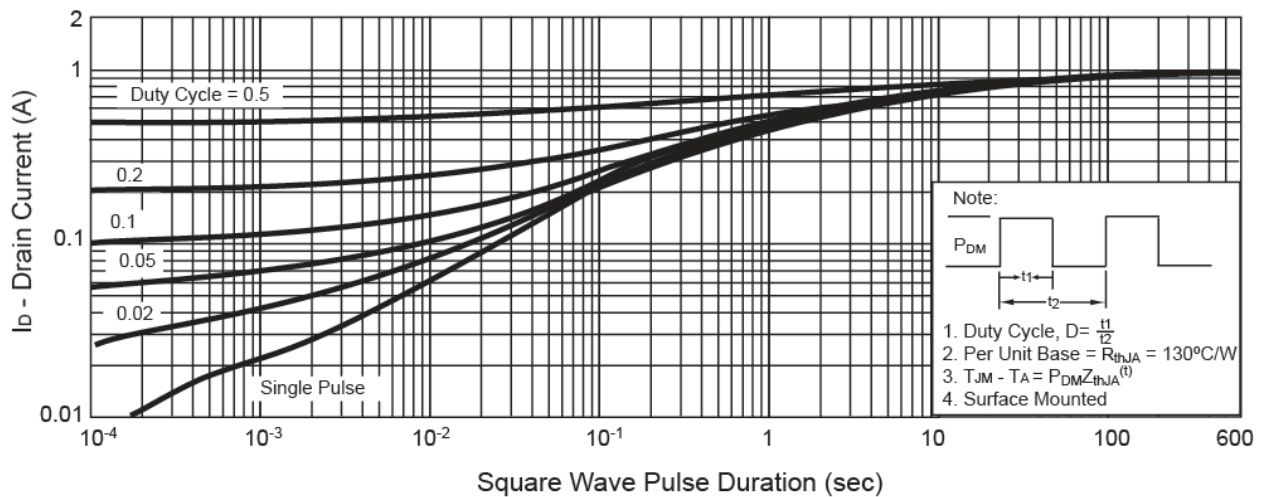
**Threshold Voltage**



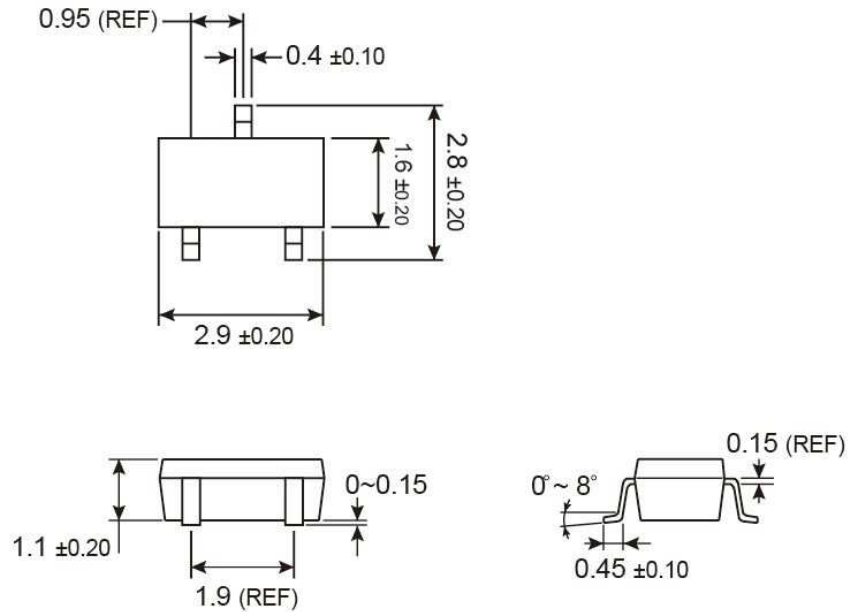
**Single Pulse Power**



**Normalized Thermal Transient Impedance, Junction-to-Ambient**

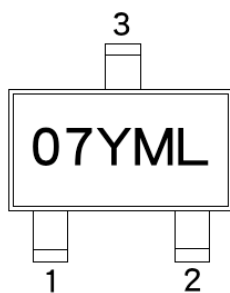


**SOT-23 Mechanical Drawing**



Unit: Millimeters

**Marking Diagram**



- 07** = 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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