

**SOT-23**

**Pin Definition:**

1. Gate
2. Source
3. Drain

**PRODUCT SUMMARY**

<b>V<sub>DS</sub> (V)</b>	<b>R<sub>DS(on)</sub>(mΩ)</b>	<b>I<sub>D</sub> (A)</b>
20	33 @ V <sub>GS</sub> = 4.5V	4
	40 @ V <sub>GS</sub> = 2.5V	3.2
	100 @ V <sub>GS</sub> = 1.8V	2.0

**Features**

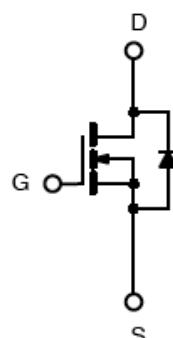
- Advance Trench Process Technology
- High Density Cell Design for Ultra Low On-resistance

**Application**

- Load Switch
- PA Switch

**Ordering Information**

<b>Part No.</b>	<b>Package</b>	<b>Packing</b>
TSM2310CX RF	SOT-23	3Kpcs / 7" Reel

**Block Diagram**

**N-Channel MOSFET**
**Absolute Maximum Rating (Ta = 25°C unless otherwise noted)**

<b>Parameter</b>	<b>Symbol</b>	<b>Limit</b>	<b>Unit</b>
Drain-Source Voltage	V <sub>DS</sub>	20	V
Gate-Source Voltage	V <sub>GS</sub>	±12	V
Continuous Drain Current, V <sub>GS</sub> @4.5V	I <sub>D</sub>	4	A
Pulsed Drain Current, V <sub>GS</sub> @4.5V	I <sub>DM</sub>	15	A
Continuous Source Current (Diode Conduction) <sup>a,b</sup>	I <sub>S</sub>	1.0	A
Maximum Power Dissipation	P <sub>D</sub>	1.25	W
		0.8	
Operating Junction Temperature	T <sub>J</sub>	+150	°C
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**Thermal Performance**

<b>Parameter</b>	<b>Symbol</b>	<b>Limit</b>	<b>Unit</b>
Junction to Case Thermal Resistance	R <sub>θ<sub>JF</sub></sub>	75	°C/W
Junction to Ambient Thermal Resistance (PCB mounted)	R <sub>θ<sub>JA</sub></sub>	160	°C/W

Notes:

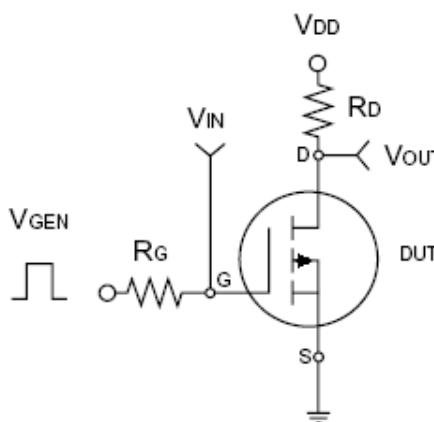
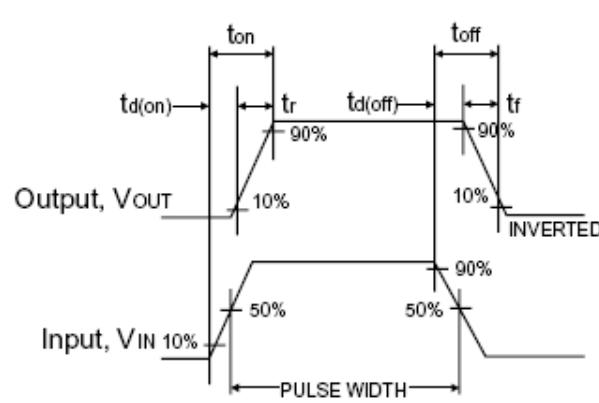
- a. Pulse width limited by the Maximum junction temperature
- b. Surface Mounted on FR4 Board, t ≤ 5 sec.

**Electrical Specifications** (Ta = 25°C unless otherwise noted)

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA	BV <sub>DSS</sub>	20	--	--	V
Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	V <sub>GS(TH)</sub>	0.6	0.8	1.2	V
Gate Body Leakage	V <sub>GS</sub> = ±4.5V, V <sub>DS</sub> = 0V	I <sub>GSS</sub>	--	--	±100	nA
Zero Gate Voltage Drain Current	V <sub>DS</sub> = 16V, V <sub>GS</sub> = 0V	I <sub>DSS</sub>	--	--	1.0	μA
On-State Drain Current	V <sub>DS</sub> ≥ 10V, V <sub>GS</sub> = 4.5V	I <sub>D(ON)</sub>	15	--	--	A
Drain-Source On-State Resistance	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 4A	R <sub>DS(ON)</sub>	--	24	30	mΩ
	V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 3.2A		--	32	40	
	V <sub>GS</sub> = 1.8V, I <sub>D</sub> = 2A		--	80	100	
Forward Transconductance	V <sub>DS</sub> = 15V, I <sub>D</sub> = 4A	g <sub>fs</sub>	--	40	--	S
Diode Forward Voltage	I <sub>S</sub> = 1.6A, V <sub>GS</sub> = 0V	V <sub>SD</sub>	--	0.8	1.2	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	V <sub>DS</sub> = 10V, I <sub>D</sub> = 4A, V <sub>GS</sub> = 4.5V	Q <sub>g</sub>	--	8.6	--	nC
Gate-Source Charge		Q <sub>gs</sub>	--	2	--	
Gate-Drain Charge		Q <sub>gd</sub>	--	2.7	--	
Input Capacitance	V <sub>DS</sub> = 10V, V <sub>GS</sub> = 0V, f = 1.0MHz	C <sub>iss</sub>	--	550	--	pF
Output Capacitance		C <sub>oss</sub>	--	100	--	
Reverse Transfer Capacitance		C <sub>rss</sub>	--	30	--	
<b>Switching<sup>c</sup></b>						
Turn-On Delay Time	V <sub>DD</sub> = 10V, R <sub>L</sub> = 10Ω, I <sub>D</sub> = 1A, V <sub>GEN</sub> = 4.5V, R <sub>G</sub> = 6Ω	t <sub>d(on)</sub>	--	15	--	nS
Turn-On Rise Time		t <sub>r</sub>	--	20	--	
Turn-Off Delay Time		t <sub>d(off)</sub>	--	40	--	
Turn-Off Fall Time		t <sub>f</sub>	--	8	--	

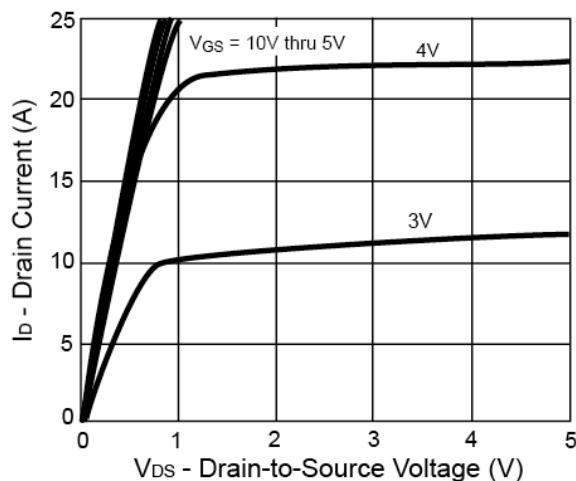
**Notes:**

- pulse test: PW ≤300μS, duty cycle ≤2%
- For DESIGN AID ONLY, not subject to production testing.
- Switching time is essentially independent of operating temperature.

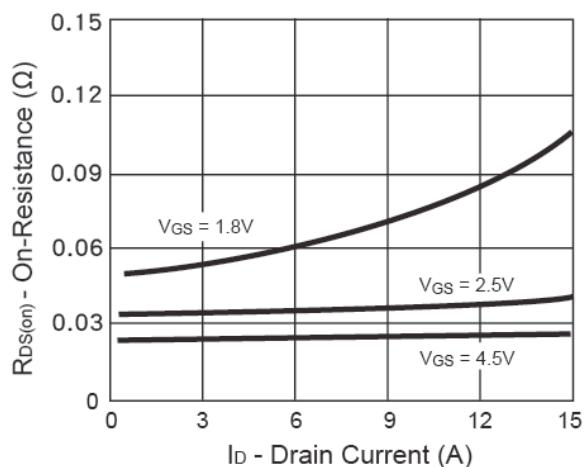

**Switching Test Circuit**

**Switching Waveforms**

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

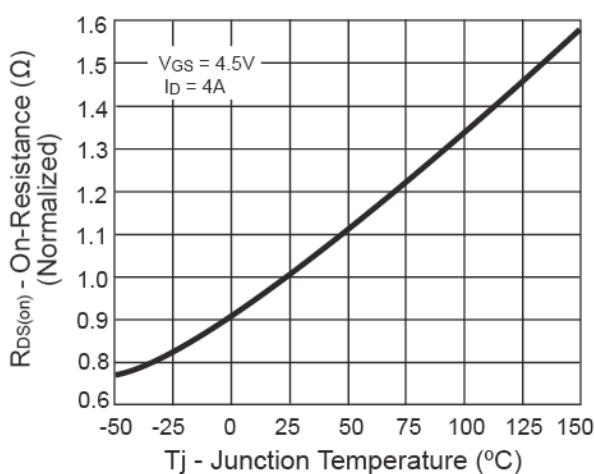
**Output Characteristics**



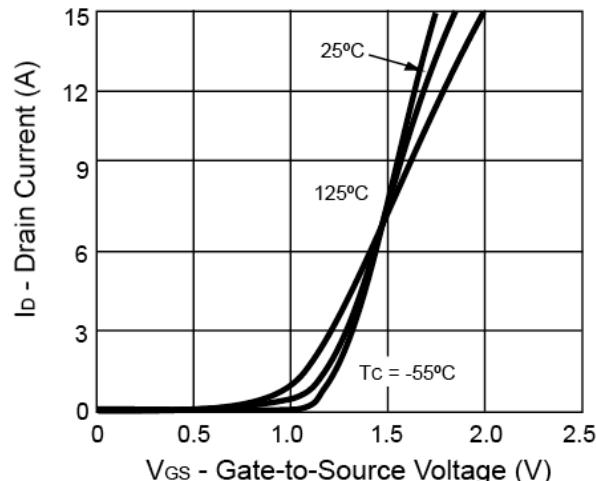
**On-Resistance vs. Drain Current**



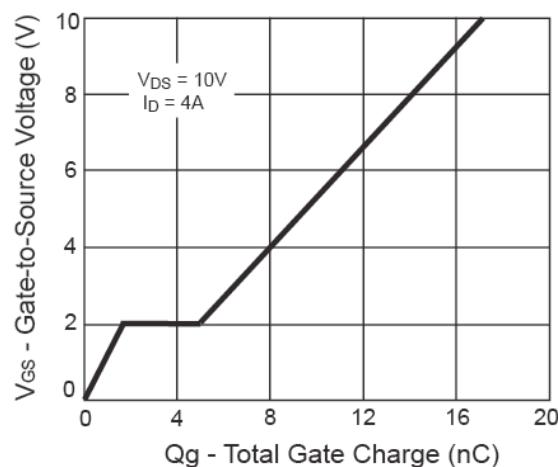
**On-Resistance vs. Junction Temperature**



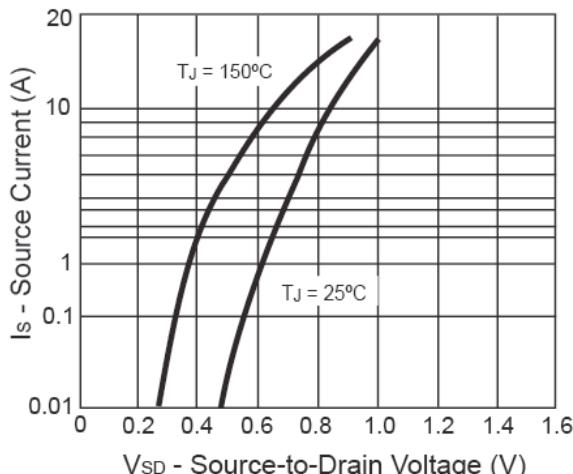
**Transfer Characteristics**



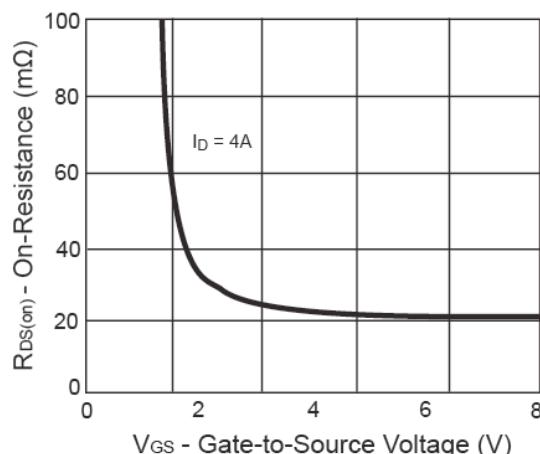
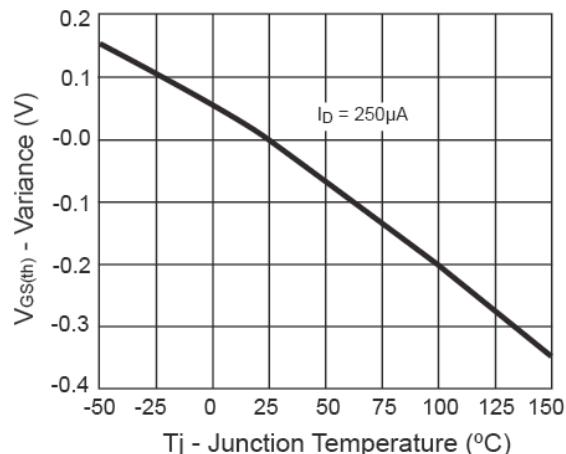
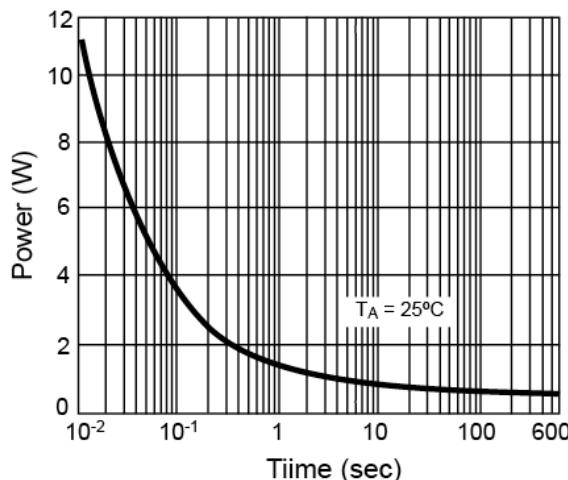
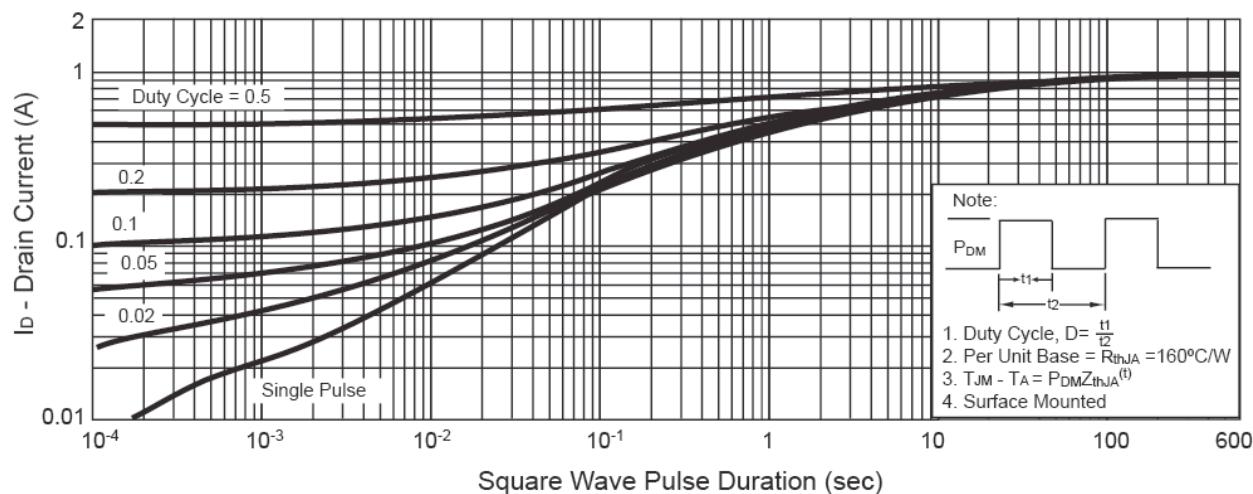
**Gate Charge**



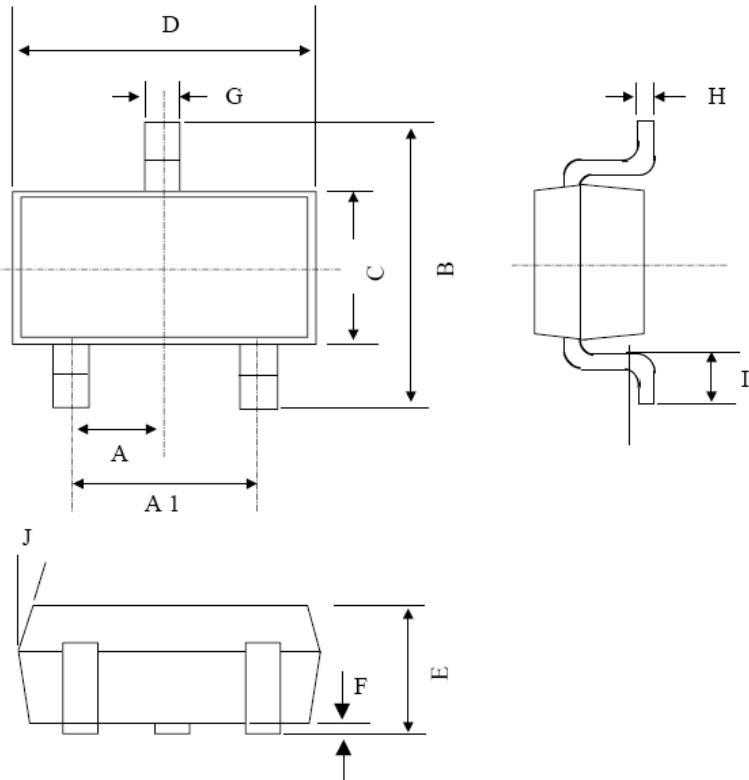
**Source-Drain Diode Forward Voltage**



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

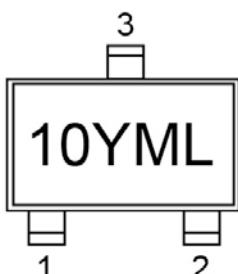
**On-Resistance vs. Gate-Source Voltage**

**Threshold Voltage**

**Single Pulse Power**

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


## SOT-23 Mechanical Drawing



DIM	SOT-23 DIMENSION		INCHES	
	MIN	MAX	MIN	MAX.
A	0.95 BSC		0.037 BSC	
A1	1.9 BSC		0.074 BSC	
B	2.60	3.00	0.102	0.118
C	1.40	1.70	0.055	0.067
D	2.80	3.10	0.110	0.122
E	1.00	1.30	0.039	0.051
F	0.00	0.10	0.000	0.004
G	0.35	0.50	0.014	0.020
H	0.10	0.20	0.004	0.008
I	0.30	0.60	0.012	0.024
J	5°	10°	5°	10°

## Marking Diagram



**10** = Device Code  
**Y** = Year Code  
**M** = Month Code  
**(A=Jan, B=Feb, C=Mar, D=Apl, E=May, F=Jun, G=Jul, H=Aug,  
I=Sep, J=Oct, K=Nov, L=Dec)**  
**L** = Lot Code

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