

**SOT-23**

**Pin Definition:**

1. Gate
2. Source
3. Drain

**PRODUCT SUMMARY**

$V_{DS}$ (V)	$R_{DS(on)}$ (m $\Omega$ )	$I_D$ (A)
30	57 @ $V_{GS}=10V$	3.5
	94 @ $V_{GS}=4.5V$	2.8

**Features**

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

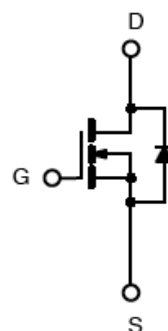
**Application**

- Load Switch
- PA Switch

**Ordering Information**

Part No.	Package	Packing
TSM2306CX RFG	SOT-23	3Kpcs / 7" Reel

Note: "G" denote for Green Product

**Block Diagram**


N-Channel MOSFET

**Absolute Maximum Rating** ( $T_a = 25^\circ C$  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	$I_D$	3.5	A
Pulsed Drain Current	$I_{DM}$	$\pm 20$	A
Continuous Source Current (Diode Conduction) <sup>a,b</sup>	$I_S$	1.7	A
Maximum Power Dissipation	$P_D$	$T_a = 25^\circ C$	1.25
		$T_a = 75^\circ C$	0.8
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 Case Thermal Resistance	$R_{\theta_{JC}}$	75	$^\circ C/W$
Junction to Ambient Thermal Resistance (PCB mounted)	$R_{\theta_{JA}}$	130	$^\circ C/W$

**Notes:**

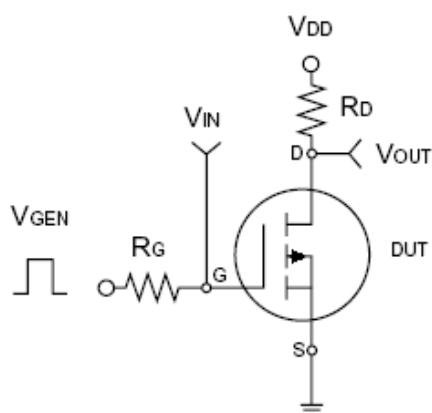
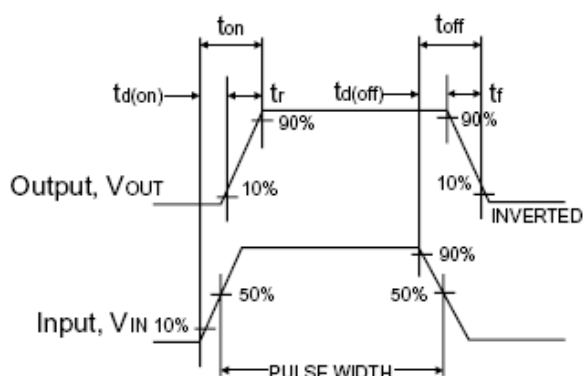
- a. Pulse width limited by the Maximum junction temperature
- b. Surface Mounted on FR4 Board,  $t \leq 5$  sec.

**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>	30	--	--	V
Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	V <sub>GS(TH)</sub>	1	--	3	V
Gate Body Leakage	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V	I <sub>GSS</sub>	--	--	±100	nA
Zero Gate Voltage Drain Current	V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V	I <sub>DSS</sub>	--	--	1.0	μA
On-State Drain Current	V <sub>DS</sub> ≥ 4.5V, V <sub>GS</sub> = 10V	I <sub>D(ON)</sub>	6	--	--	A
Drain-Source On-State Resistance	V <sub>GS</sub> = 10V, I <sub>D</sub> = 3.5A	R <sub>DS(ON)</sub>	--	46	57	mΩ
	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 2.8A		--	70	94	
Forward Transconductance	V <sub>DS</sub> = 15V, I <sub>D</sub> = 3.5A	g <sub>fs</sub>	--	11	--	S
Diode Forward Voltage	I <sub>S</sub> = 1.7A, V <sub>GS</sub> = 0V	V <sub>SD</sub>	--	--	1.2	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	V <sub>DS</sub> = 15V, I <sub>D</sub> = 3.5A, V <sub>GS</sub> = 10V	Q <sub>g</sub>	--	4.2	7	nC
Gate-Source Charge		Q <sub>gs</sub>	--	1.9	--	
Gate-Drain Charge		Q <sub>gd</sub>	--	1.35	--	
Input Capacitance	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V, f = 1.0MHz	C <sub>iss</sub>	--	555	--	pF
Output Capacitance		C <sub>oss</sub>	--	120	--	
Reverse Transfer Capacitance		C <sub>rss</sub>	--	60	--	
<b>Switching<sup>c</sup></b>						
Turn-On Delay Time	V <sub>DD</sub> = 15V, R <sub>L</sub> = 15Ω, I <sub>D</sub> = 1A, V <sub>GEN</sub> = 10V, R <sub>G</sub> = 6Ω	t <sub>d(on)</sub>	--	4.2	5.5	nS
Turn-On Rise Time		t <sub>r</sub>	--	19	25	
Turn-Off Delay Time		t <sub>d(off)</sub>	--	13	17	
Turn-Off Fall Time		t <sub>f</sub>	--	9	12	

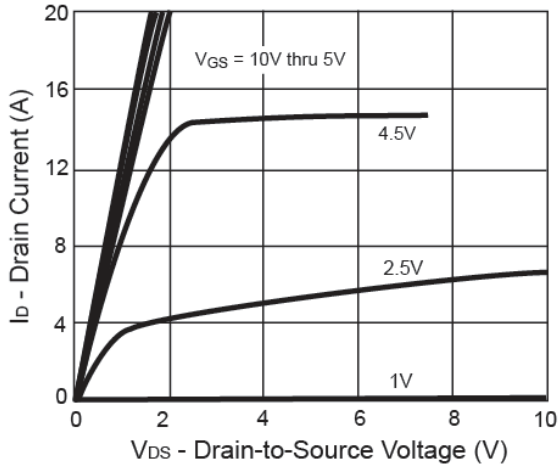
**Notes:**

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

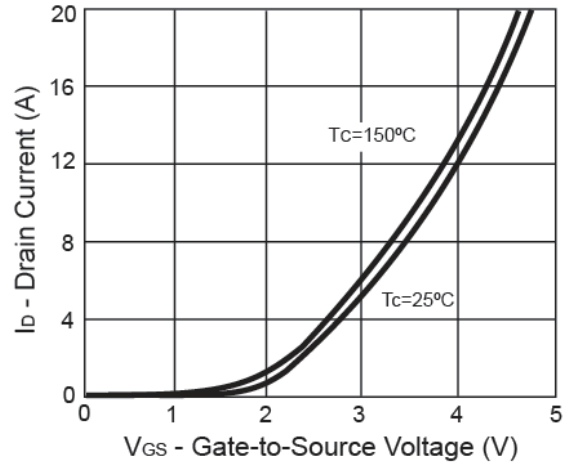

**Switching Test Circuit**

**Switchin Waveforms**

**Electrical Characteristics Curve** (Ta = 25°C, unless otherwise noted)

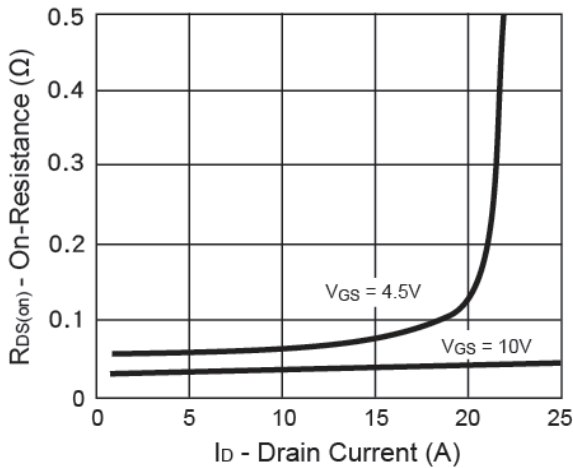
**Output Characteristics**



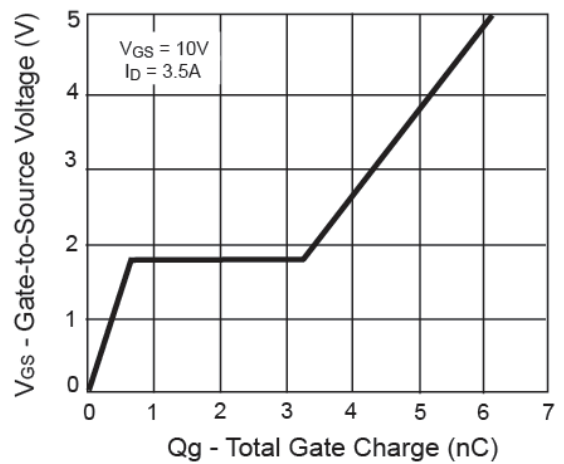
**Transfer Characteristics**



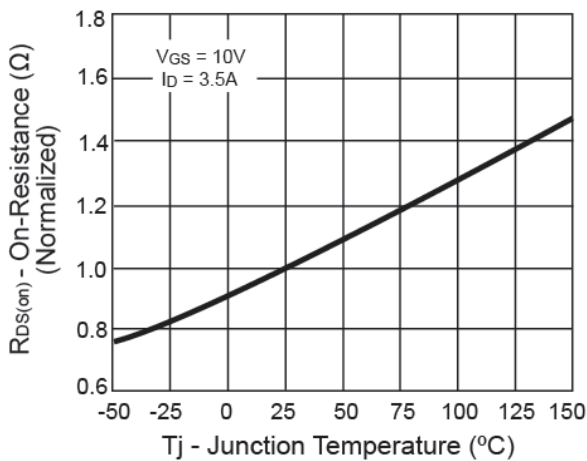
**On-Resistance vs. Drain Current**



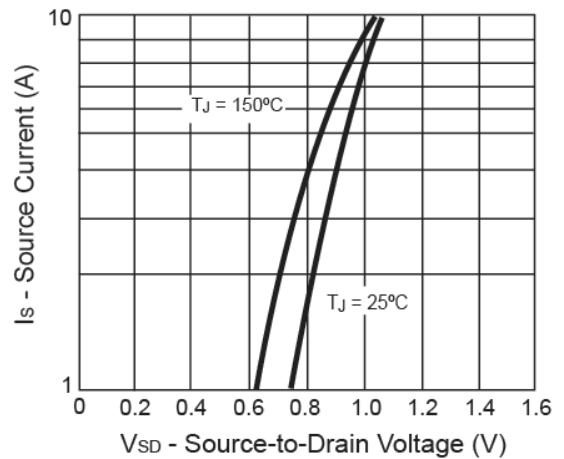
**Gate Charge**



**On-Resistance vs. Junction Temperature**

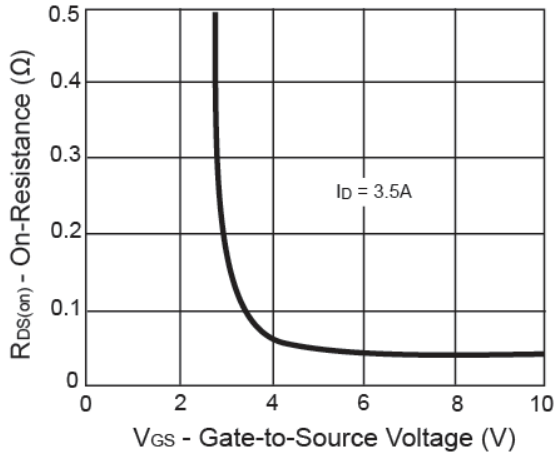


**Source-Drain Diode Forward Voltage**

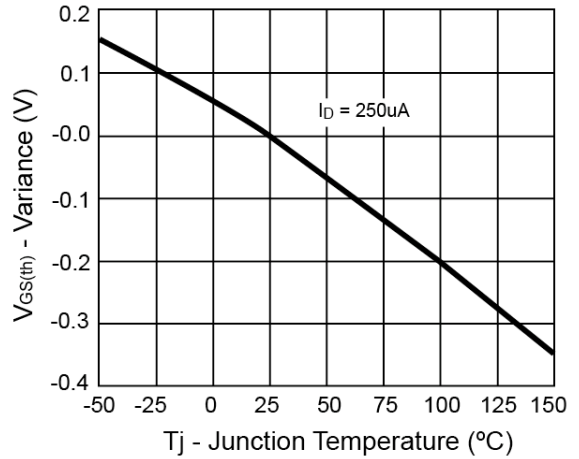


**Electrical Characteristics Curve** (Ta = 25°C, unless otherwise noted)

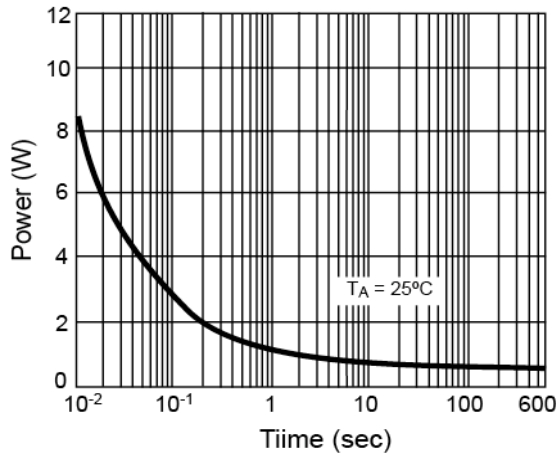
**On-Resistance vs. Gate-Source Voltage**



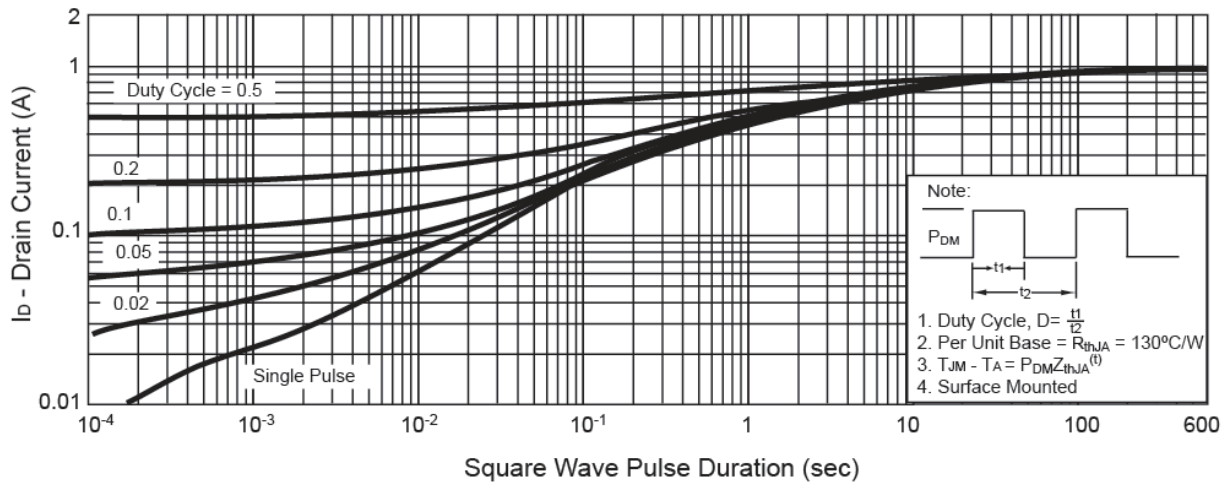
**Threshold Voltage**



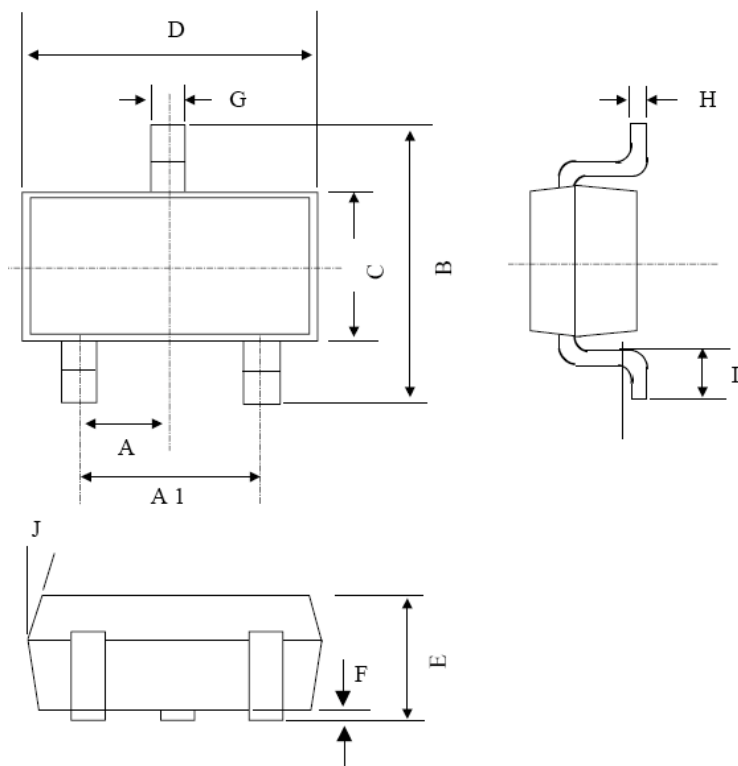
**Single Pulse Power**



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

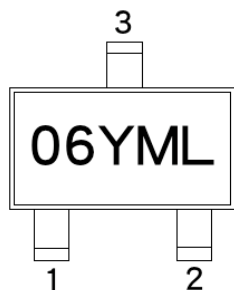


**SOT-23 Mechanical Drawing**



SOT-23 DIMENSION				
DIM	MILLIMETERS		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**



- 06** = 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



# TSM2306

## 30V N-Channel MOSFET

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