

SOT-23

Pin Definition:

1. Gate
2. Source
3. Drain

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (m Ω)	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

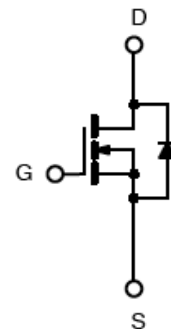
Application

- 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 ($T_a = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	3.5	A
Pulsed Drain Current	I_{DM}	± 20	A
Continuous Source Current (Diode Conduction) ^{a,b}	I_S	1.7	A
Maximum Power Dissipation	P_D	1.25	W
		0.8	
Operating Junction Temperature	T_J	+150	$^\circ\text{C}$
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

Thermal Performance

Parameter	Symbol	Limit	Unit
Junction to Case Thermal Resistance	$R\theta_{JC}$	75	$^\circ\text{C/W}$
Junction to Ambient Thermal Resistance (PCB mounted)	$R\theta_{JA}$	130	$^\circ\text{C/W}$

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)

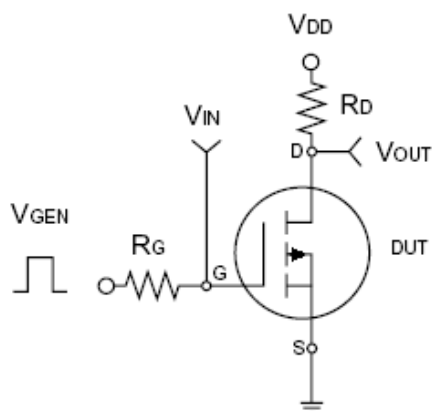
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	BV_{DSS}	30	--	--	V
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	$V_{GS(TH)}$	1	--	3	V
Gate Body Leakage	$V_{GS} = \pm 20V, V_{DS} = 0V$	I_{GSS}	--	--	± 100	nA
Zero Gate Voltage Drain Current	$V_{DS} = 30V, V_{GS} = 0V$	I_{DSS}	--	--	1.0	μA
On-State Drain Current	$V_{DS} \geq 4.5V, V_{GS} = 10V$	$I_{D(ON)}$	6	--	--	A
Drain-Source On-State Resistance	$V_{GS} = 10V, I_D = 3.5A$	$R_{DS(ON)}$	--	46	57	m Ω
	$V_{GS} = 4.5V, I_D = 2.8A$		--	70	94	
Forward Transconductance	$V_{DS} = 15V, I_D = 3.5A$	g_{fs}	--	11	--	S
Diode Forward Voltage	$I_S = 1.7A, V_{GS} = 0V$	V_{SD}	--	--	1.2	V
Dynamic ^b						
Total Gate Charge	$V_{DS} = 15V, I_D = 3.5A,$ $V_{GS} = 10V$	Q_g	--	4.2	7	nC
Gate-Source Charge		Q_{gs}	--	1.9	--	
Gate-Drain Charge		Q_{gd}	--	1.35	--	
Input Capacitance	$V_{DS} = 15V, V_{GS} = 0V,$ $f = 1.0MHz$	C_{iss}	--	555	--	pF
Output Capacitance		C_{oss}	--	120	--	
Reverse Transfer Capacitance		C_{rss}	--	60	--	
Switching ^c						
Turn-On Delay Time	$V_{DD} = 15V, R_L = 15\Omega,$ $I_D = 1A, V_{GEN} = 10V,$ $R_G = 6\Omega$	$t_{d(on)}$	--	4.2	5.5	nS
Turn-On Rise Time		t_r	--	19	25	
Turn-Off Delay Time		$t_{d(off)}$	--	13	17	
Turn-Off Fall Time		t_f	--	9	12	

Notes:

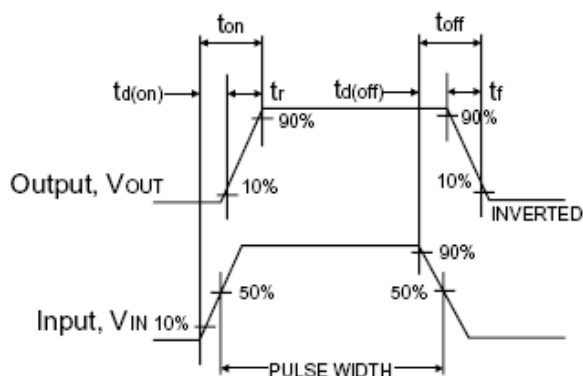
a. pulse test: $PW \leq 300\mu S$, duty cycle $\leq 2\%$

b. For DESIGN AID ONLY, not subject to production testing.

b. Switching time is essentially independent of operating temperature.



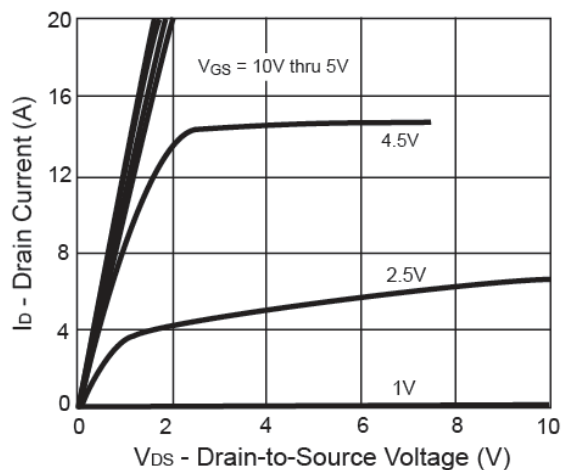
Switching Test Circuit



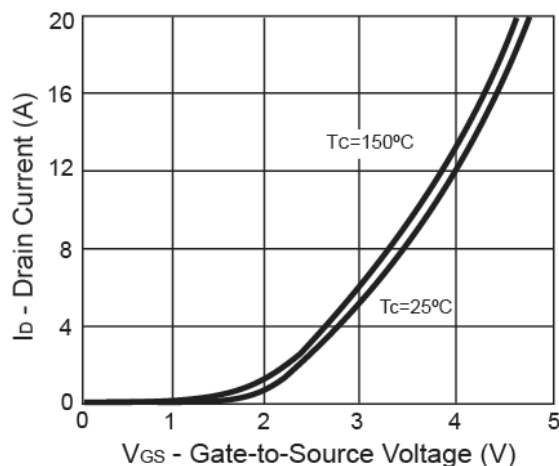
Switchin Waveforms

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

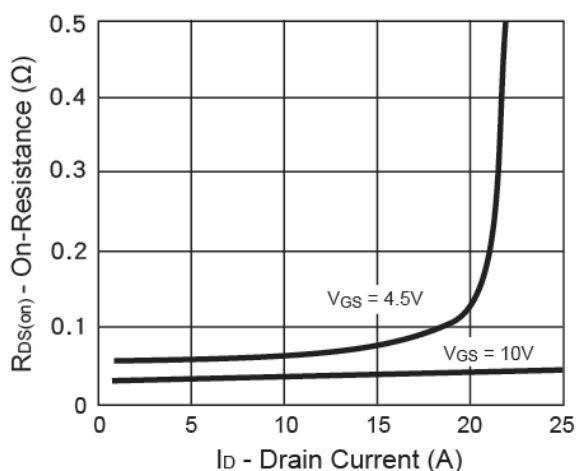
Output Characteristics



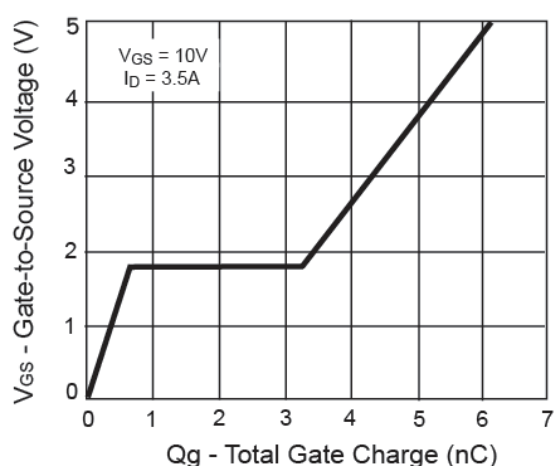
Transfer Characteristics



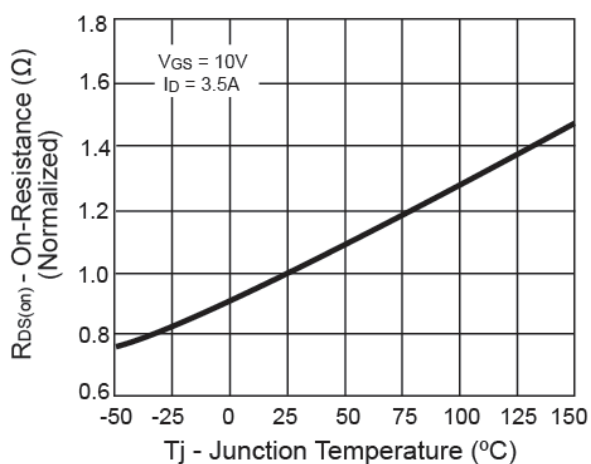
On-Resistance vs. Drain Current



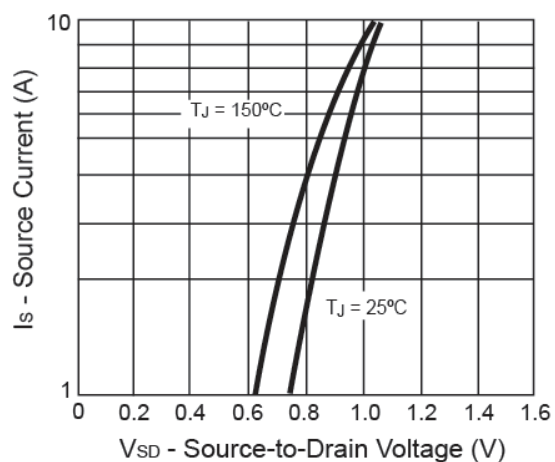
Gate Charge



On-Resistance vs. Junction Temperature

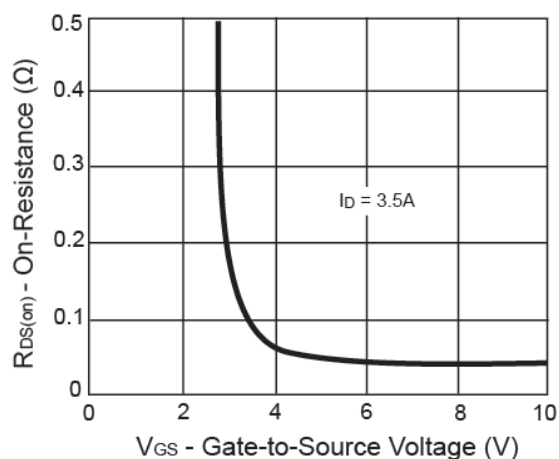


Source-Drain Diode Forward Voltage

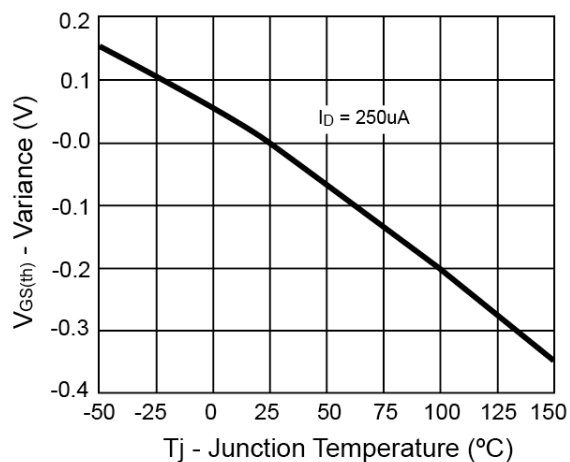


Electrical Characteristics Curve ($T_A = 25^\circ\text{C}$, unless otherwise noted)

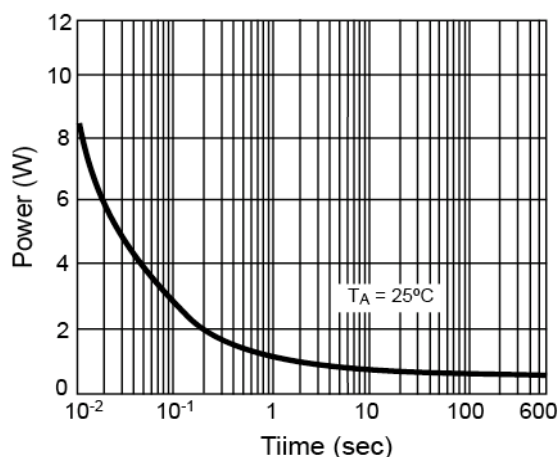
On-Resistance vs. Gate-Source Voltage



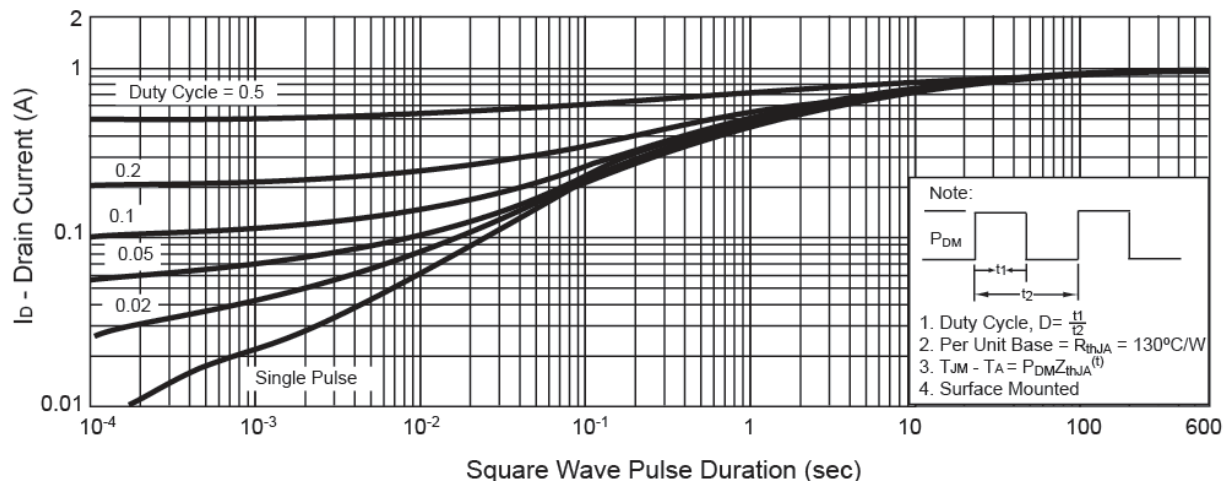
Threshold Voltage



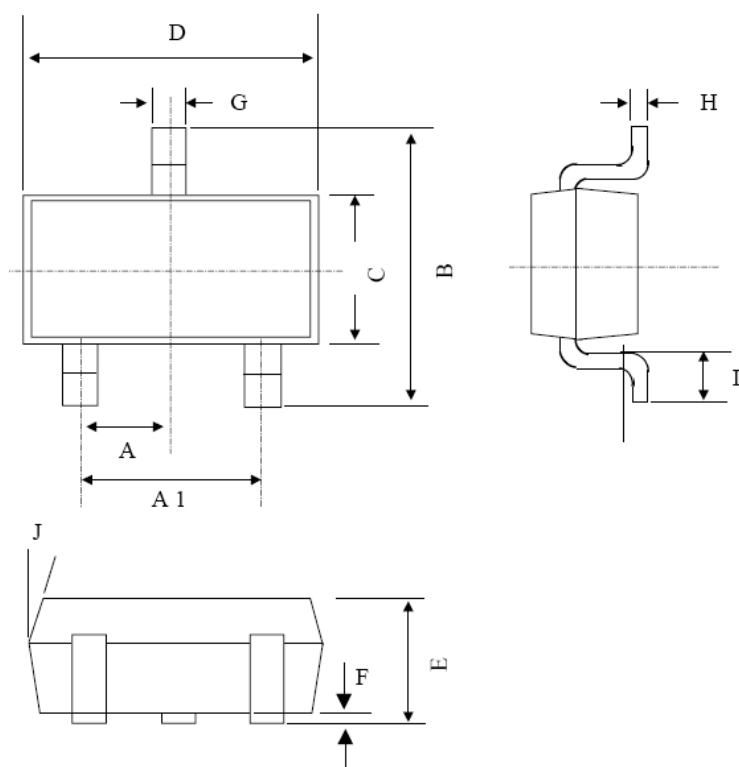
Single Pulse Power



Normalized Thermal Transient Impedance, Junction-to-Ambient

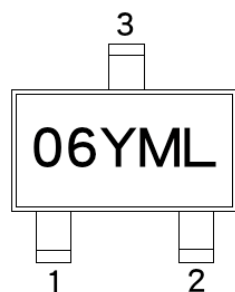


SOT-23 Mechanical Drawing



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

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