

SOT-23

Pin Definition:

1. Gate
2. Source
3. Drain

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (m Ω)	I_D (A)
20	65 @ $V_{GS} = 4.5V$	2.8
	95 @ $V_{GS} = 2.5V$	2.0

Features

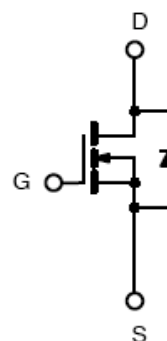
- Advance Trench Process Technology
- High Density Cell Design for Ultra Low On-resistance

Application

- Load Switch
- PA Switch

Ordering Information

Part No.	Package	Packing
TSM2302CX RF	SOT-23	3Kpcs / 7" Reel

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}	20	V
Gate-Source Voltage	V_{GS}	± 8	V
Continuous Drain Current, $V_{GS} @ 4.5V$.	I_D	2.8	A
Pulsed Drain Current, $V_{GS} @ 4.5V$	I_{DM}	8	A
Continuous Source Current (Diode Conduction) ^{a,b}	I_S	1.0	A
Maximum Power Dissipation	P_D	$T_a = 25^\circ C$	0.9
		$T_a = 75^\circ C$	0.57
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	$R_{\theta_{JF}}$	75	$^\circ C/W$
Junction to Ambient Thermal Resistance (PCB mounted)	$R_{\theta_{JA}}$	250	$^\circ C/W$

Notes:

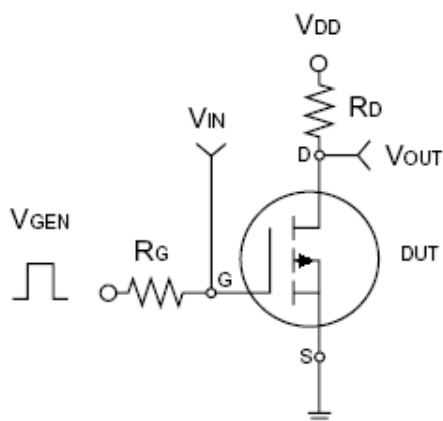
- a. Pulse width limited by the Maximum junction temperature
- b. Surface Mounted on FR4 Board, $t \leq 5$ sec.

Electrical Specifications

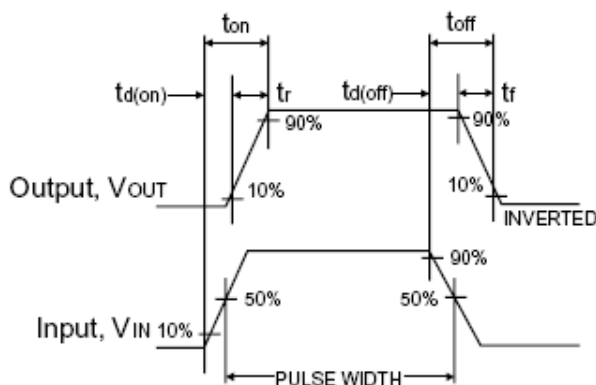
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	BV_{DSS}	20	--	--	V
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	$V_{GS(TH)}$	0.65	0.95	1.2	V
Gate Body Leakage	$V_{GS} = \pm 8V, V_{DS} = 0V$	I_{GSS}	--	--	± 100	nA
Zero Gate Voltage Drain Current	$V_{DS} = 16V, V_{GS} = 0V$	I_{DSS}	--	--	1.0	μA
On-State Drain Current	$V_{DS} \square 5V, V_{GS} = 4.5V$	$I_{D(ON)}$	6	--	--	A
Drain-Source On-State Resistance	$V_{GS} = 4.5V, I_D = 2.8A$	$R_{DS(ON)}$	--	40	65	m Ω
	$V_{GS} = 2.5V, I_D = 2.0A$		--	50	95	
Forward Transconductance	$V_{DS} = 5V, I_D = 2.8A$	g_{fs}	--	6.5	--	S
Diode Forward Voltage	$I_S = 1.6A, V_{GS} = 0V$	V_{SD}	--	0.76	1.2	V
Dynamic^b						
Total Gate Charge	$V_{DS} = 6V, I_D = 2.8A, V_{GS} = 4.5V$	Q_g	--	3.69	--	nC
Gate-Source Charge		Q_{gs}	--	0.7	--	
Gate-Drain Charge		Q_{gd}	--	1.06	--	
Input Capacitance	$V_{DS} = 6V, V_{GS} = 0V, f = 1.0MHz$	C_{iss}	--	427.12	--	pF
Output Capacitance		C_{oss}	--	80.56	--	
Reverse Transfer Capacitance		C_{rss}	--	57	--	
Switching^c						
Turn-On Delay Time	$V_{DD} = 6V, R_L = 10\Omega, I_D = 1A, V_{GEN} = 4.5V, R_G = 6\Omega$	$t_{d(on)}$	--	6.16	--	ns
Turn-On Rise Time		t_r	--	7.56	--	
Turn-Off Delay Time		$t_{d(off)}$	--	16.61	--	
Turn-Off Fall Time		t_f	--	4.07	--	

Notes:

- a. pulse test: PW \square 300 μ S, duty cycle \square 2%
- b. For DESIGN AID ONLY, not subject to production testing.
- b. Switching time is essentially independent of operating temperature.



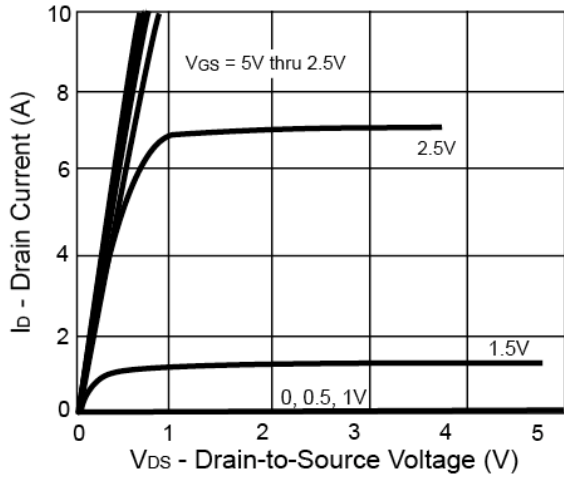
Switching Test Circuit



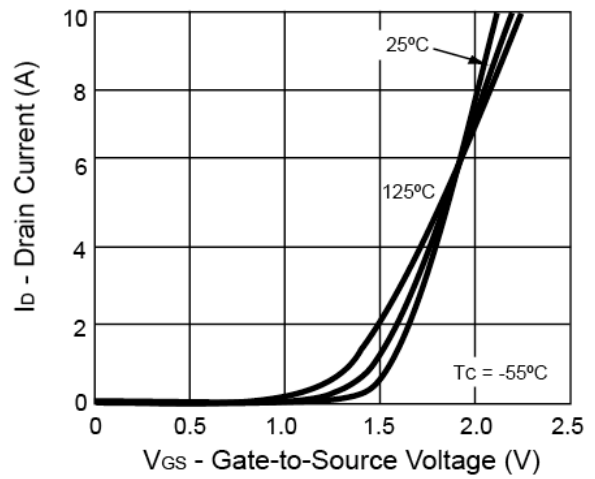
Switchin Waveforms

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

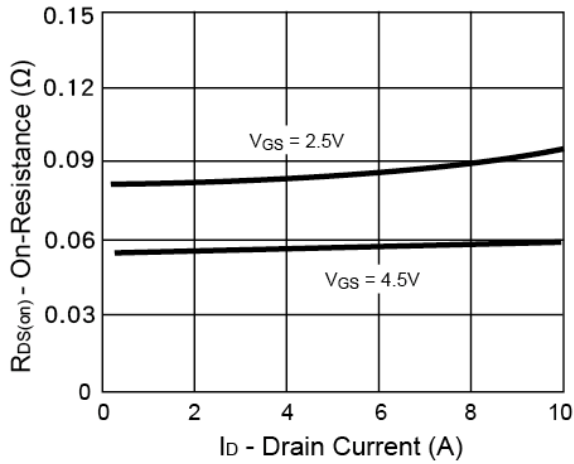
Output Characteristics



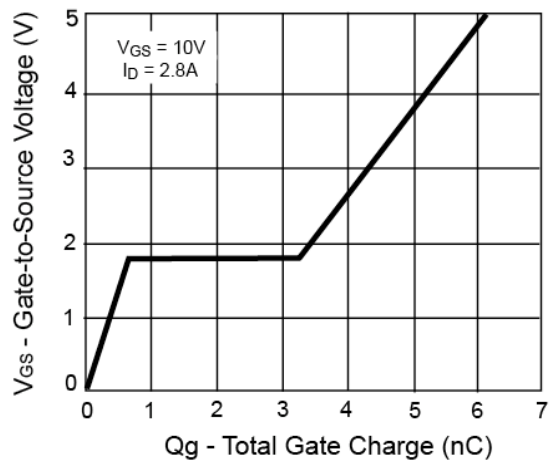
Transfer Characteristics



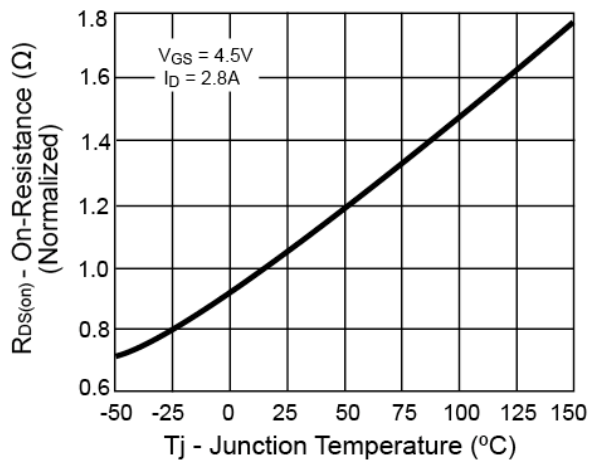
On-Resistance vs. Drain Current



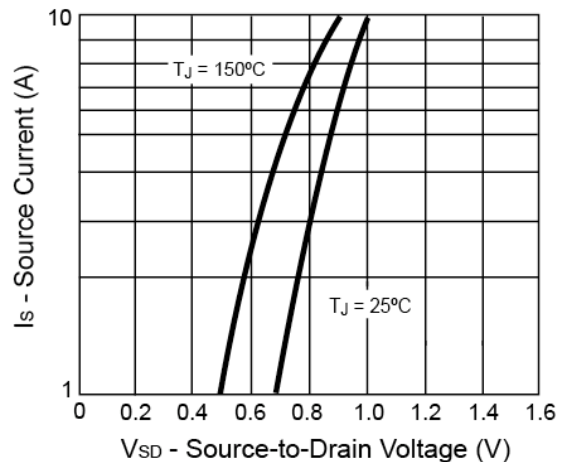
Gate Charge



On-Resistance vs. Junction Temperature

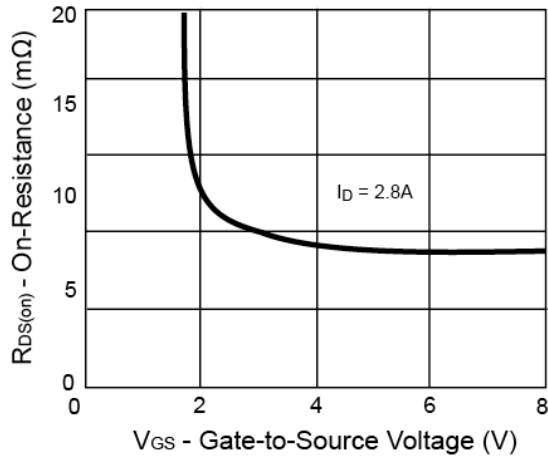


Source-Drain Diode Forward Voltage

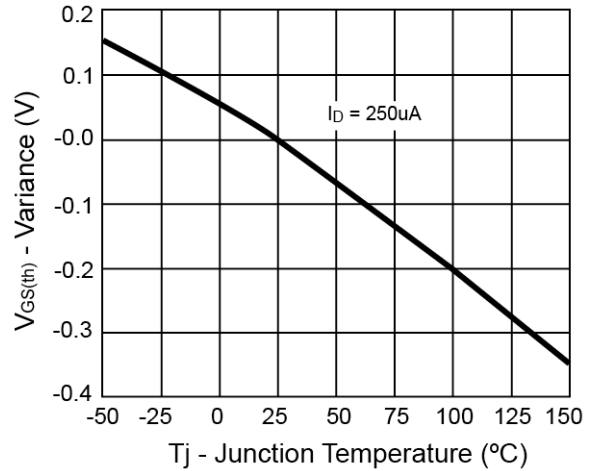


Electrical Characteristics Curve ($T_a = 25^\circ\text{C}$, unless otherwise noted)

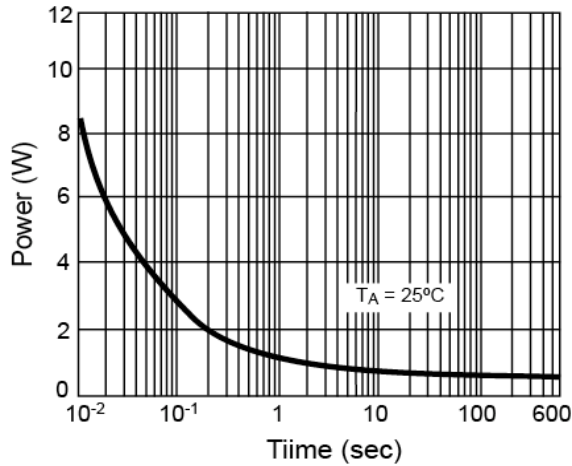
On-Resistance vs. Gate-Source Voltage



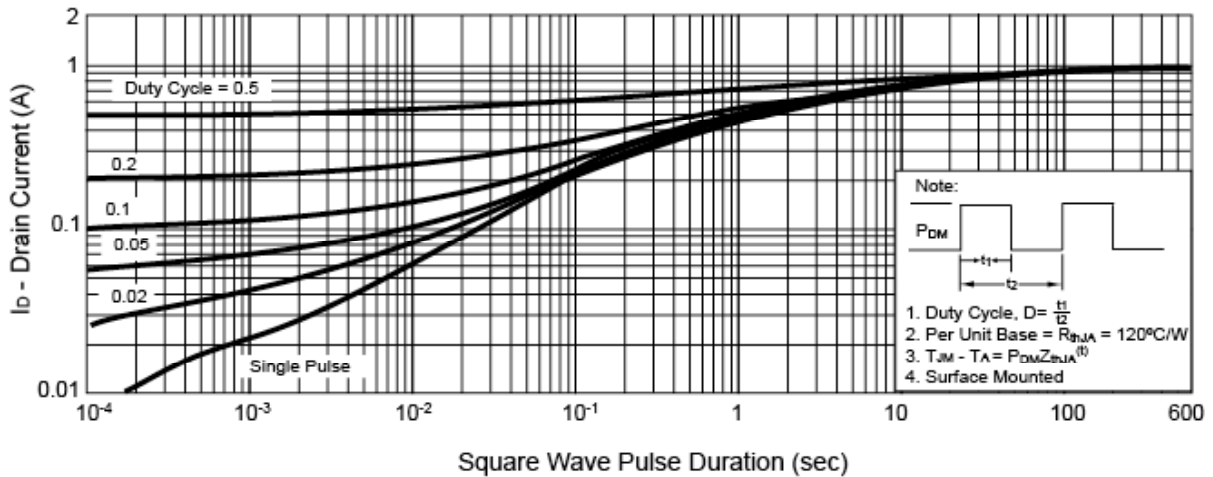
Threshold Voltage



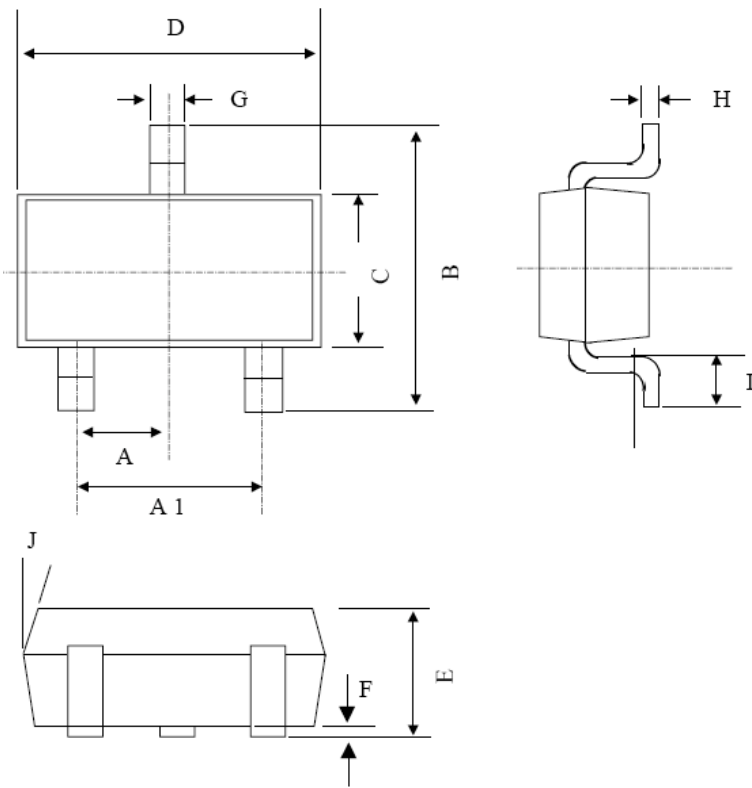
Single Pulse Power



Normalized Thermal Transient Impedance, Junction-to-Ambient

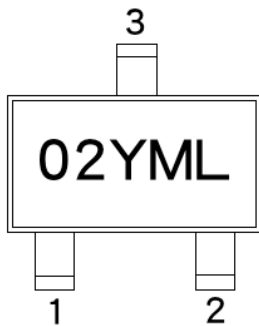


SOT-23 Mechanical Drawing



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



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

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