

SOT-23

Pin Definition:

1. Gate
2. Source
3. Drain

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (m Ω)	I_D (A)
-20	100 @ $V_{GS} = -4.5V$	-2.8
	150 @ $V_{GS} = -2.5V$	-2.0
	190 @ $V_{GS} = -1.8V$	-2.0

Features

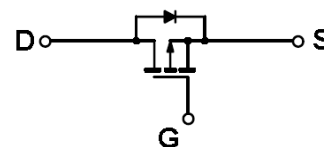
- Advance Trench Process Technology
- High Density Cell Design for Ultra Low On-resistance

Application

- Load Switch
- PA Switch

Ordering Information

Part No.	Package	Packing
TSM2301BCX RF	SOT-23	3Kpcs / 7" Reel

Block Diagram


P-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	-0.72	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
Lead Temperature (1/8" from case)	T_L	5	S
Junction to Ambient Thermal Resistance (PCB mounted)	$R\theta_{JA}$	120	$^\circ C/W$

Notes:

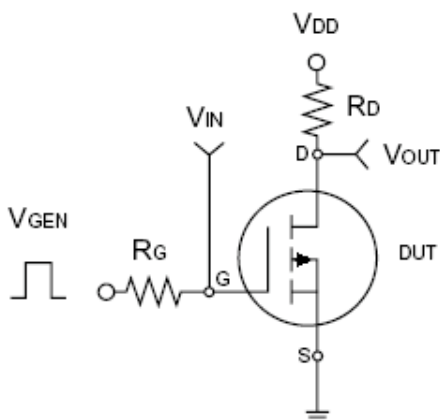
- a. Pulse width limited by the Maximum junction temperature
- b. Surface Mounted on FR4 Board, $t \leq 5$ sec.
- c. Surface Mounted on FR4 Board,

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

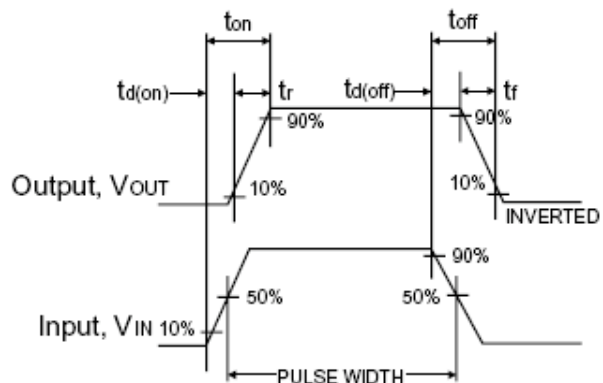
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = -250\mu A$	BV_{DSS}	-20	--	--	V
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = -250\mu A$	$V_{GS(TH)}$	-0.45	--	-0.95	V
Gate Body Leakage	$V_{GS} = \pm 8V, V_{DS} = 0V$	I_{GSS}	--	--	± 100	nA
Zero Gate Voltage Drain Current	$V_{DS} = -9.6V, V_{GS} = 0V$	I_{DSS}	--	--	-1.0	μA
On-State Drain Current ^a	$V_{DS} \geq -10V, V_{GS} = -5V$	$I_{D(ON)}$	-6	--	--	A
Drain-Source On-State Resistance ^a	$V_{GS} = -4.5V, I_D = -2.8A$	$R_{DS(ON)}$	--	80	100	m Ω
	$V_{GS} = -2.5V, I_D = -2.0A$		--	110	150	
	$V_{GS} = -1.8V, I_D = -2.0A$		--	150	190	
Forward Transconductance ^a	$V_{DS} = -5V, I_D = -4A$	g_{fs}	--	6.5	--	S
Diode Forward Voltage	$I_S = -0.75A, V_{GS} = 0V$	V_{SD}	--	-0.8	-1.2	V
Dynamic^b						
Total Gate Charge	$V_{DS} = -6V, I_D = -2.8A,$ $V_{GS} = -4.5V$	Q_g	--	5.8	--	nC
Gate-Source Charge		Q_{gs}	--	0.85	--	
Gate-Drain Charge		Q_{gd}	--	1.7	--	
Input Capacitance	$V_{DS} = -6V, V_{GS} = 0V,$ $f = 1.0MHz$	C_{iss}	--	415	--	pF
Output Capacitance		C_{oss}	--	223	--	
Reverse Transfer Capacitance		C_{rss}	--	87	--	
Switching^c						
Turn-On Delay Time	$V_{DD} = -6V, R_L = 6\Omega,$ $I_D = -1A, V_{GEN} = -4.5V,$ $R_G = 6\Omega$	$t_{d(on)}$	--	13	--	nS
Turn-On Rise Time		t_r	--	36	--	
Turn-Off Delay Time		$t_{d(off)}$	--	42	--	
Turn-Off Fall Time		t_f	--	34	--	

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.



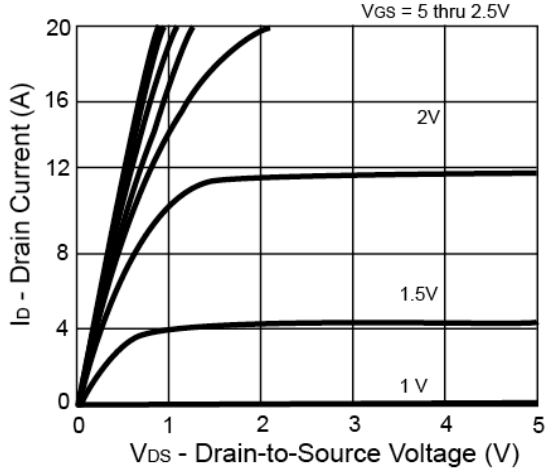
Switching Test Circuit



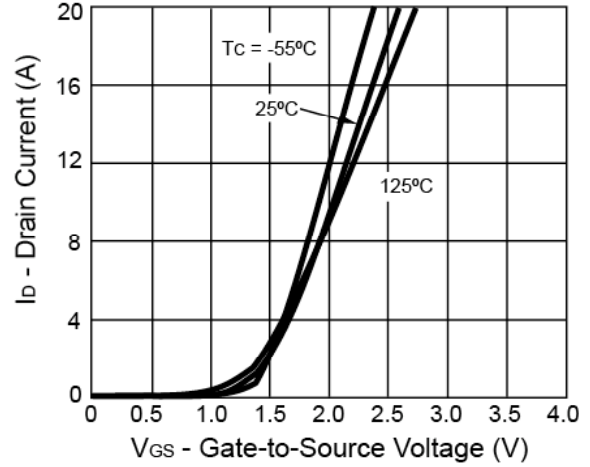
Switchin Waveforms

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

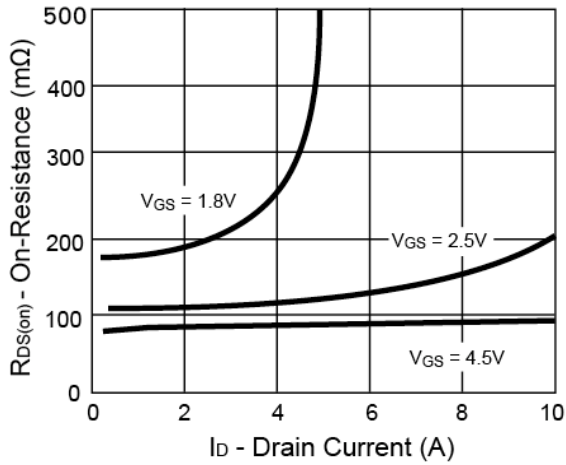
Output Characteristics



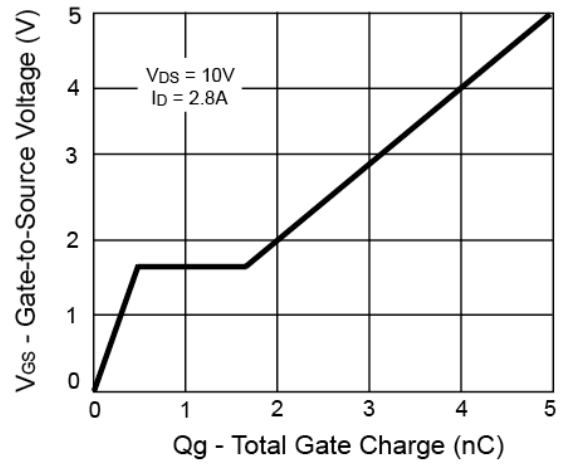
Transfer Characteristics



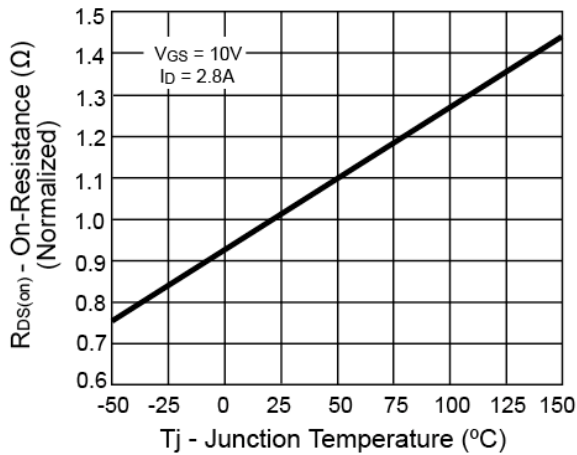
On-Resistance vs. Drain Current



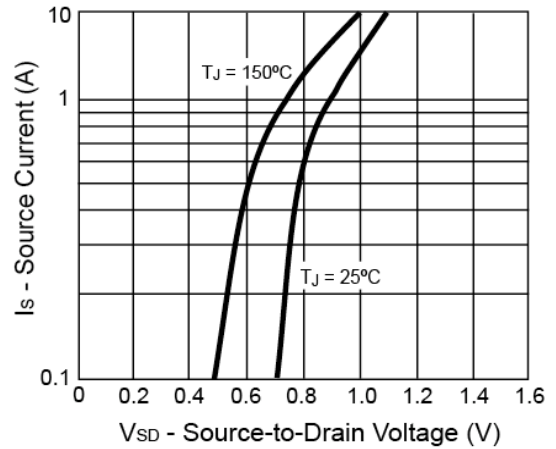
Gate Charge



On-Resistance vs. Junction Temperature

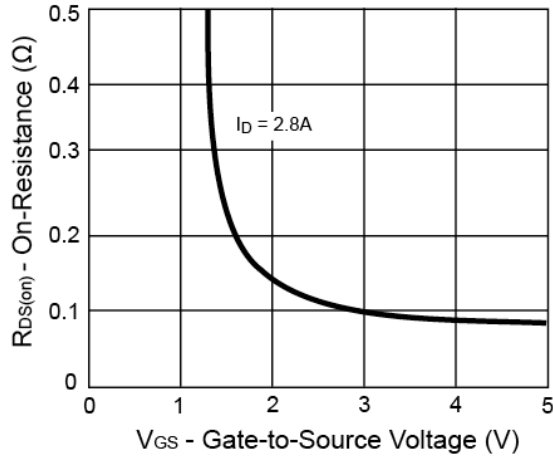


Source-Drain Diode Forward Voltage

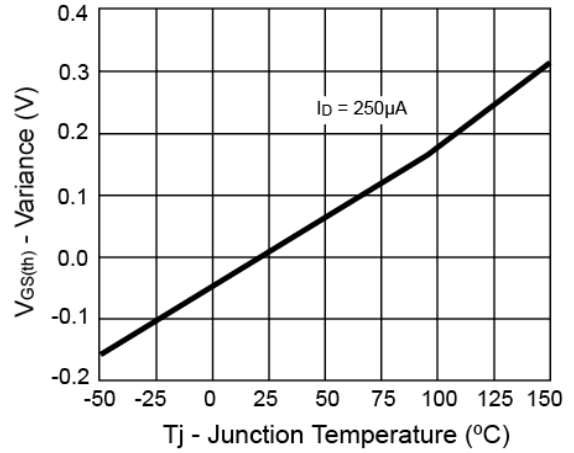


Electrical Characteristics Curve ($T_a = 25^\circ\text{C}$, unless otherwise noted)

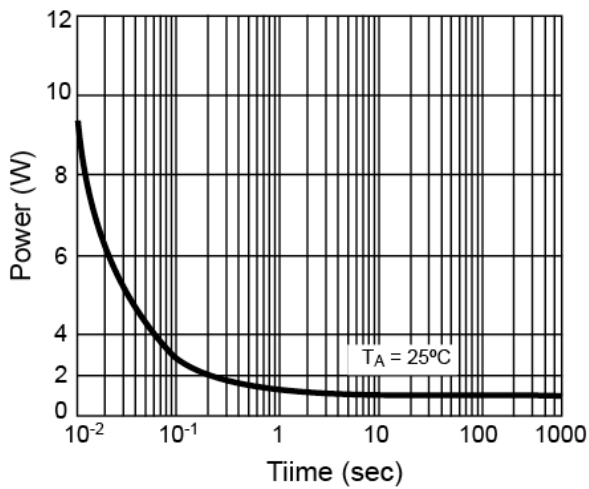
On-Resistance vs. Gate-Source Voltage



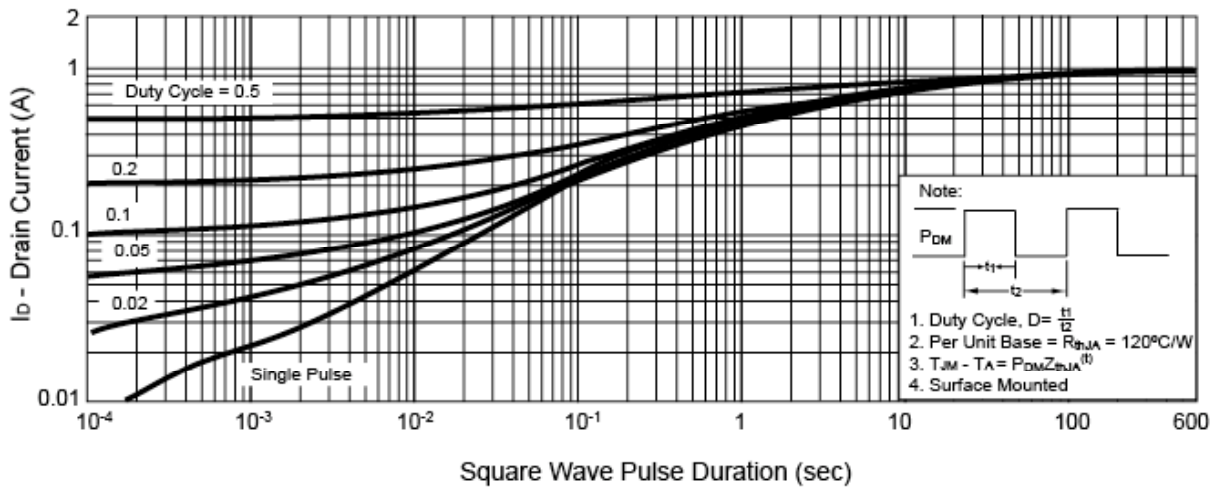
Threshold Voltage



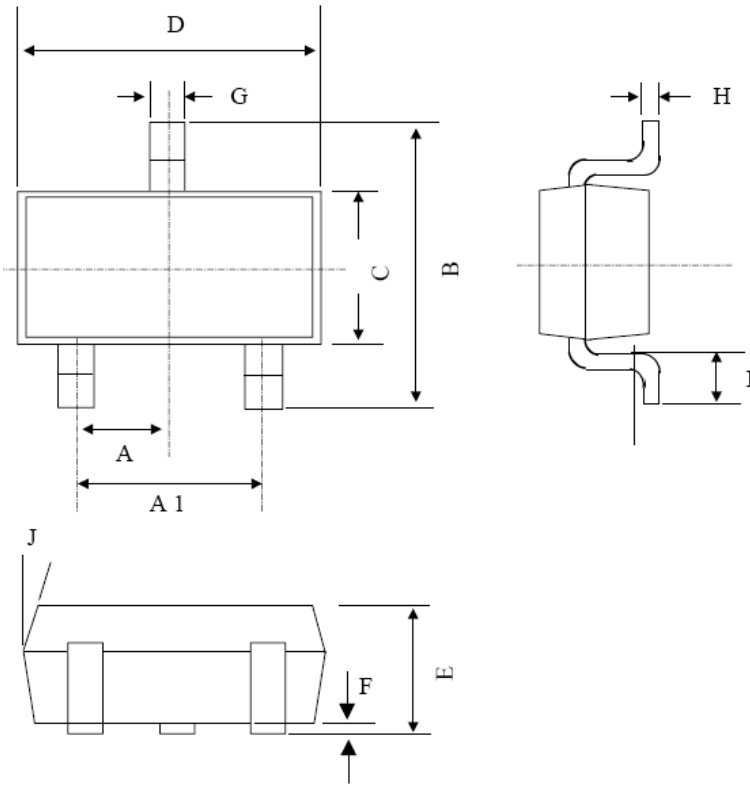
Single Pulse Power



Normalized Thermal Transient Impedance, Junction-to-Ambient

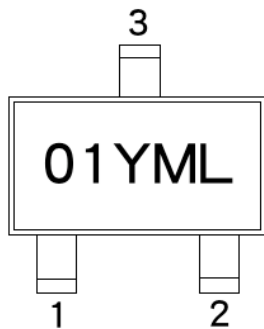


SOT-23 Mechanical Drawing



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



- 01** = 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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