TAIWAN SEMICONDUCTOR

RoHS COMPLIANCE

TSM2303

30V P-Channel MOSFET

SOT-23



Pin Definition:
1. Gate
2. Source
3. Drain

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$(mΩ)	I_D (A)
-30	180 @ V_{GS} =-10V	-1.3
	300 @ V_{GS} =-4.5V	-1.1

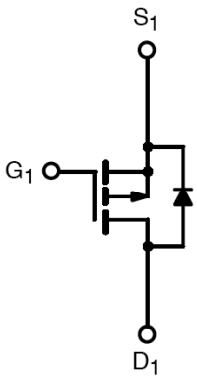
Features

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

Application

- Portable Devices
- High Speed Switch

Block Diagram



P-Channel MOSFET

Ordering Information

Part No.	Package	Packing
TSM2303CX RFG	SOT-23	3Kpcs / 7" Reel

Note: "G" denotes Halogen Free Product.

Absolute Maximum Rating (T_A=25°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	-1.3	A
Pulsed Drain Current		I_{DM}	-10	A
Continuous Source Current (Diode Conduction)[a,b]		I_S	-1.3	A
Maximum Power Dissipation	T_A=25°C	P_D	0.7	W
	T_A=75°C		0.45	
Operating Junction Temperature		T_J	+150	°C
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Thermal Performance

Parameter	Symbol	Limit	Unit
Junction to Case Thermal Resistance	$R\Theta_{JC}$	80	°C/W
Junction to Ambient Thermal Resistance (PCB mounted)	$R\Theta_{JA}$	140	°C/W

Notes:

a. Pulse width limited by the Maximum junction temperature

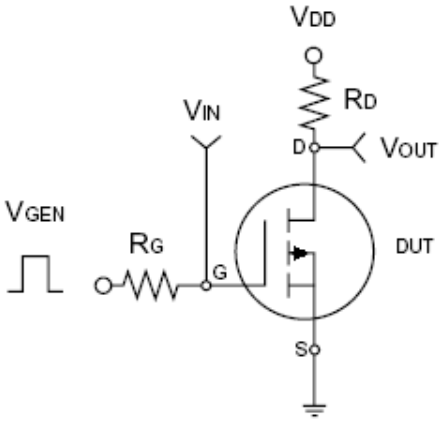
b. Surface Mounted on a 1 in^2 pad of 2oz Cu, t ≤ 5 sec.

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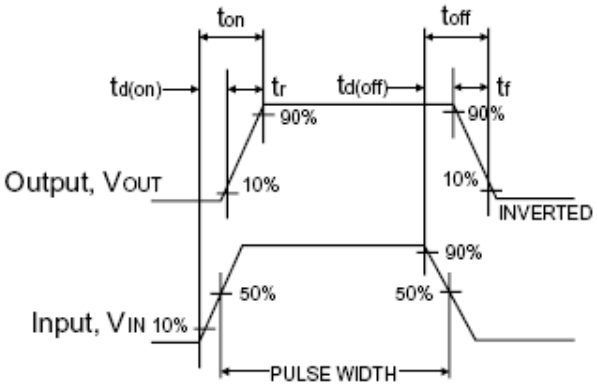
Electrical Specifications (Ta = 25°C unless otherwise noted)

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250µA	BV_{DSS}	-30	--	--	V
Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250µA	$V_{GS(TH)}$	-1	--	-3	V
Gate Body Leakage	V_{GS} = ±20V, V_{DS} = 0V	I_{GSS}	--	--	±100	nA
Zero Gate Voltage Drain Current	V_{DS} = -30V, V_{GS} = 0V	I_{DSS}	--	--	1.0	µA
Drain-Source On-State Resistance	V_{GS} = -10V, I_D = -1.3A	$R_{DS(ON)}$	--	150	180	mΩ
	V_{GS} = -4.5V, I_D = -1.1A		--	250	300	
Forward Transconductance[a]	V_{DS} = -15V, I_D = -1.3A	g_{fs}	--	5	--	S
Diode Forward Voltage	I_S = -1.3A, V_{GS} = 0V	V_{SD}	--	--	-1.2	V
Dynamic[b]						
Total Gate Charge	V_{DS} = -10V, I_D = -1.3A, V_{GS} = -4.5V	Q_g	--	10	15	nC
Gate-Source Charge		Q_{gs}	--	1.9	--	
Gate-Drain Charge		Q_{gd}	--	2	--	
Input Capacitance	V_{DS} = -10V, V_{GS} = 0V, f = 1.0MHz	C_{iss}	--	565	--	pF
Output Capacitance		C_{oss}	--	126	--	
Reverse Transfer Capacitance		C_{rss}	--	75	--	
Switching[b,c]						
Turn-On Delay Time	V_{DD} = -10V, R_L = 15Ω, I_D = -1A, V_{GEN} = -4.5V, R_G = 6Ω	$t_{d(on)}$	--	10	--	nS
Turn-On Rise Time		t_r	--	9	--	
Turn-Off Delay Time		$t_{d(off)}$	--	27	--	
Turn-Off Fall Time		t_f	--	7	--	

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



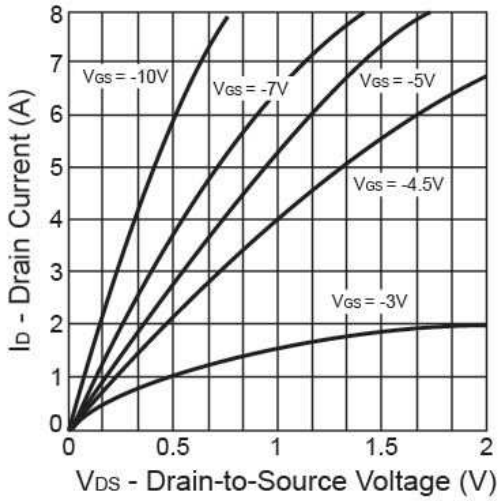
Switching Test Circuit



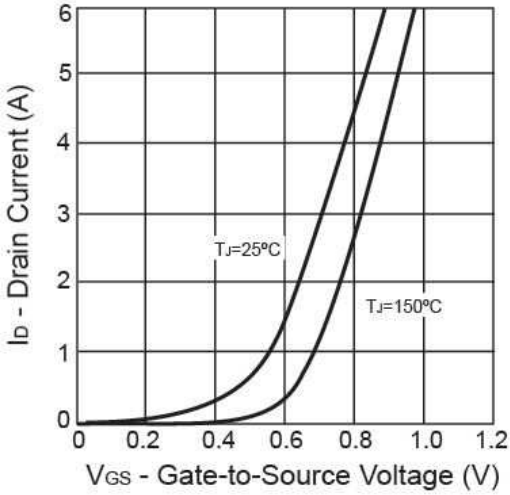
Switchin Waveforms

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

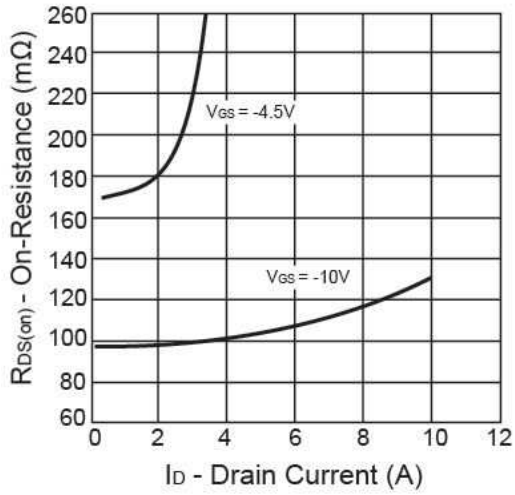
Output Characteristics



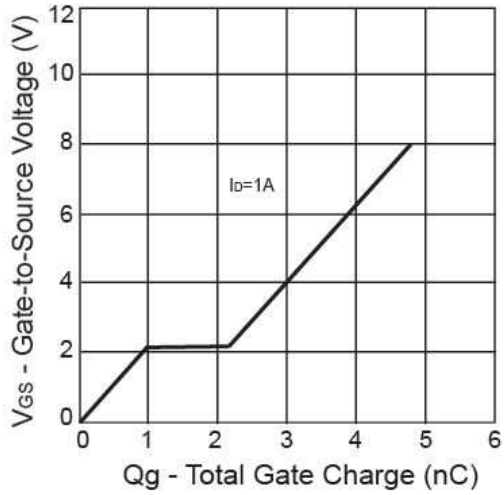
Transfer Characteristics



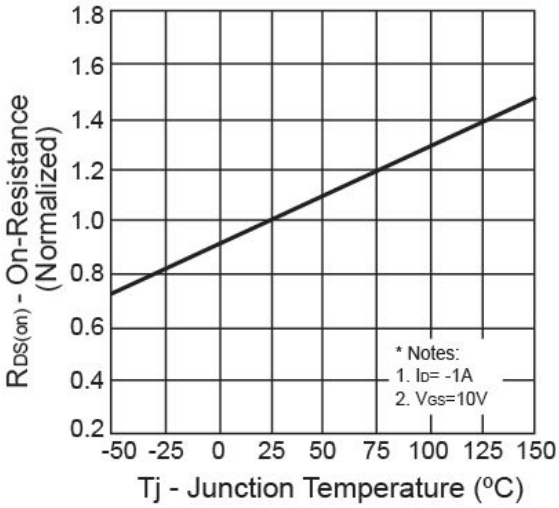
On-Resistance vs. Drain Current



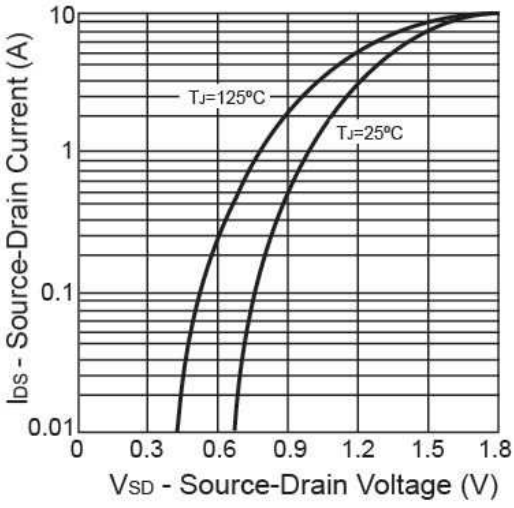
Gate Charge



On-Resistance vs. Junction Temperature

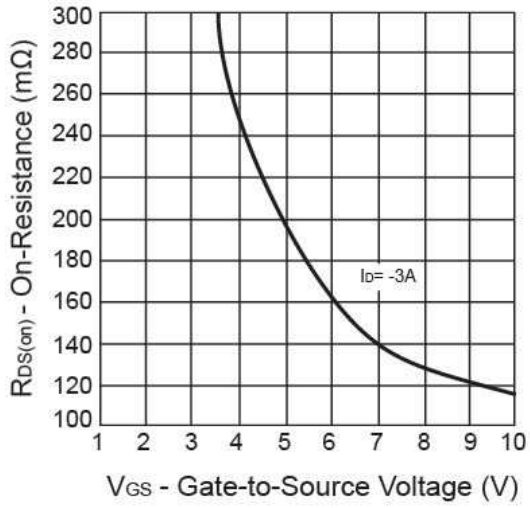


Source-Drain Diode Forward Voltage

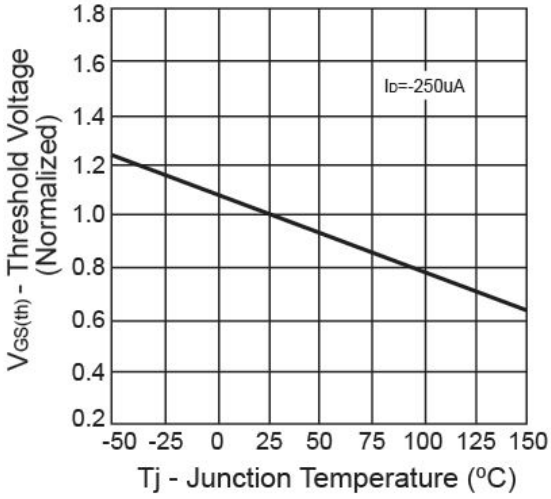


Electrical Characteristics Curve (Ta = 25°C, unless otherwise noted)

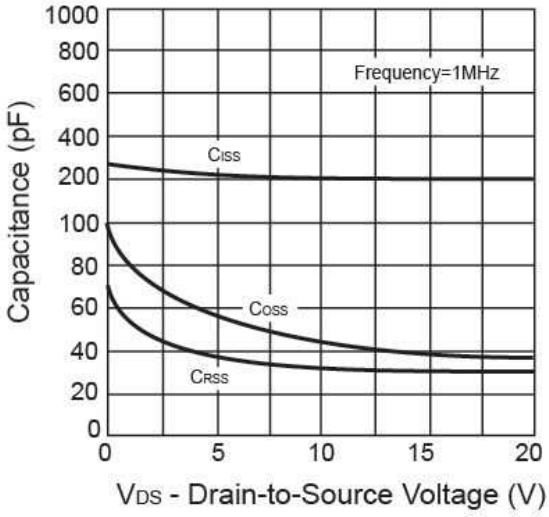
On-Resistance vs. Gate-Source Voltage



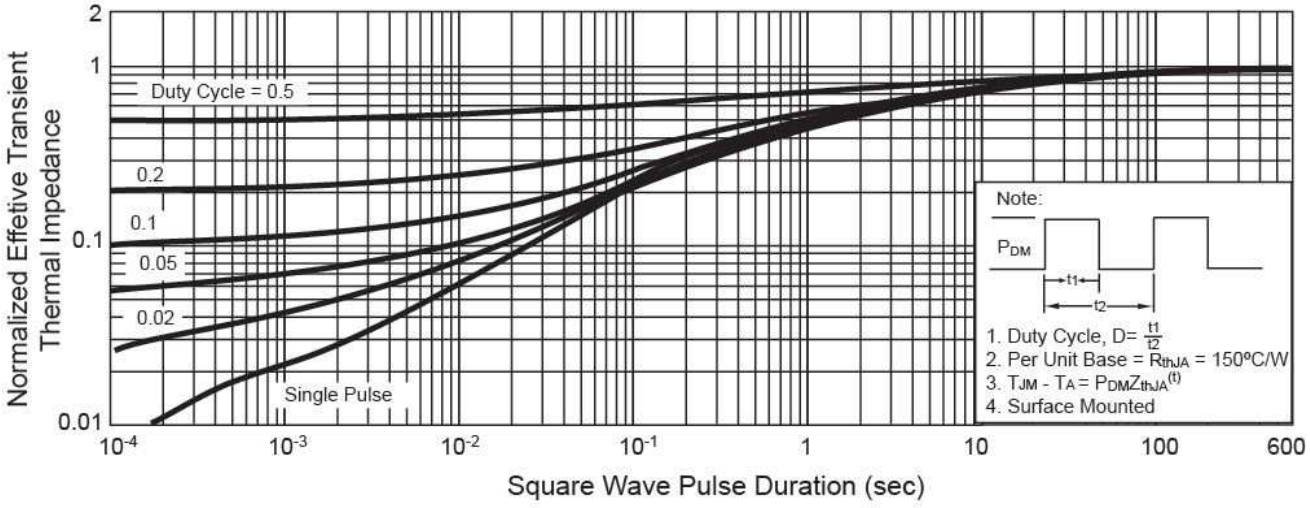
Threshold Voltage



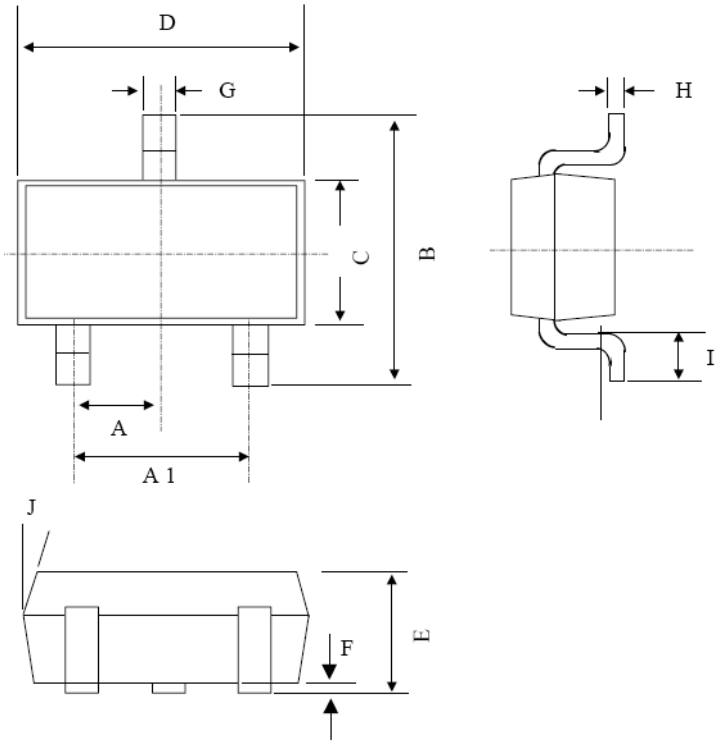
Capacitance



Normalized Thermal Transient Impedance, Junction-to-Ambient

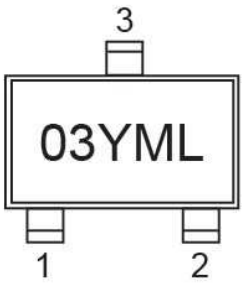


SOT-23 Mechanical Drawing



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	5º	10º	5º	10º

Marking Diagram



03 = Device Code
Y = Year Code
M = Month Code for Halogen Free Product
(**O**=Jan, **P**=Feb, **Q**=Mar, **R**=Apl, **S**=May, **T**=Jun, **U**=Jul, **V**=Aug, **W**=Sep, **X**=Oct, **Y**=Nov, **Z**=Dec)
L = Lot Code

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