

SOT-23



Pin Definition:

1. Gate
2. Source
3. Drain

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (m Ω)	I_D (A)
60	156 @ $V_{GS} = 10V$	3
	192 @ $V_{GS} = 4.5V$	2.1

Features

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

Application

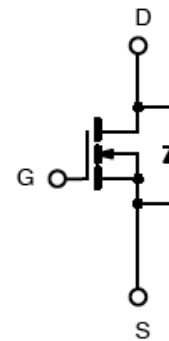
- DC-DC Power System
- Load Switch

Ordering Information

Part No.	Package	Packing
TSM2308CX RFG	SOT-23	3Kpcs / 7" Reel

Note: "G" denotes Halogen Free 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}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	3	A
Pulsed Drain Current	I_{DM}	6	A
Continuous Source Current (Diode Conduction) ^{a,b}	I_S	3	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	$R_{\theta JC}$	80	$^\circ\text{C/W}$
Junction to Ambient Thermal Resistance (PCB mounted)	$R_{\theta JA}$	150	$^\circ\text{C/W}$

Notes:

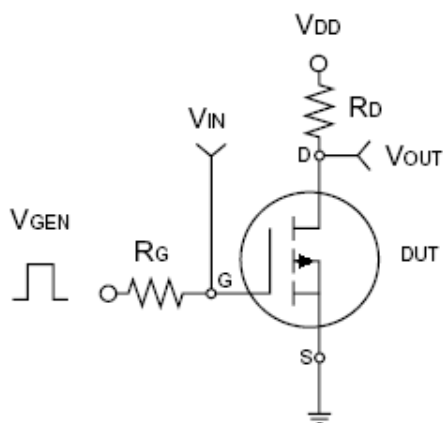
- a. Pulse width limited by the Maximum junction temperature
- b. Surface Mounted on a 1 in² pad of 2oz Cu, $t \leq 5$ sec.

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

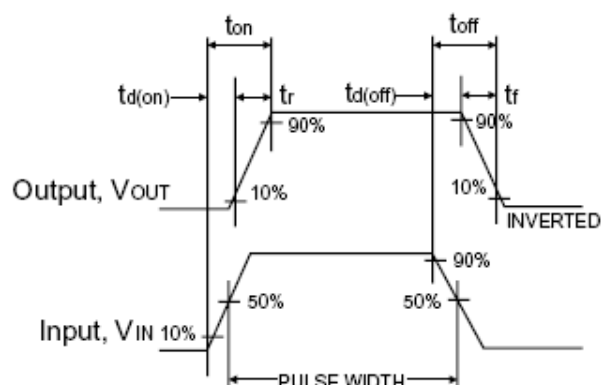
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	BV _{DSS}	60	--	--	V
Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	V _{GS(TH)}	1.2	--	2.5	V
Gate Body Leakage	V _{GS} = ±20V, V _{DS} = 0V	I _{GSS}	--	--	±100	nA
Zero Gate Voltage Drain Current	V _{DS} = 48V, V _{GS} = 0V	I _{DSS}	--	--	1.0	μA
Drain-Source On-State Resistance	V _{GS} = 10V, I _D = 3A	R _{DS(ON)}	--	130	156	mΩ
	V _{GS} = 4.5V, I _D = 2A		--	160	192	
Diode Forward Voltage	I _S = 1A, V _{GS} = 0V	V _{SD}	--	--	-1.2	V
Dynamic ^b						
Total Gate Charge	V _{DS} = 48V, I _D = 3A, V _{GS} = 4.5V	Q _g	--	3.99	--	nC
Gate-Source Charge		Q _{gs}	--	1.31	--	
Gate-Drain Charge		Q _{gd}	--	1.78	--	
Input Capacitance	V _{DS} = 15V, V _{GS} = 0V, f = 1.0MHz	C _{iss}	--	511	--	pF
Output Capacitance		C _{oss}	--	38	--	
Reverse Transfer Capacitance		C _{rss}	--	25	--	
Switching ^{b,c}						
Turn-On Delay Time	V _{DD} = 30V, I _D = 3A, V _{GEN} = 10V, R _G = 3.3Ω	t _{d(on)}	--	5.3	--	nS
Turn-On Rise Time		t _r	--	17.5	--	
Turn-Off Delay Time		t _{d(off)}	--	14.2	--	
Turn-Off Fall Time		t _f	--	2.4	--	

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.



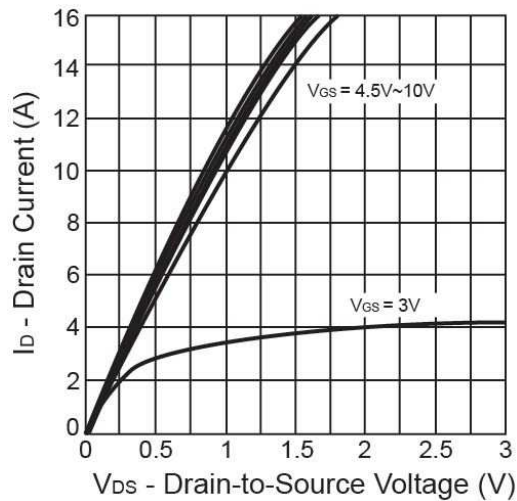
Switching Test Circuit



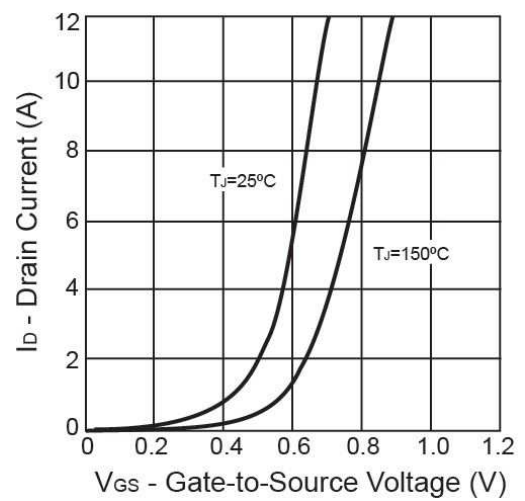
Switchin Waveforms

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

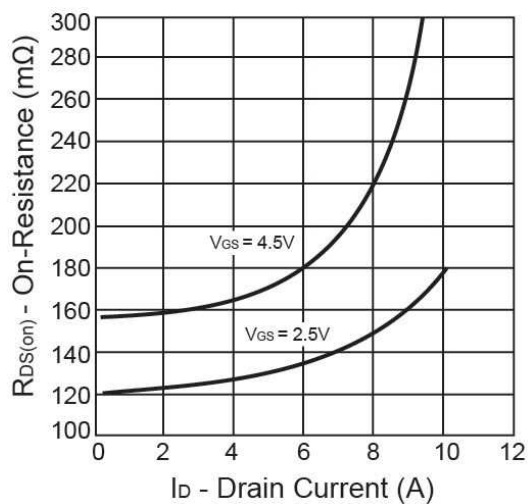
Output Characteristics



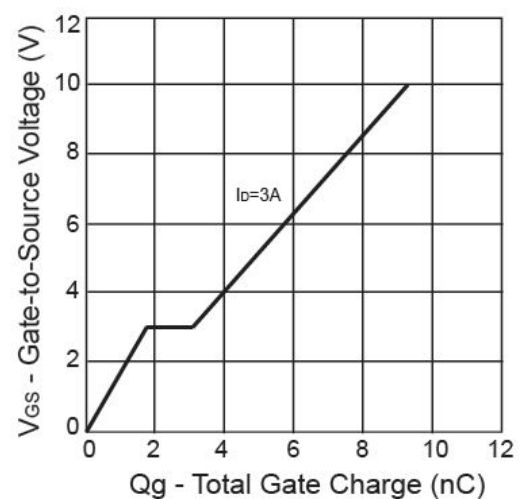
Transfer Characteristics



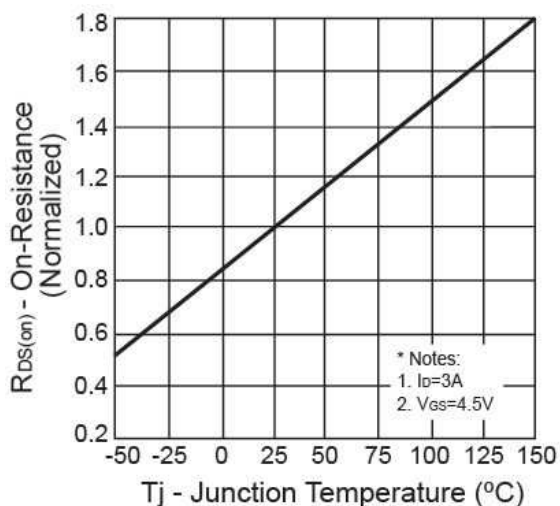
On-Resistance vs. Drain Current



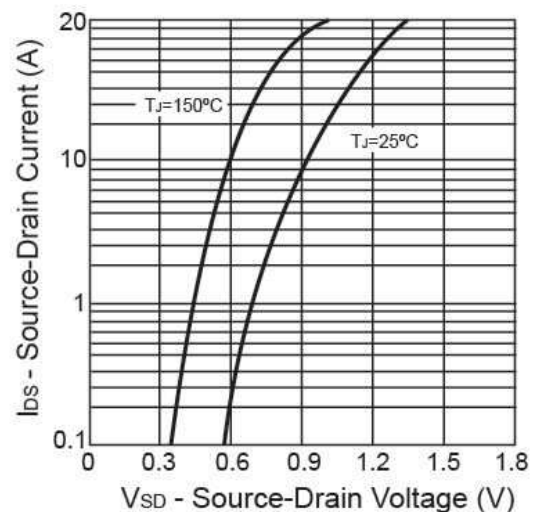
Gate Charge



On-Resistance vs. Junction Temperature

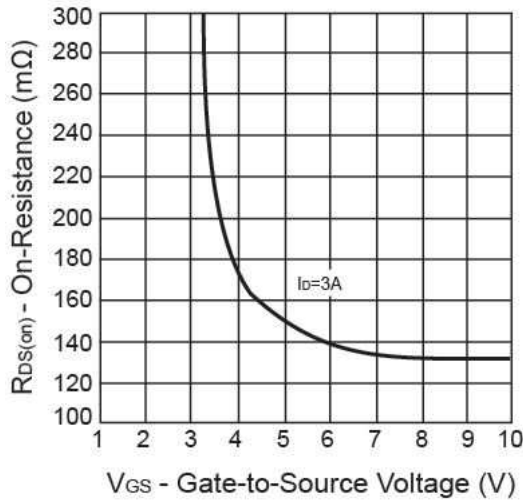


Source-Drain Diode Forward Voltage

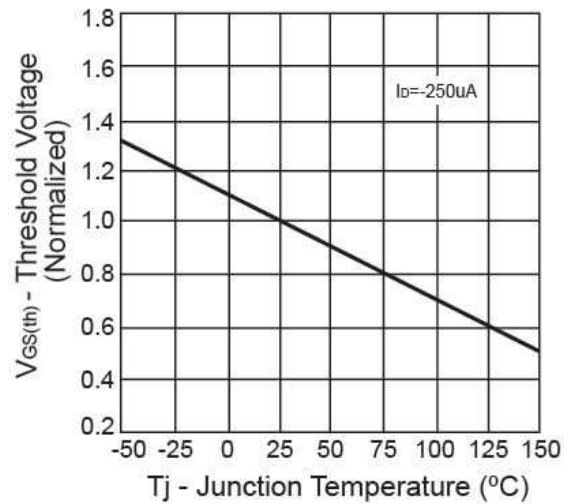


Electrical Characteristics Curve ($T_a = 25^\circ\text{C}$, unless otherwise noted)

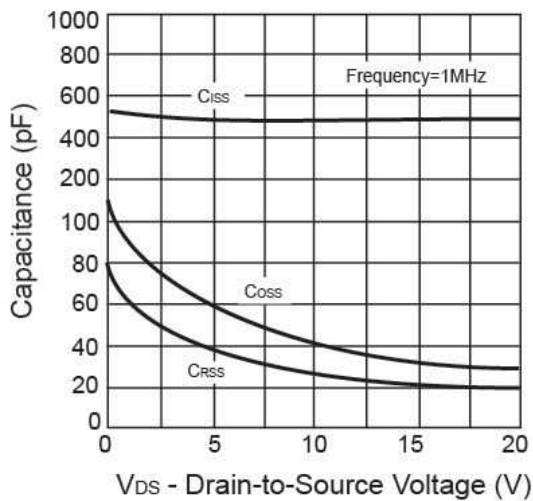
On-Resistance vs. Gate-Source Voltage



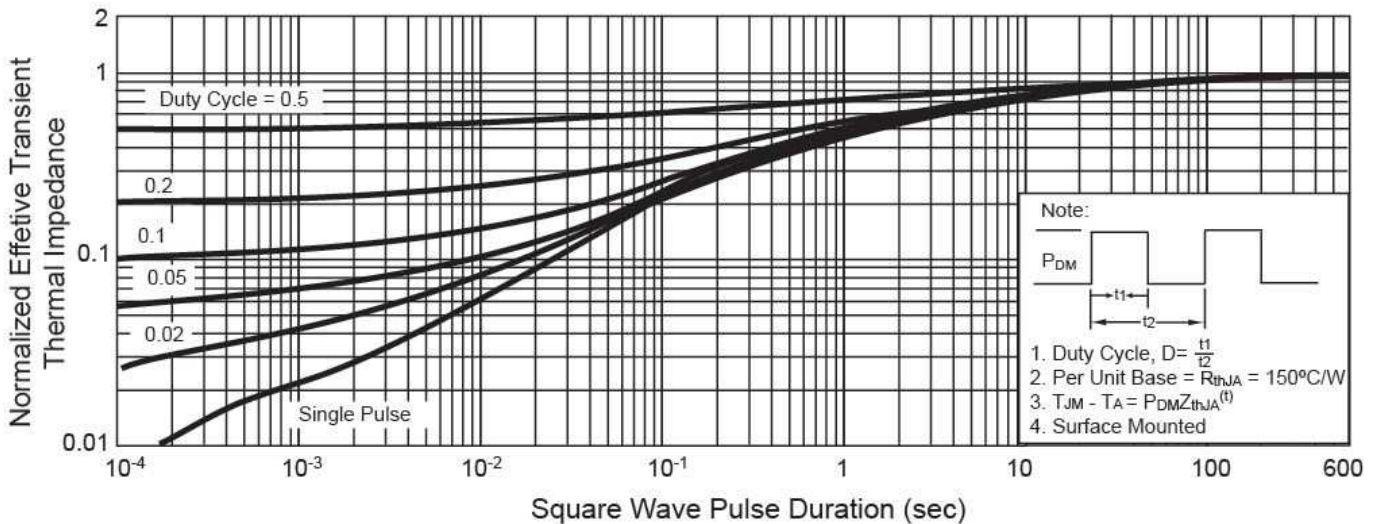
Threshold Voltage



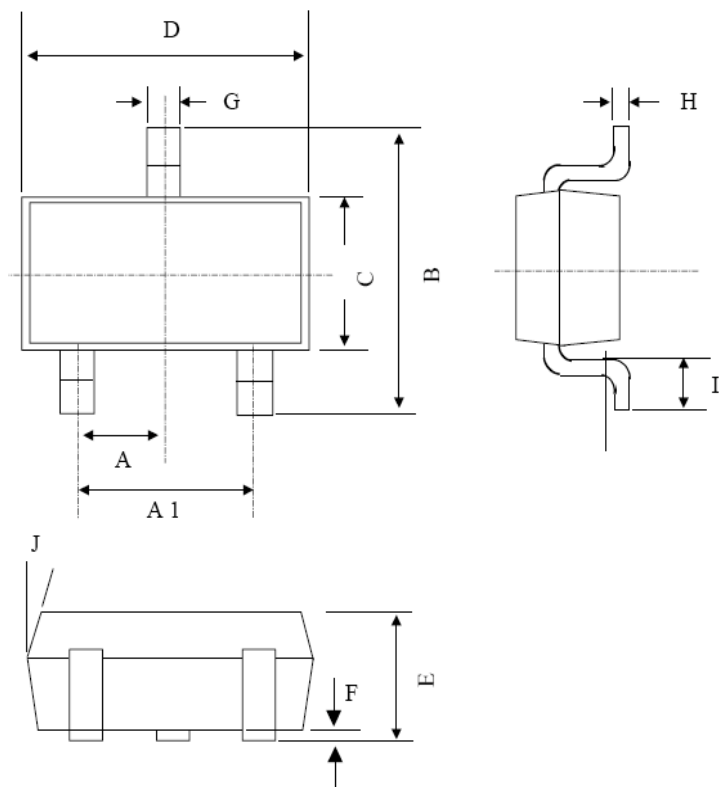
Capacitance



Normalized Thermal Transient Impedance, Junction-to-Ambient

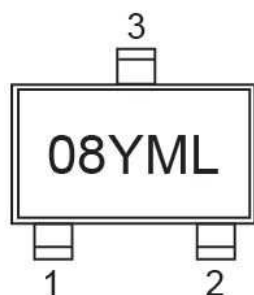


SOT-23 Mechanical Drawing



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	2.25	2.55	0.089	0.100
C	1.20	1.40	0.047	0.055
D	2.80	3.00	0.110	0.118
E	0.90	1.15	0.035	0.045
F	0.00	0.10	0.000	0.004
G	0.30	0.50	0.012	0.020
H	0.08	0.15	0.003	0.006
I	0.30	0.50	0.012	0.020
J	5°	10°	5°	10°

Marking Diagram



08 = 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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