P-Channel Power MOSFET

-20V, -2.8A, 100mΩ

Features

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

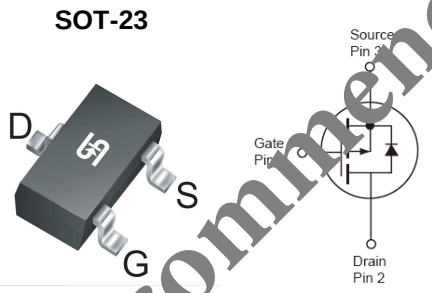
KEY PERFORMANCE PARAMETERS			
PARAMETER		**VALUE**	**UNIT**
V_{DS}		-20	V
$R_{DS(on)}$ (max)	V_{GS} = -4.5V	100	mΩ
	V_{GS} = -2.5V	150	
	V_{GS} = -1.8V	190	
Q_g		5.8	nC

Application

- Load Switch
- PA Switch

Pb-Free RoHS COMPLIANT HALOGEN FREE

SOT-23



Notes: Moisture sensitivity level: level 3. Per J-STD-020

ABSOLUTE MAXIMUM RATINGS (T_A = 25°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 (Note 1)	V_{GS} = 4.5V.	I_D	-2.8	A
Pulsed Drain Current (Note 2)	V_{GS} = 4.5V.	I_{DM}	-8	A
Continuous Source Current (Diode Conduction)		I_S	-0.72	A
Total Power Dissipation	T_A = 25°C	P_{DTOT}	0.9	W
	T_A = 75°C		0.57	
Operating Junction and Storage Temperature Range		T_J, T_{STG}	- 55 to +150	°C

THERMAL PERFORMANCE			
PARAMETER	**SYMBOL**	**LIMIT**	**UNIT**
Junction to Ambient Thermal Resistance(PCB mounted)	$R_{\Theta JA}$	120	°C/W
Lead Temperature (1/8" from case)	T_L	5	S

Notes: $R_{\Theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistances. The case thermal reference is defined at the solder mounting surface of the drain pins. $R_{\Theta JA}$ is guaranteed by design while $R_{\Theta CA}$ is determined by the user's board design. $R_{\Theta JA}$ shown below for single device operation on FR-4 PCB in still air.

ELECTRICAL SPECIFICATIONS (T_A = 25°C unless otherwise noted)						
PARAMETER	**CONDITIONS**	**SYMBOL**	**MIN**	**TYP**	**MAX**	**UNIT**
Static (Note 3)						
Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = -250uA	BV_{DSS}	-20	--	--	V
Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = -250μA	$V_{GS(TH)}$	-0.45	--	-0.95	V
Gate Body Leakage	V_{GS} = ±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	V_{DS} ≥ -10V, V_{GS} = -5V	$I_{D(ON)}$	-6	--	--	A
Drain-Source On-State Resistance	V_{GS} = -4.5V, I_D = -2.8A	$R_{DS(ON)}$	--	80	100	mΩ
	V_{GS} = -2.5V, I_D = -2.0A		--	110	150	
	V_{GS} = -1.8V, I_D = -2.0A		--	150	190	
Forward Transconductance	V_{DS} = -5V, I_D = -4A	g_{fs}	--	6.5	--	S
Dynamic (Note 4)						
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 (Note 5)						
Turn-On Delay Time	V_{DD} = -6V, R_L = 6Ω, I_D = -1A, V_{GEN} = -4.5V, R_G = 6Ω	$t_{d(on)}$	--	13	--	ns
Turn-On Rise Time		t_r	--	36	--	
Turn-Off Delay Time		$t_{d(off)}$	--	42	--	
Turn-Off Fall Time		t_f	--	34	--	
Source-Drain Diode (Note 3)						
Forward On Voltage	I_S = -0.75A, V_{GS} = 0V	V_{SD}	--	- 0.8	-1.2	V

Notes:

1. Pulse width limited by the maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 5 sec.
3. Pulse test: PW ≤ 300μs, duty cycle ≤ 2%.
4. For DESIGN AID ONLY, not subject to production testing.
5. Switching time is essentially independent of operating temperature.

ORDERING INFORMATION

PART NO.	PACKAGE	PACKING
TSM2301BCX RFG	SOT-23	3,000pcs / 7”Reel

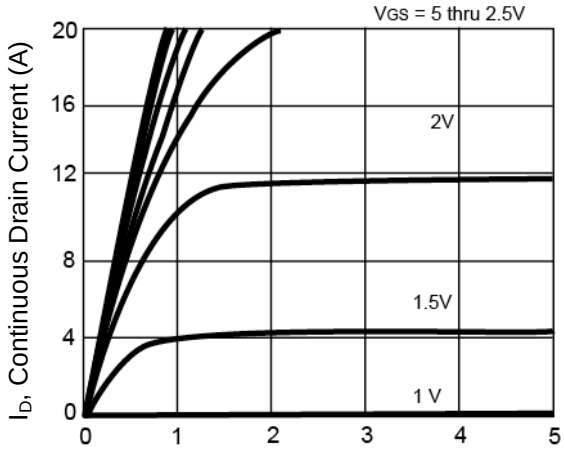
Note:

1. Compliant to RoHS Directive 2011/65/EU and in accordance to WEEE 2002/96/EC
2. Halogen-free according to IEC 61249-2-21 definition

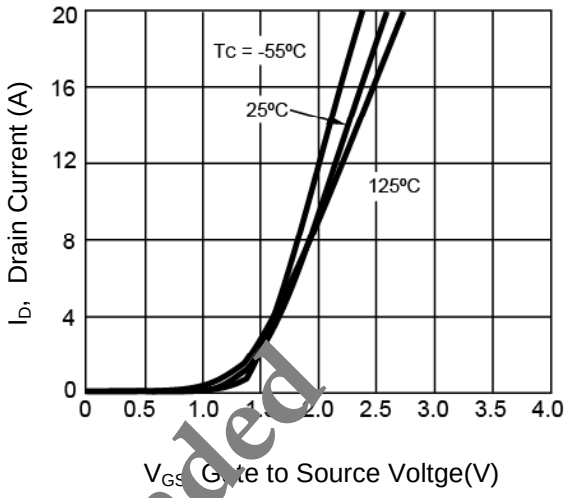
CHARACTERISTICS CURVES

(T_A = 25°C unless otherwise noted)

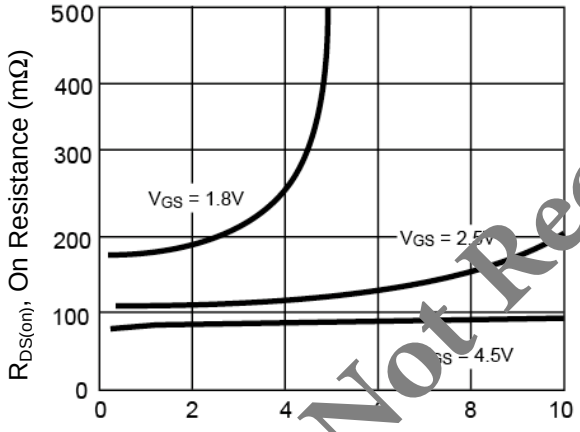
Output Characteristics



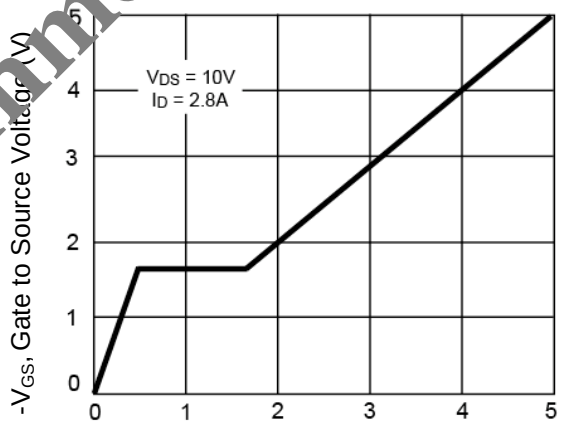
Transfer Characteristics



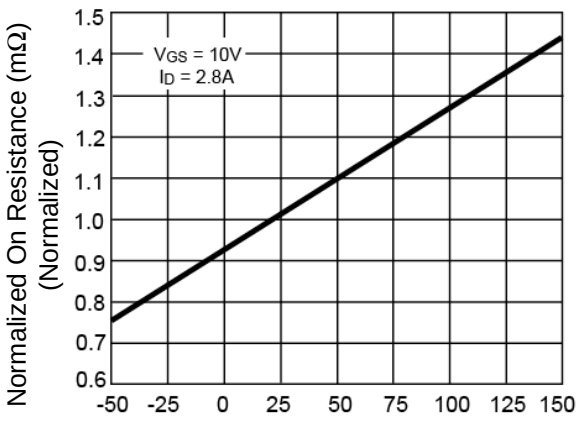
On-Resistance vs. Drain Current



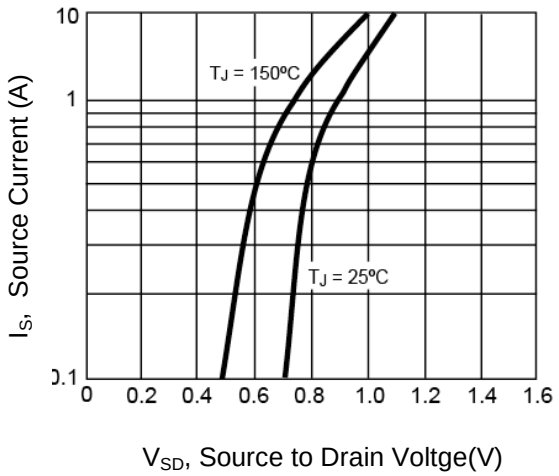
Gate Charge



On-Resistance vs. Junction Temperature



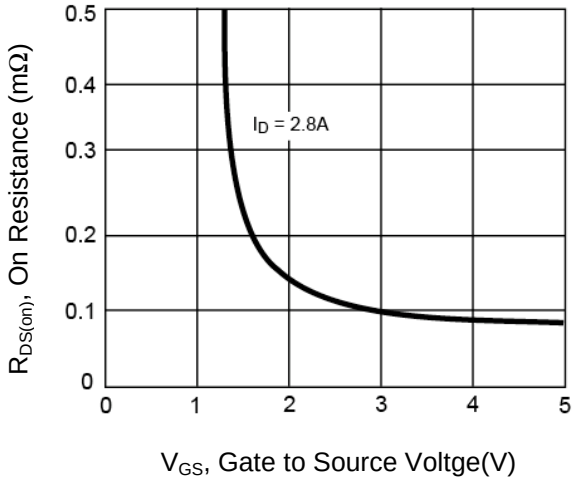
Source-Drain Diode Forward Voltage



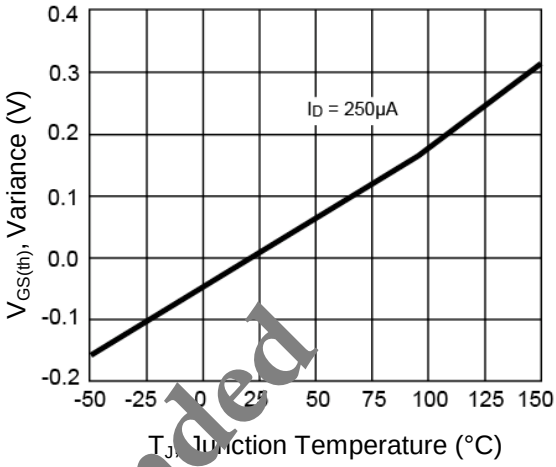
CHARACTERISTICS CURVES

(T_A = 25°C unless otherwise noted)

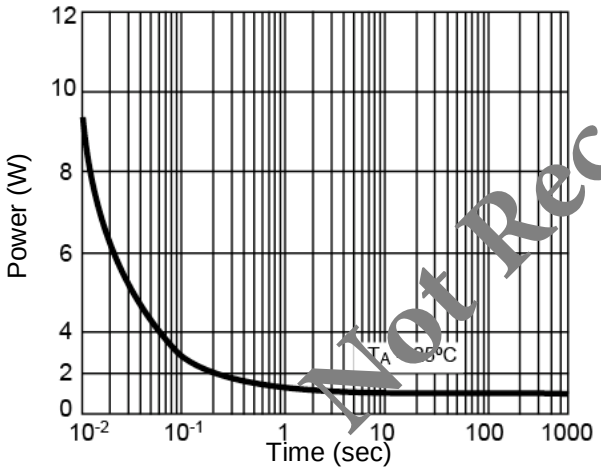
On-Resistance vs. Gate-Source Voltage



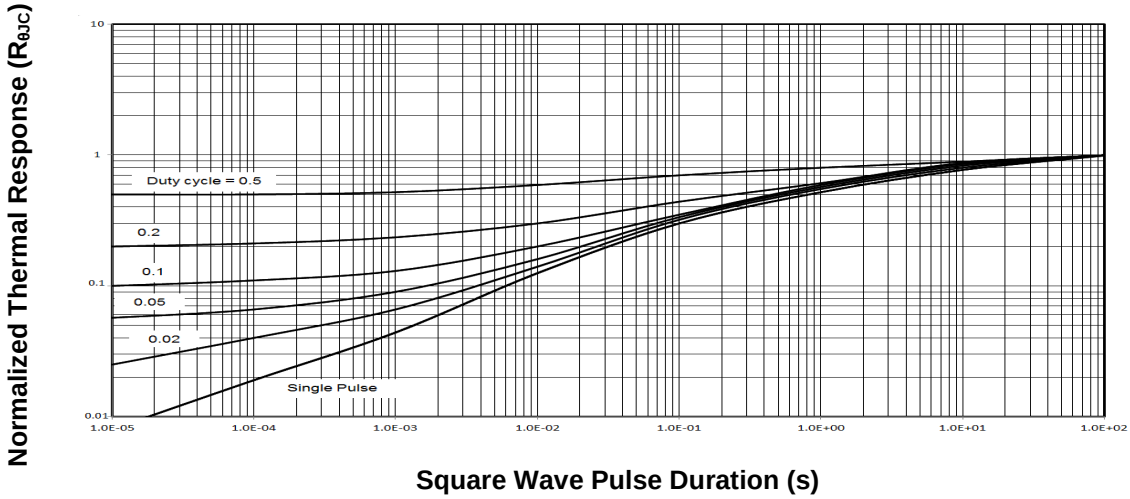
Threshold Voltage



Single Pulse Power

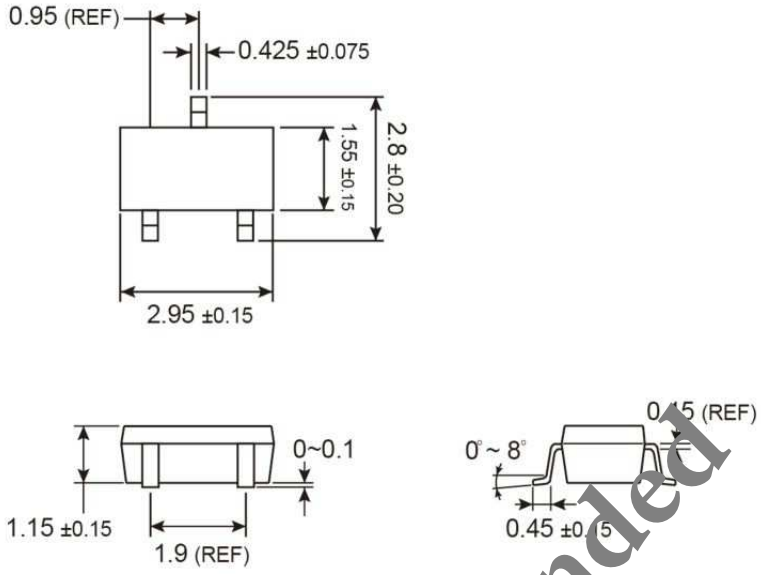


Normalized Thermal Transient Impedance, Junction-to-Ambient

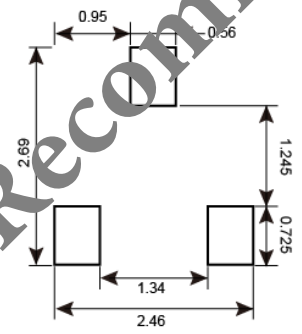


PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

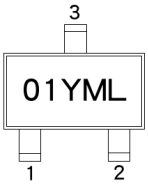
SOT-23



SUGGESTED PAD LAYOUT (Unit: Millimeters)



MARKING DIAGRAM



01 = 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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