P-Channel Power MOSFET

-30V, -3A, 60mΩ

Features

- Advance Trench Process Technology
- High Density Cell Design for Ultra Low On-resistance
- Pb-free plating
- RoHS compliant
- Halogen-free package

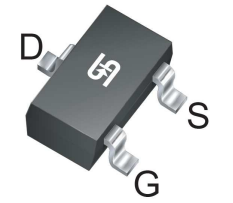
Application

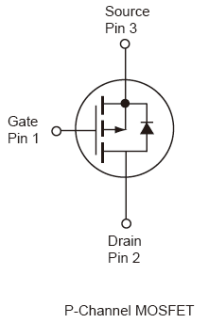
- Load Switch
- PA Switch

KEY PERFORMANCE PARAMETERS			
PARAMETER		**VALUE**	**UNIT**
V_{DS}		-30	V
$R_{DS(on)}$ (max)	V_{GS} = -10V	60	mΩ
	V_{GS} = -4.5V	90	
Q_g		9.52	nC

Pb-Free RoHS COMPLIANT HALOGEN FREE

SOT23





P-Channel MOSFET

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}	-30	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current (Note 1)	T_A = 25°C	I_D	-3	A
Pulsed Drain Current (Note 2)		I_{DM}	-10	A
Continuous Source Current (Diode Conduction)		I_S	-1.9	A
Total Power Dissipation	T_A = 25°C	P_{DTOT}	1.6	W
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	$R_{\Theta JC}$	75	°C/W
Junction to Ambient Thermal Resistance	$R_{\Theta JA}$	250	°C/W

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 = -250μA	BV_{DSS}	-30	--	--	V
Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = -250μA	$V_{GS(TH)}$	-1.0	-1.5	-3.0	V
Gate Body Leakage	V_{GS} = ±20V, V_{DS} = 0V	I_{GSS}	--	--	±100	nA
Zero Gate Voltage Drain Current	V_{DS} = -24V, V_{GS} = 0V	I_{DSS}	--	--	-1	μA
On-State Drain Current	V_{DS} = -5V, V_{GS} = -10V	$I_{D(ON)}$	-6	--	--	A
Drain-Source On-State Resistance	V_{GS} = -10V, I_D = -3A	$R_{DS(ON)}$	--	50	60	mΩ
	V_{GS} = -4.5V, I_D = -2A		--	75	90	
Forward Transconductance	V_{DS} = -15V, I_D = -5A	g_{fs}	4	7	--	S
Dynamic (Note 4)						
Total Gate Charge	V_{DS} = -15V, I_D = -3A, V_{GS} = -10V	Q_g	--	9.52	--	nC
Gate-Source Charge		Q_{gs}	--	3.43	--	
Gate-Drain Charge		Q_{gd}	--	1.71	--	
Input Capacitance	V_{DS} = -15V, V_{GS} = 0V, f = 1.0MHz	C_{iss}	--	551.57	--	pF
Output Capacitance		C_{oss}	--	90.96	--	
Reverse Transfer Capacitance		C_{rss}		60.79		
Switching (Note 5)						
Turn-On Delay Time	V_{DD} = -15V, R_{GEN} = 6Ω, I_D = -1A, V_{GS} = -10V,	$t_{d(on)}$	--	10.8	--	ns
Turn-On Rise Time		t_r	--	2.33	--	
Turn-Off Delay Time		$t_{d(off)}$	--	22.53	--	
Turn-Off Fall Time		t_f	--	3.87	--	
Source-Drain Diode (Note 3)						
Forward On Voltage	I_S = -1.9 A, V_{GS} = 0V	V_{SD}	--	-0.8	-1.3	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
TSM3401CX RFG	SOT-23	3,000pcs / 7”Reel

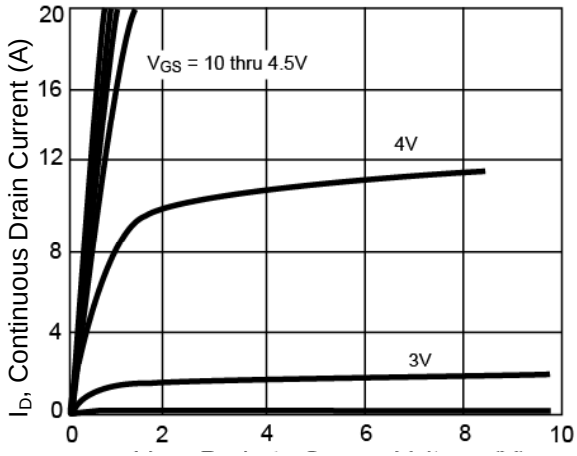
Note:

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

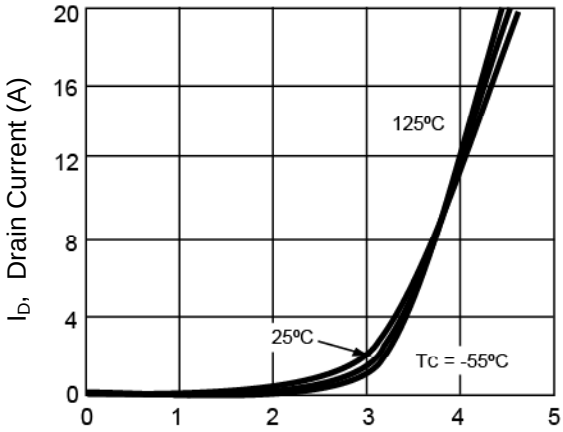
CHARACTERISTICS CURVES

(T_A = 25°C unless otherwise noted)

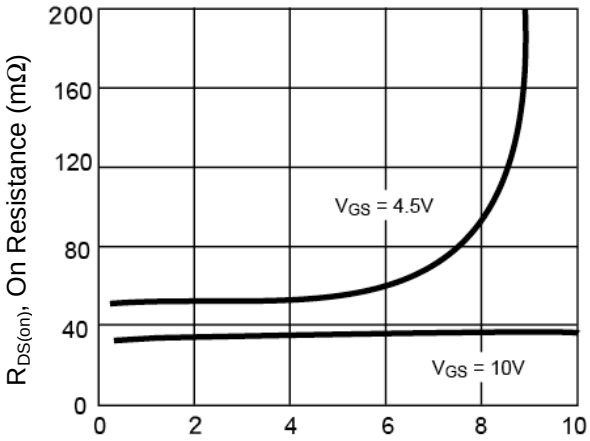
Output Characteristics



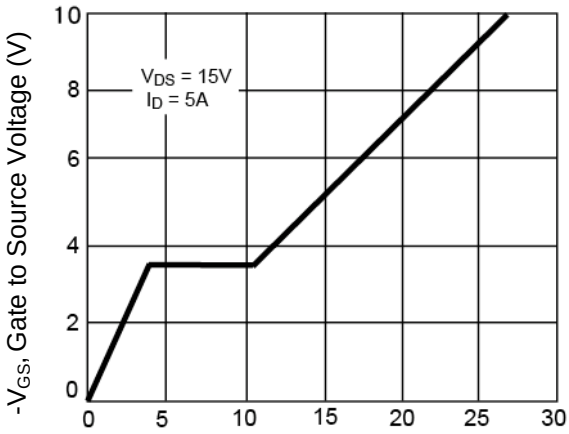
Transfer Characteristics



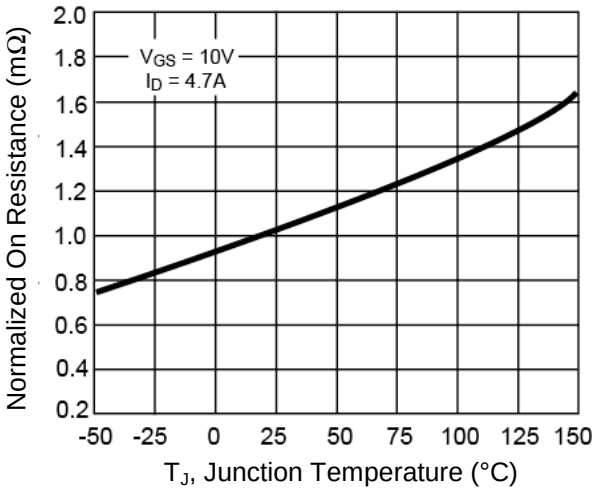
On-Resistance vs. Drain Current



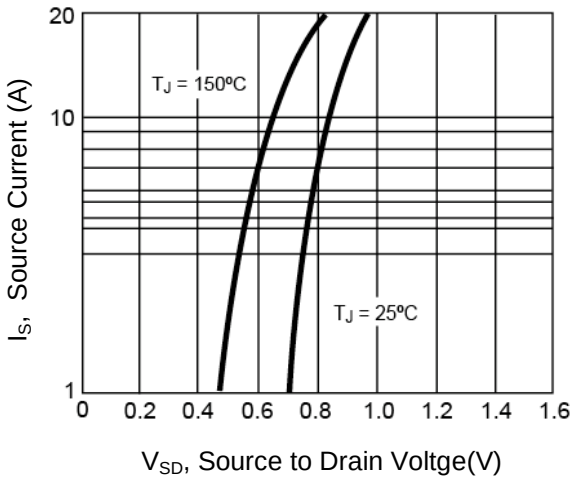
Gate Charge



On-Resistance vs. Junction Temperature



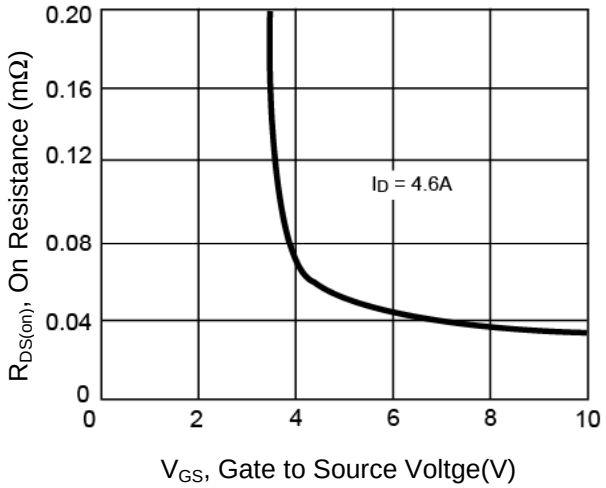
Source-Drain Diode Forward Voltage



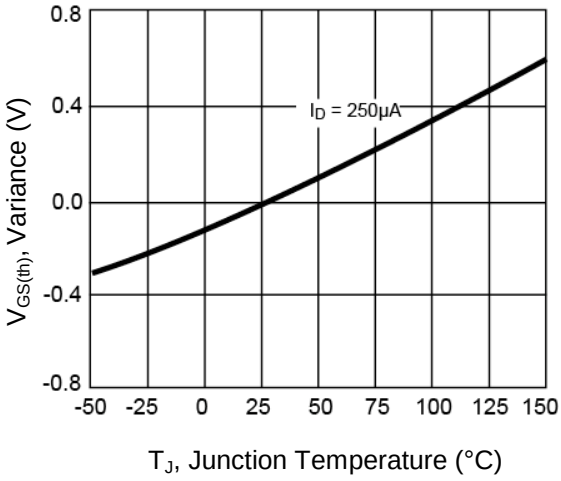
CHARACTERISTICS CURVES

(T_A = 25°C unless otherwise noted)

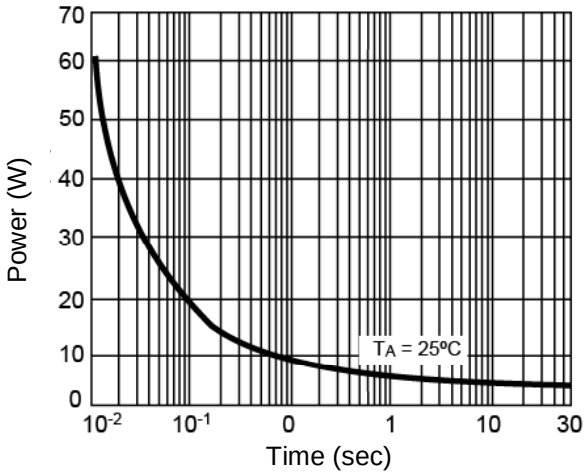
On-Resistance vs. Gate-Source Voltage



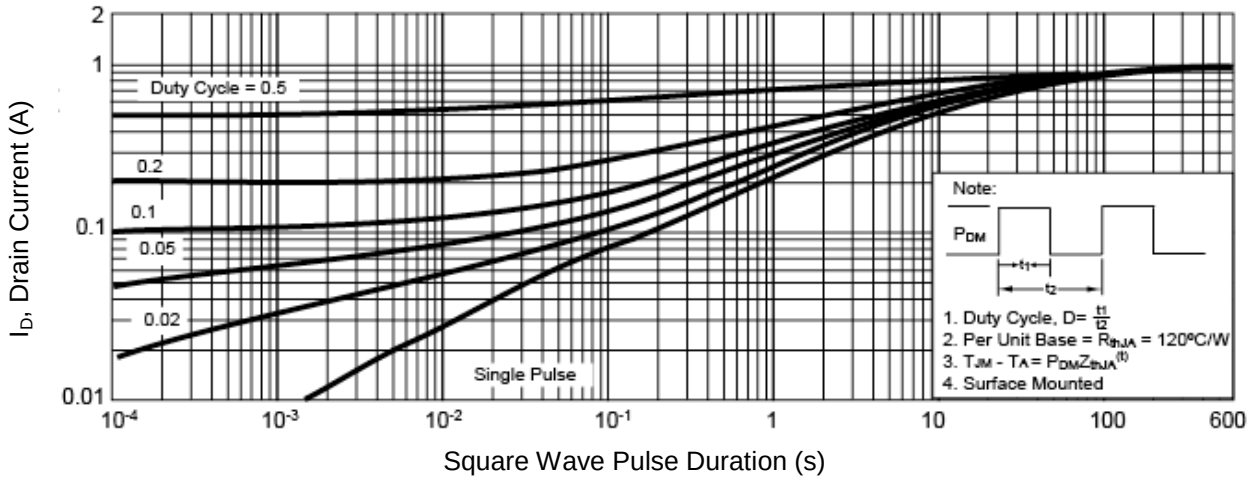
Threshold Voltage



Single Pulse Power

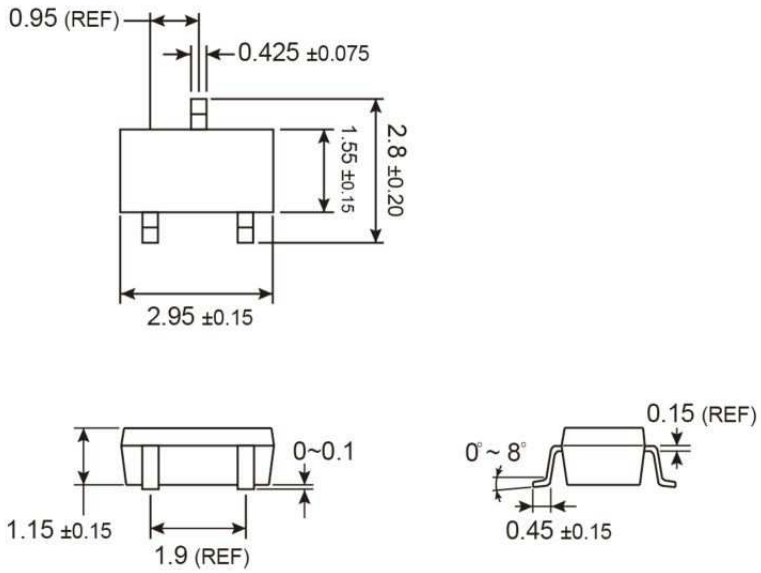


Normalized Thermal Transient Impedance Curve

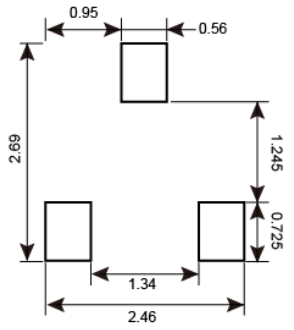


PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

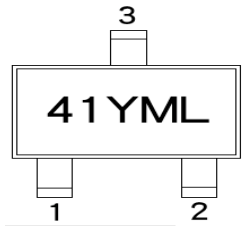
SOT-23



SUGGESTED PAD LAYOUT (Unit: Millimeters)



MARKING DIAGRAM



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 (1~9, A~Z)

Notice

Specifications of the products displayed herein are subject to change without notice. TSC or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies.

Information contained herein is intended to provide a product description only. No license, express or implied, to any intellectual property rights is granted by this document. Except as provided in TSC's terms and conditions of sale for such products, TSC assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of TSC products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify TSC for any damages resulting from such improper use or sale.