N-Channel Power MOSFET

40V, 3.9A, 45mΩ

FEATURES

- Advance Trench Process Technology
- High density cell design for Ultra Low On-resistance
- Pb-free plating
- Compliant to RoHS Directive 2011/65/EU and in accordance to WEE2002/96/EC
- Halogen-free according to IEC 61249-2-21 definition

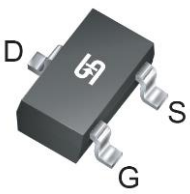
APPLICATION

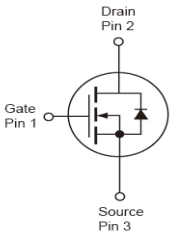
- Load Switch
- Stepper Motors

KEY PERFORMANCE PARAMETERS			
PARAMETER		**VALUE**	**UNIT**
V_{DS}		40	V
$R_{DS(on)}$ (max)	V_{GS} = 10V	45	mΩ
	V_{GS} = 4.5V	62.5	
Qg		10	nC

Pb-Free RoHS COMPLIANT HALOGEN FREE

SOT-23





Notes: MSL 3 (Moisture Sensitivity Level) per J-STD-020

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)			
PARAMETER	**SYMBOL**	**LIMIT**	**UNIT**
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current (Note 1)	I_D	3.9	A
Pulsed Drain Current (Note 2)	I_{DM}	16	A
Total Power Dissipation @ T_A = 25°C	P_{DTOT}	1.25	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	$R_{\Theta JC}$	50	°C/W
Junction to Ambient Thermal Resistance	$R_{\Theta JA}$	100	°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 with minimum recommended footprint 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}	40	--	--	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} = 32V, V_{GS} = 0V	I_{DSS}	--	--	1.0	μA
Drain-Source On-State Resistance	V_{GS} = 10V, I_D = 3.9A	$R_{DS(on)}$	--	36	45	mΩ
	V_{GS} = 4.5V, I_D = 3.5A			50	62.5	
Dynamic (Note 4)						
Total Gate Charge	V_{DS} = 20V, I_D = 3.9A, V_{GS} = 10V	Q_g	--	10	--	nC
Gate-Source Charge		Q_{gs}	--	1.6	--	
Gate-Drain Charge		Q_{gd}	--	2.1	--	
Input Capacitance	V_{DS} = 20V, V_{GS} = 0V, f = 1.0MHz	C_{iss}	--	540	--	pF
Output Capacitance		C_{oss}	--	80	--	
Reverse Transfer Capacitance		C_{rss}	--	45	--	
Switching (Note 5)						
Turn-On Delay Time	V_{DD} = 20V, R_L = 20Ω, I_D = 1A, V_{GEN} = 10V, R_G = 6Ω	$t_{d(on)}$	--	5	--	ns
Turn-On Rise Time		t_r	--	12	--	
Turn-Off Delay Time		$t_{d(off)}$	--	20	--	
Turn-Off Fall Time		t_f	--	15	--	
Source-Drain Diode (Note 3)						
Forward On Voltage	I_S = 1.25A, V_{GS} = 0V	V_{SD}	--	0.8	1.2	V

Notes:

1. Current limited by package
2. Pulse width limited by the maximum junction temperature
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.

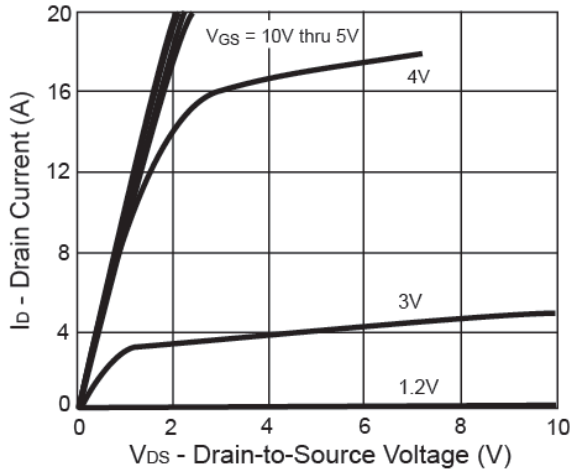
ORDERING INFORMATION

PART NO.	PACKAGE	PACKING
TSM2318CX RFG	SOT-23	3,000pcs / 7” Reel

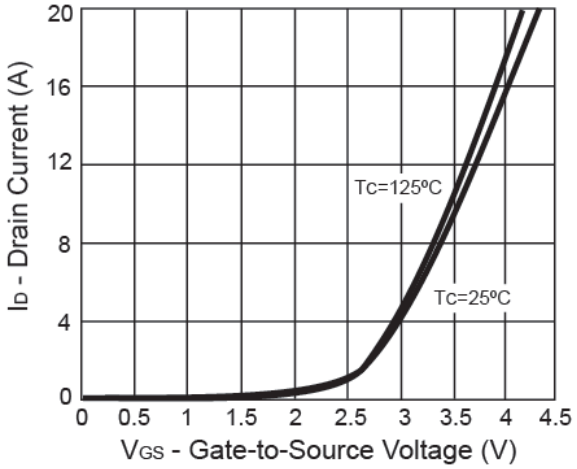
CHARACTERISTICS CURVES

(T_C = 25°C unless otherwise noted)

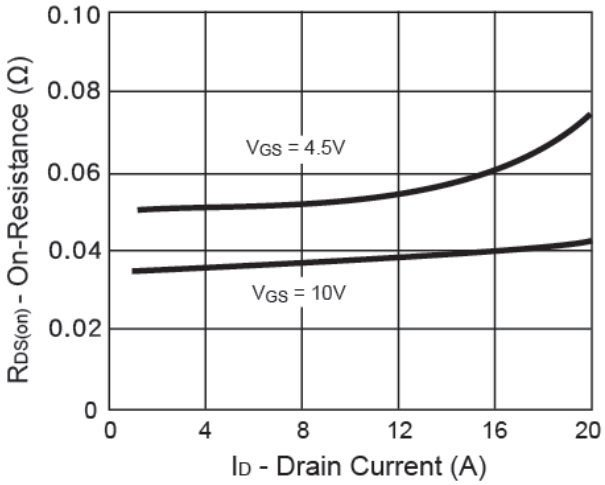
Output Characteristics



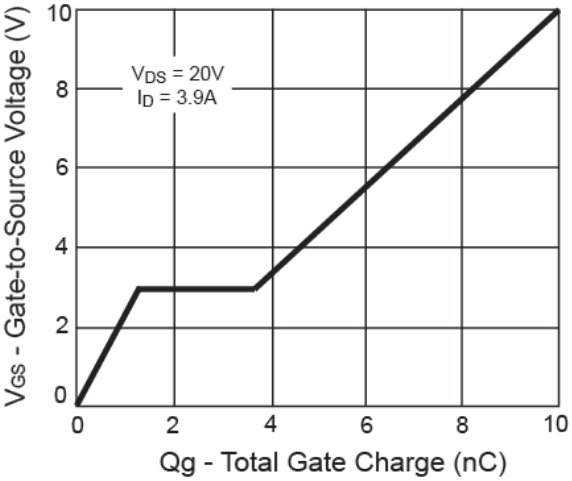
Transfer Characteristics



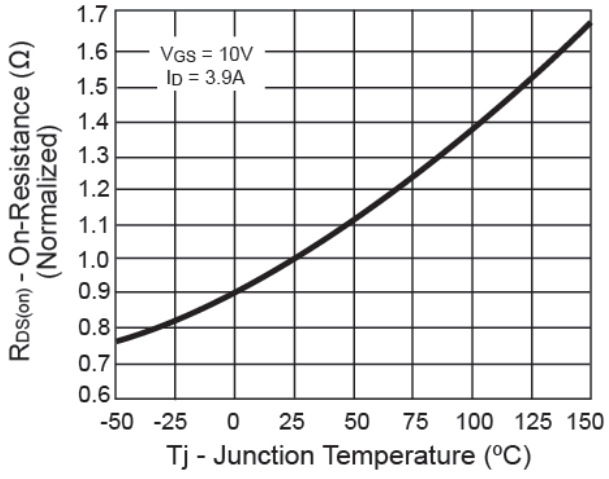
On-Resistance vs. Drain Current



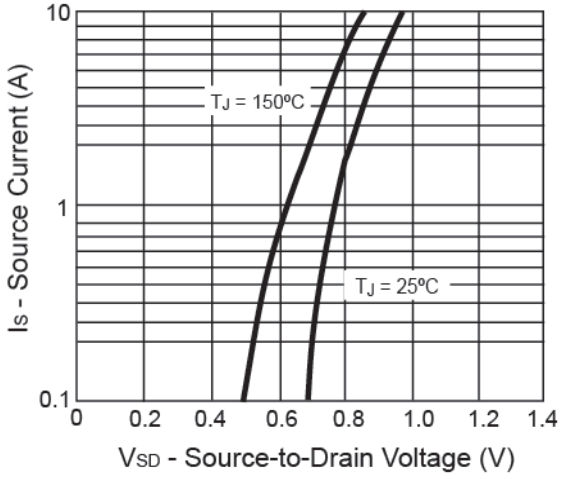
Gate Charge



On-Resistance vs. Junction Temperature



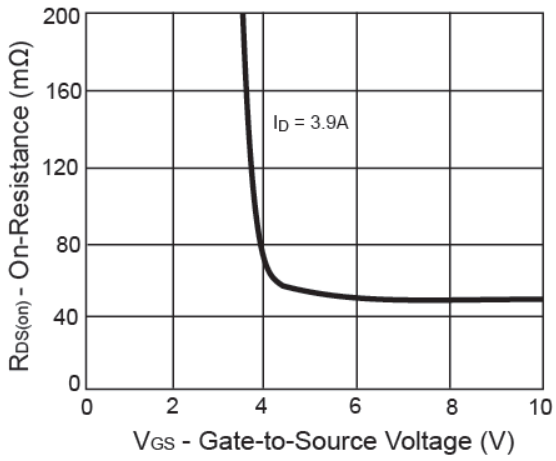
Source-Drain Diode Forward Voltage



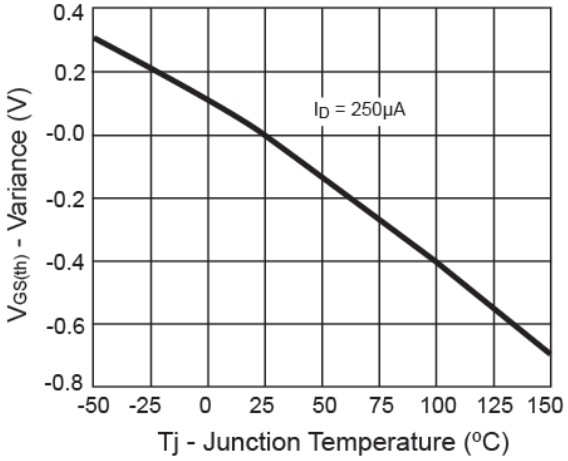
CHARACTERISTICS CURVES

(Tc = 25°C unless otherwise noted)

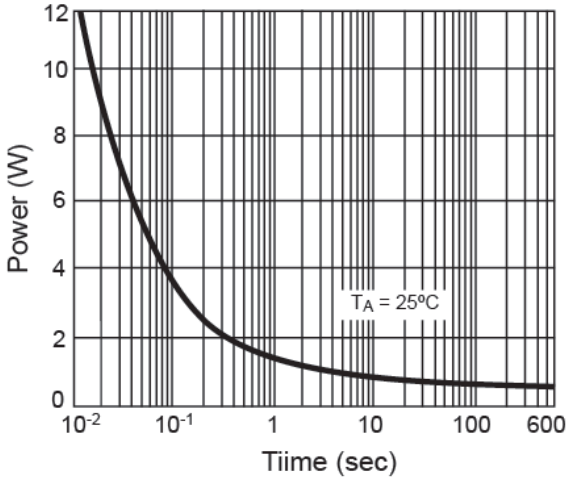
On-Resistance vs. Gate-Source Voltage



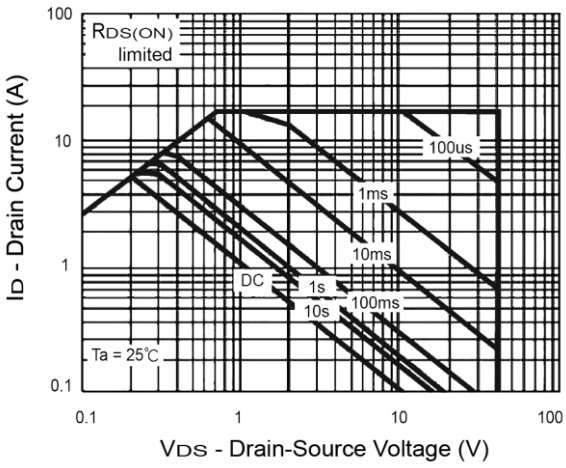
Threshold Voltage



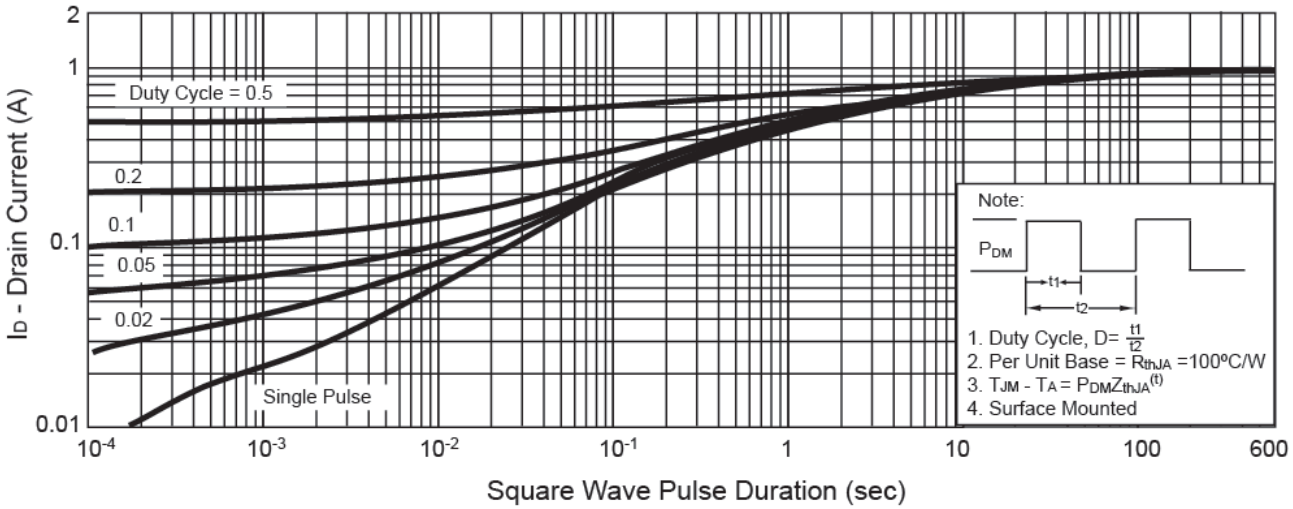
Single Pulse Power



Maximum Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient



PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

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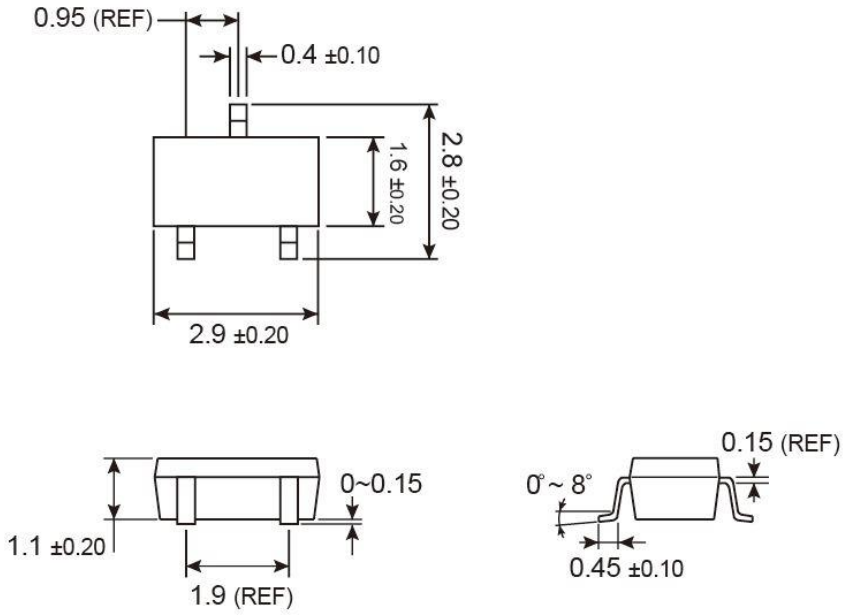
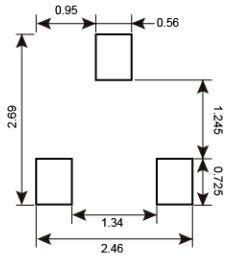
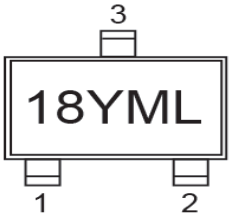


SUGGESTED PAD LAYOUT



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)

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