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With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

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## N-Channel Power MOSFET

40V, 3.9A, 45mΩ

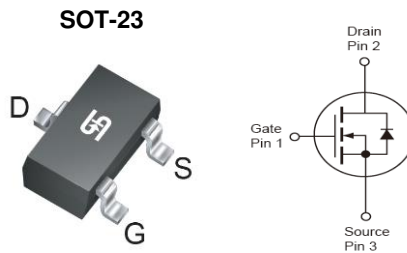
### FEATURES

- 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
	$V_{GS} = 4.5V$	62.5
$Q_g$	10	nC



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

ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ C$ unless otherwise noted)			
PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	$V_{DS}$	40	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current <sup>(Note 1)</sup>	$I_D$	3.9	A
Pulsed Drain Current <sup>(Note 2)</sup>	$I_{DM}$	16	A
Total Power Dissipation @ $T_A = 25^\circ C$	$P_{DTOT}$	1.25	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	- 55 to +150	$^\circ C$

THERMAL PERFORMANCE			
PARAMETER	SYMBOL	LIMIT	UNIT
Junction to Case Thermal Resistance	$R_{\theta JC}$	50	$^\circ C/W$
Junction to Ambient Thermal Resistance	$R_{\theta JA}$	100	$^\circ C/W$

**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.

<b>ELECTRICAL SPECIFICATIONS</b> ( $T_A = 25^\circ\text{C}$ unless otherwise noted)						
PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNIT
<b>Static</b> (Note 3)						
Drain-Source Breakdown Voltage	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$	$BV_{DSS}$	40	--	--	V
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	$V_{GS(TH)}$	1	--	3	V
Gate Body Leakage	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$	$I_{GSS}$	--	--	$\pm 100$	nA
Zero Gate Voltage Drain Current	$V_{DS} = 32\text{V}, V_{GS} = 0\text{V}$	$I_{DSS}$	--	--	1.0	$\mu\text{A}$
Drain-Source On-State Resistance	$V_{GS} = 10\text{V}, I_D = 3.9\text{A}$	$R_{DS(on)}$	--	36	45	m $\Omega$
	$V_{GS} = 4.5\text{V}, I_D = 3.5\text{A}$		--	50	62.5	
<b>Dynamic</b> (Note 4)						
Total Gate Charge	$V_{DS} = 20\text{V}, I_D = 3.9\text{A},$ $V_{GS} = 10\text{V}$	$Q_g$	--	10	--	nC
Gate-Source Charge		$Q_{gs}$	--	1.6	--	
Gate-Drain Charge		$Q_{gd}$	--	2.1	--	
Input Capacitance	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V},$ $f = 1.0\text{MHz}$	$C_{iss}$	--	540	--	pF
Output Capacitance		$C_{oss}$	--	80	--	
Reverse Transfer Capacitance		$C_{rss}$	--	45	--	
<b>Switching</b> (Note 5)						
Turn-On Delay Time	$V_{DD} = 20\text{V}, R_L = 20\Omega,$ $I_D = 1\text{A}, V_{GEN} = 10\text{V},$ $R_G = 6\Omega$	$t_{d(on)}$	--	5	--	ns
Turn-On Rise Time		$t_r$	--	12	--	
Turn-Off Delay Time		$t_{d(off)}$	--	20	--	
Turn-Off Fall Time		$t_f$	--	15	--	
<b>Source-Drain Diode</b> (Note 3)						
Forward On Voltage	$I_S = 1.25\text{A}, V_{GS} = 0\text{V}$	$V_{SD}$	--	0.8	1.2	V

**Notes:**

1. Current limited by package
2. Pulse width limited by the maximum junction temperature
3. Pulse test:  $PW \leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$
4. For DESIGN AID ONLY, not subject to production testing.
5. Switching time is essentially independent of operating temperature.

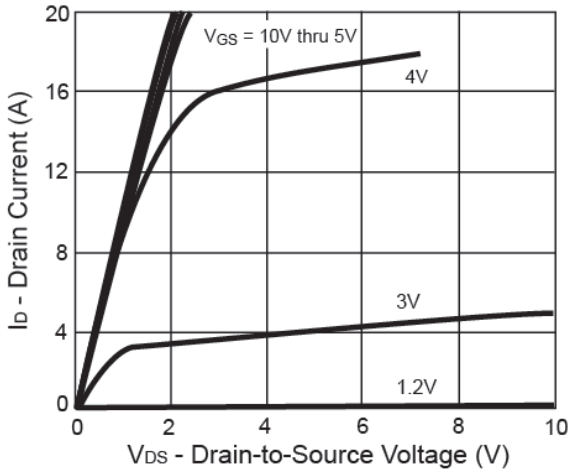
**ORDERING INFORMATION**

<b>PART NO.</b>	<b>PACKAGE</b>	<b>PACKING</b>
TSM2318CX RFG	SOT-23	3,000pcs / 7" Reel

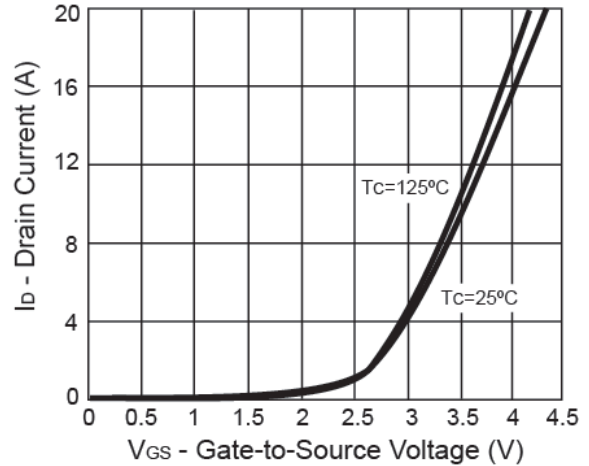
**CHARACTERISTICS CURVES**

( $T_C = 25^\circ\text{C}$  unless otherwise noted)

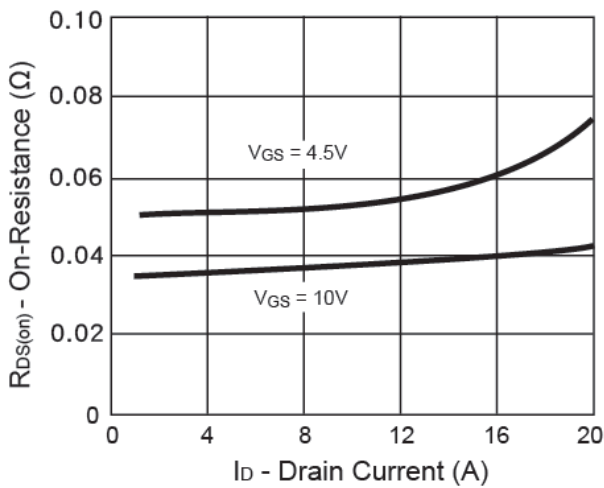
**Output Characteristics**



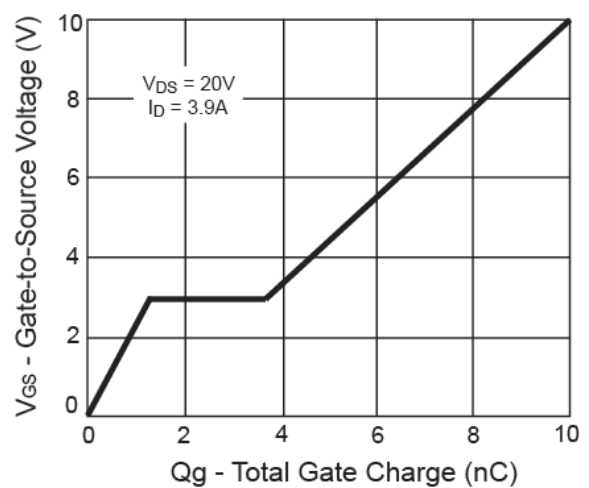
**Transfer Characteristics**



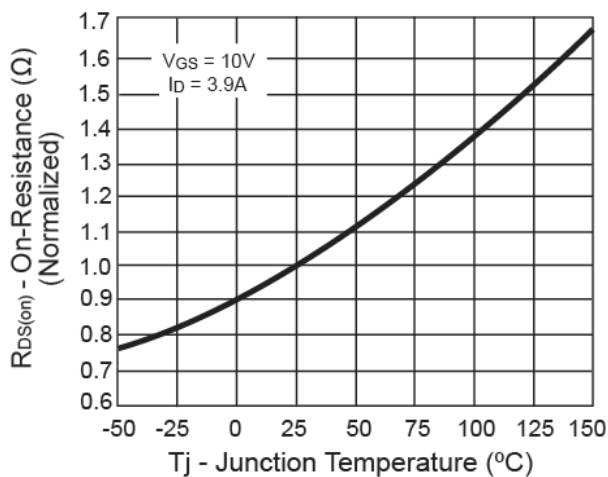
**On-Resistance vs. Drain Current**



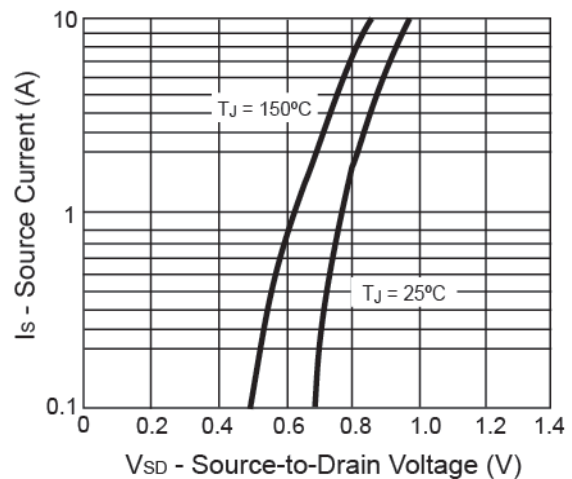
**Gate Charge**



**On-Resistance vs. Junction Temperature**



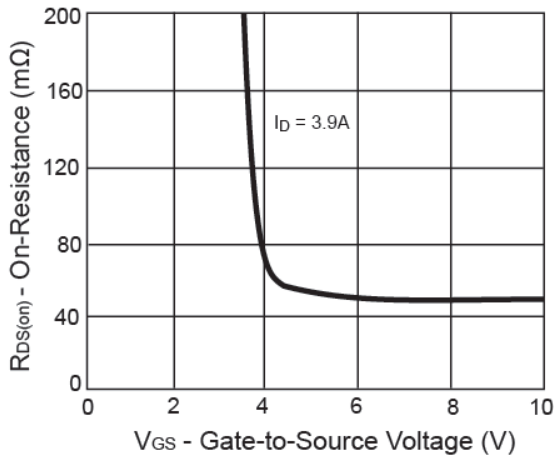
**Source-Drain Diode Forward Voltage**



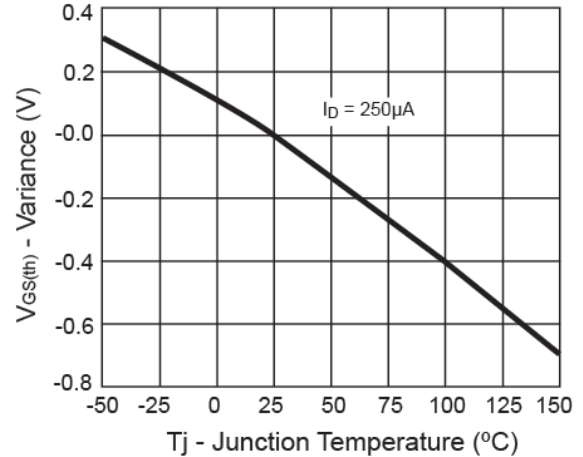
**CHARACTERISTICS CURVES**

(Tc = 25°C unless otherwise noted)

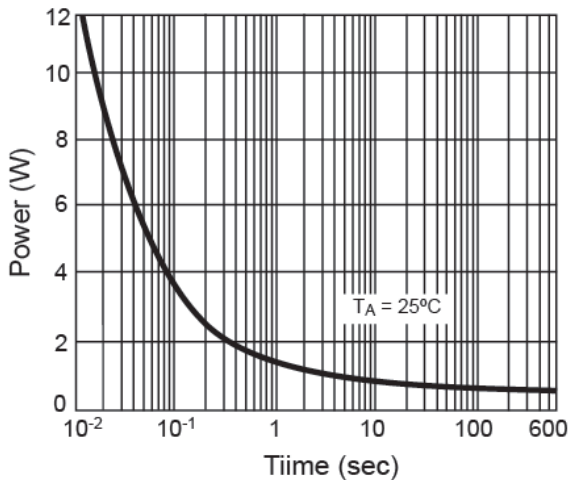
**On-Resistance vs. Gate-Source Voltage**



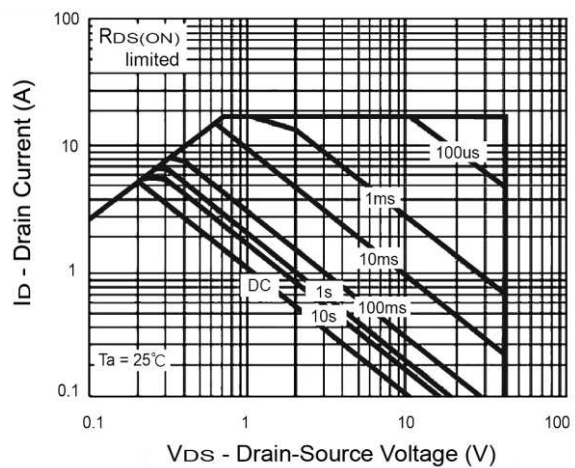
**Threshold Voltage**



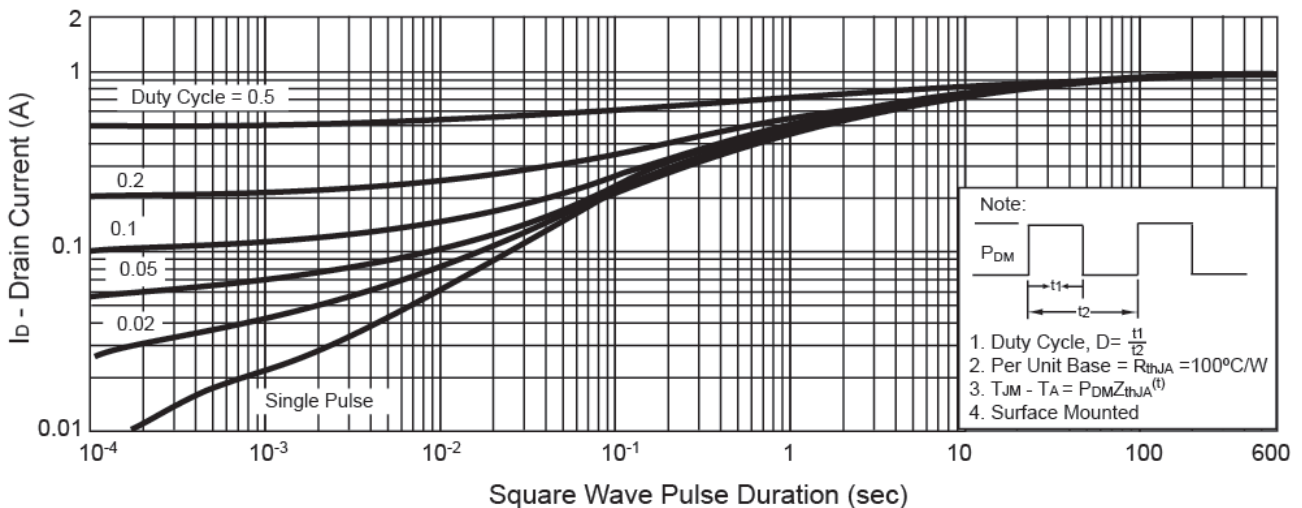
**Single Pulse Power**



**Maximum Safe Operating Area**

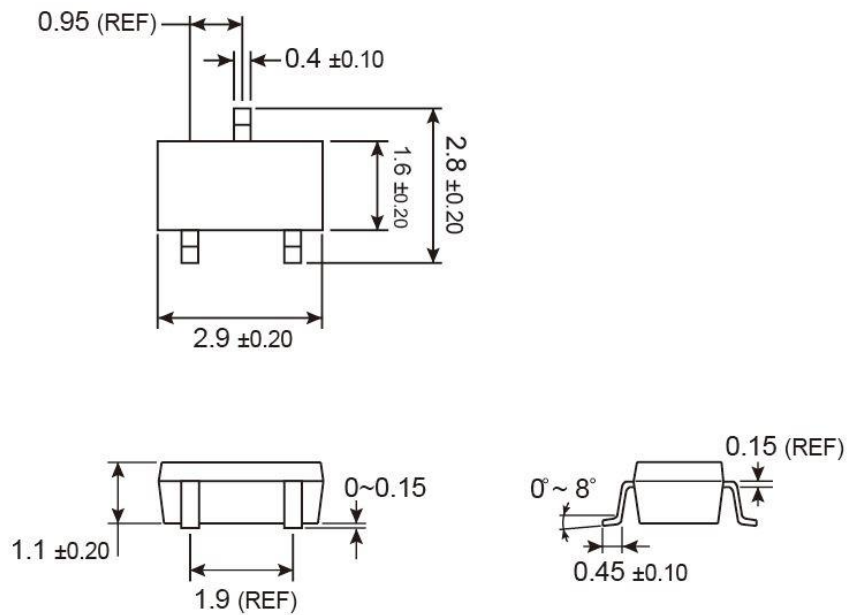


**Normalized Thermal Transient Impedance, Junction-to-Ambient**

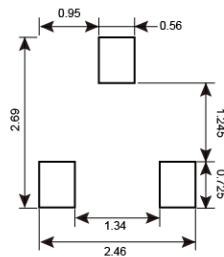


**PACKAGE OUTLINE DIMENSIONS** (Unit: Millimeters)

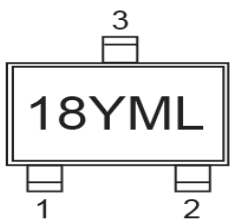
**SOT-23**



**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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