N-Channel Power MOSFET

60V, 300mA, 2Ω

FEATURES

- Low On-Resistance
- ESD Protected 2KV
- High Speed Switching
- Low Voltage Drive

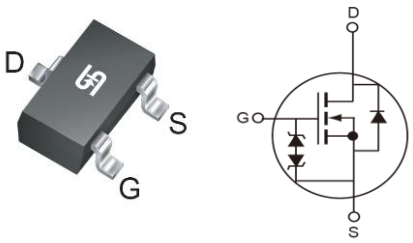
APPLICATION

- Logic Level translators
- DC-DC Converter

KEY PERFORMANCE PARAMETERS			
PARAMETER		**VALUE**	**UNIT**
V_{DS}		60	V
$R_{DS(on)}$ (max)	V_{GS} = 10V	2	Ω
	V_{GS} = 4.5V	4	
Q_g		0.4	nC

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}	60	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current (Note 1)	T_A = 25°C	I_D	300	mA
	T_A = 100°C		180	
Pulsed Drain Current (Note 2)		I_{DM}	800	mA
Total Power Dissipation @ T_A = 25°C		P_{DTOT}	300	mW
Single Pulsed Avalanche Energy (Note 3)		E_{AS}	0.2	mJ
Single Pulsed Avalanche Current (Note 3)		I_{AS}	2	A
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	$R_{\Theta JA}$	350	°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 4)						
Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 10μA	BV_{DSS}	60	--	--	V
Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	$V_{GS(TH)}$	1.0	1.5	2.5	V
Gate Body Leakage	V_{GS} =±20V, V_{DS} =0V	I_{GSS}	--	--	±10	μA
Zero Gate Voltage Drain Current	V_{DS} =60V, V_{GS} =0V	I_{DSS}	--	--	1.0	μA
Drain-Source On-State Resistance	V_{GS} =10V, I_D =300mA	$R_{DS(ON)}$	--	1.2	2	Ω
	V_{GS} =4.5V, I_D =200mA		--	2	4	
Forward Transconductance	V_{DS} =10V, I_D =200mA	g_{fs}	100	--	--	mS
Diode Forward Voltage	I_S =300mA, V_{GS} =0V	V_{SD}	--	0.8	1.4	V
Dynamic (Note 5)						
Total Gate Charge	V_{DS} =10V, I_D = 250mA, V_{GS} =4.5V	Q_g	--	0.4	0.6	nC
Input Capacitance	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz	C_{iss}	--	30	--	pF
Output Capacitance		C_{oss}	--	6	--	
Reverse Transfer Capacitance		C_{rss}	--	2.5	--	
Gate Resistance	F = 1MHz, open drain	R_g	--	70	--	Ω
Switching (Note 6)						
Turn-On Delay Time	V_{DD} =30V, R_G =10Ω I_D =200mA, V_{GEN} =10V,	$t_{d(on)}$	--	25	--	ns
Turn-Off Delay Time		$t_{d(off)}$	--	35	--	
Source-Drain Diode (Note 4)						
Diode Forward Voltage	I_S =300mA, V_{GS} =0V	V_{SD}	--	0.8	1.4	
Reverse Recovery Time	I_S = 0.5A dI$_F$/dt = 100A/μs	t_{rr}	--	40	--	ns
Reverse Recovery Charge		Q_{rr}	--	39	--	nC

Notes:

1. Current limited by package
2. Pulse width limited by the maximum junction temperature
3. L = 0.1mH, I_{AS} = 2A, V_{DD} = 25V, R_G = 25Ω, Starting T_J = 25°C
4. Pulse test: PW ≤ 300μs, duty cycle ≤ 2%
5. For DESIGN AID ONLY, not subject to production testing.
6. Switching time is essentially independent of operating temperature.

ORDERING INFORMATION

PART NO.	PACKAGE	PACKING
TSM2N7002KCX RFG	SOT-23	3,000pcs / 7” Reel

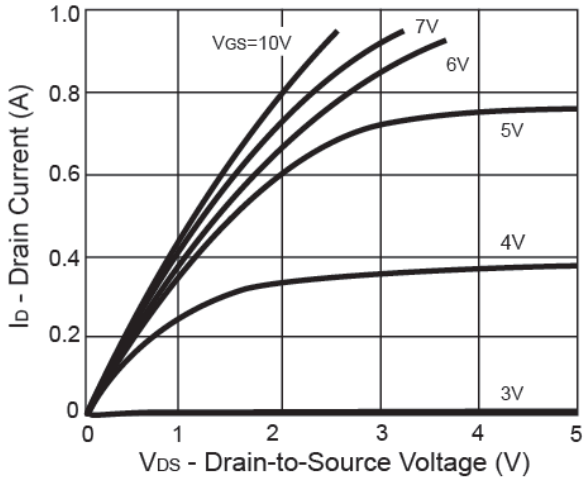
Note:

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

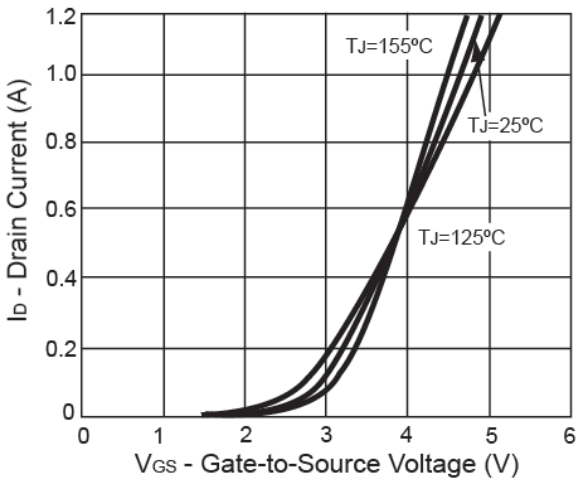
CHARACTERISTICS CURVES

(T_C = 25°C unless otherwise noted)

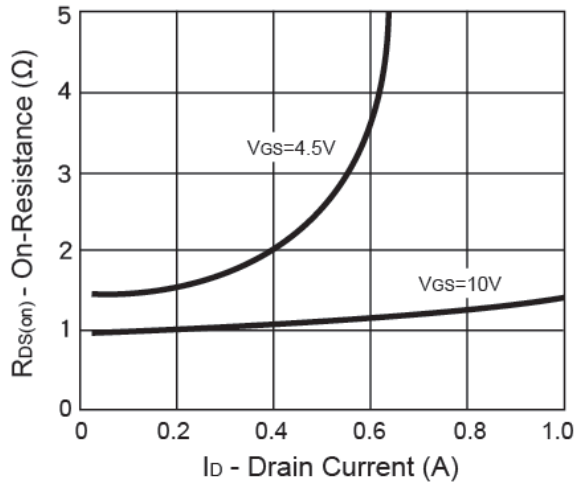
Output Characteristics



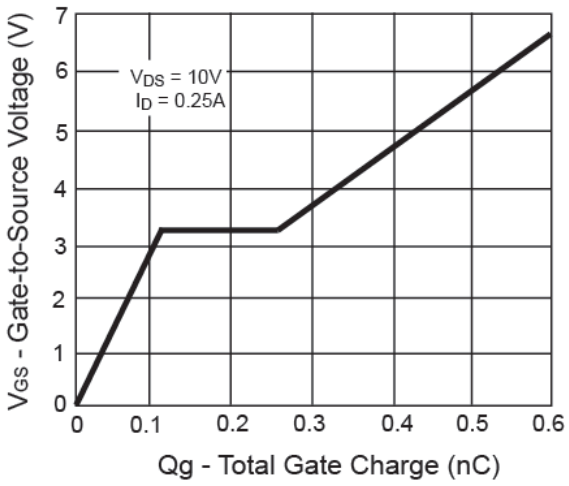
Transfer Characteristics



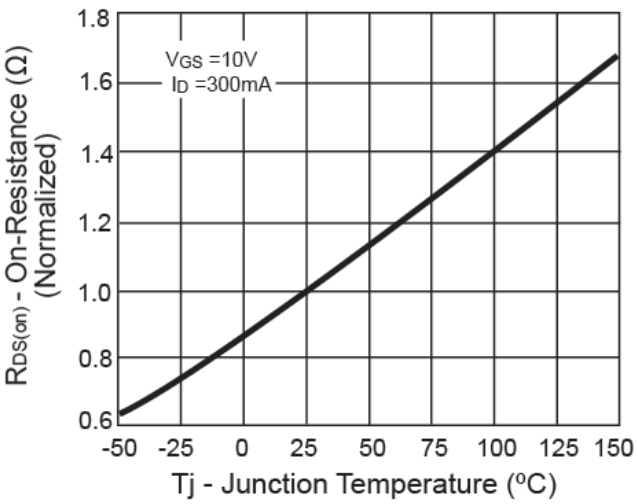
On-Resistance vs. Drain Current



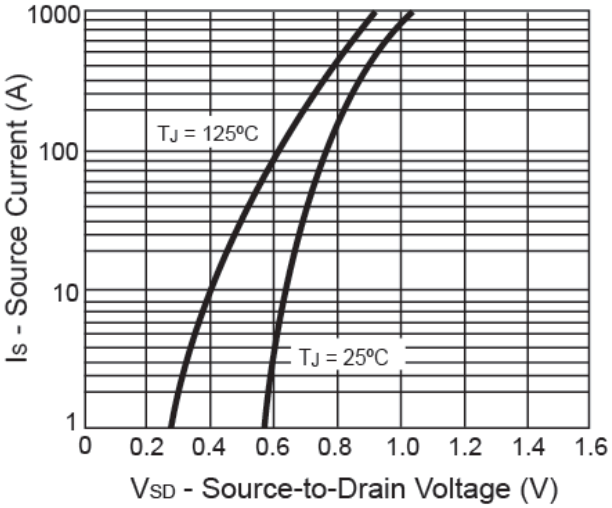
Gate Charge



On-Resistance vs. Junction Temperature



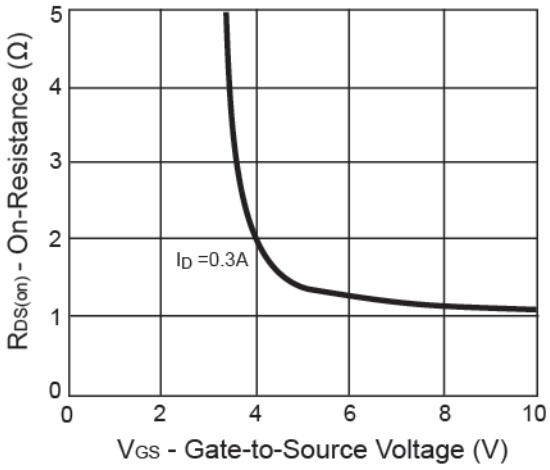
Source-Drain Diode Forward Voltage



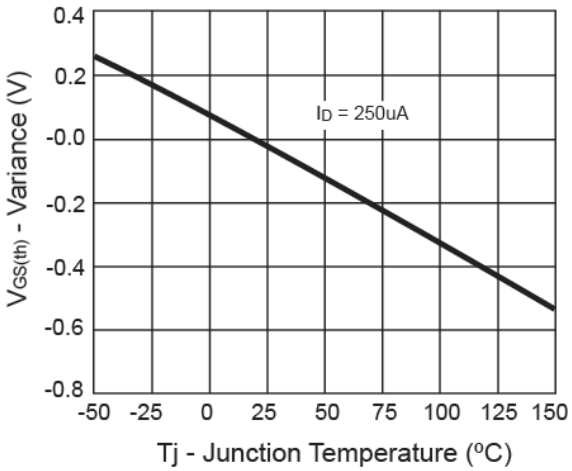
CHARACTERISTICS CURVES

(T_C = 25°C unless otherwise noted)

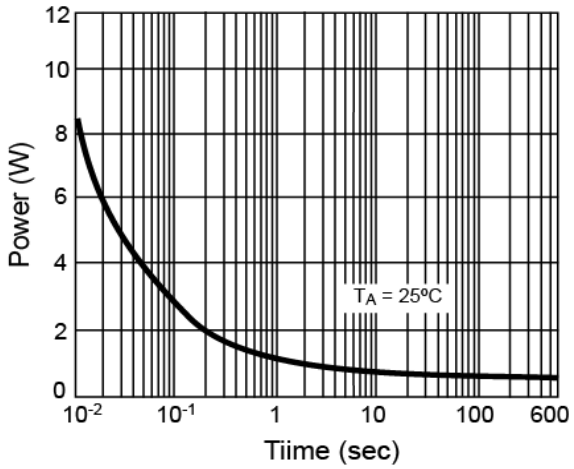
On-Resistance vs. Gate-Source Voltage



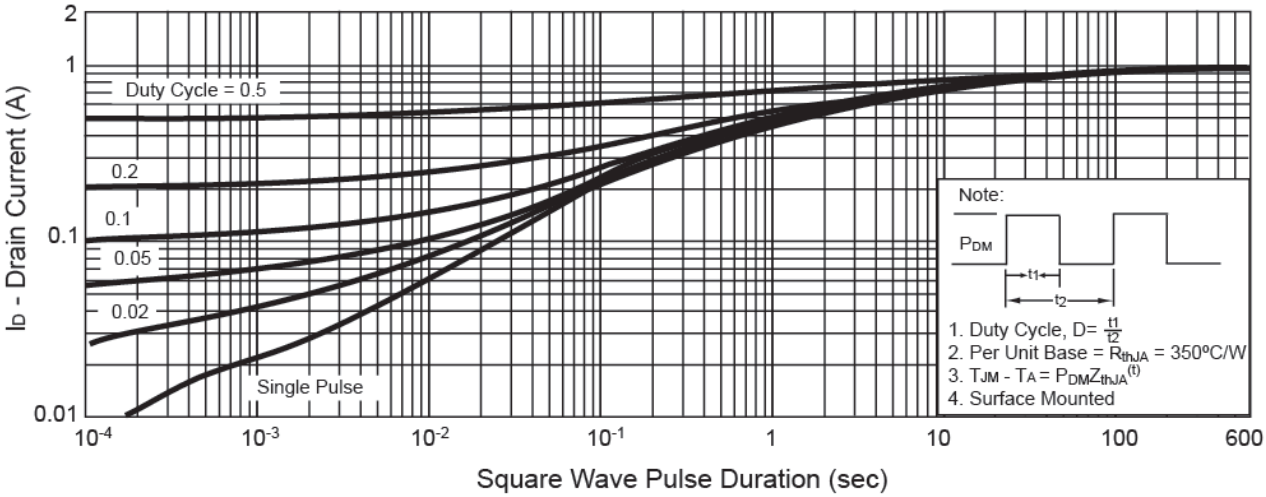
Threshold Voltage



Single Pulse Power

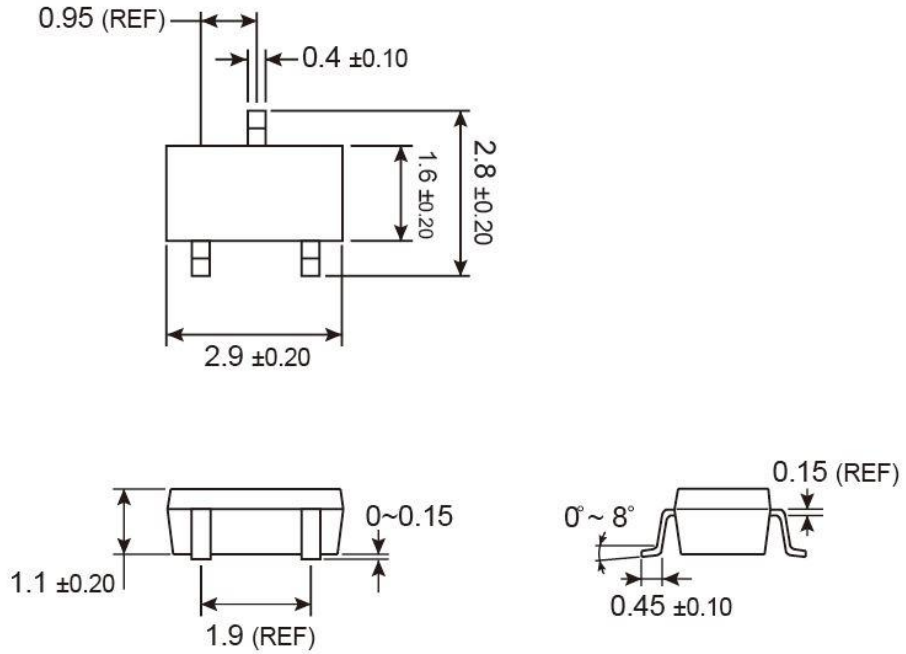


Normalized Thermal Transient Impedance, Junction-to-Ambient

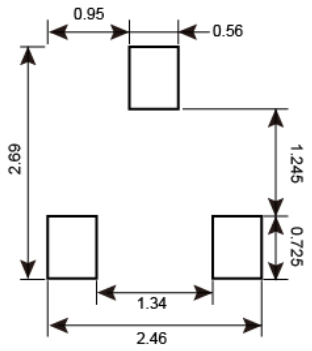


PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

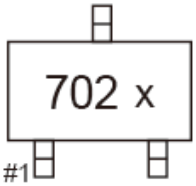
SOT-23



SUGGESTED PAD LAYOUT (Unit: Millimeters)



MARKING DIAGRAM



702 = TSM2N7002KCX Device Code
X = Internal Code

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