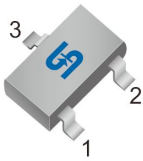


SOT-23



SOT-323



**Pin Definition:**

1. Gate
2. Source
3. Drain

**PRODUCT SUMMARY**

V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (max)	I <sub>D</sub> (mA)
60	2 @ V <sub>GS</sub> = 10V	300
	4 @ V <sub>GS</sub> = 4.5V	200

**Features**

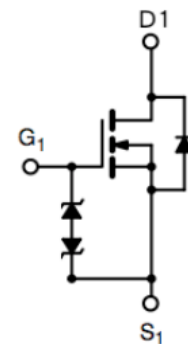
- Low On-Resistance
- ESD Protected 2KV
- High Speed Switching
- Low Voltage Drive

**Ordering Information**

Part No.	Package	Packing
TSM2N7002KCX RFG	SOT-23	3Kpcs / 7" Reel
TSM2N7002KCU RFG	SOT-323	3Kpcs / 7" Reel

**Note:** "G" denotes for Halogen Free

**Block Diagram**



N-Channel MOSFET

**Absolute Maximum Rating** (Ta = 25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V <sub>DS</sub>	60	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Drain Current	Continuous @ T <sub>A</sub> =25°C	I <sub>D</sub>	300
	Pulsed	I <sub>DM</sub>	800
Drain Reverse Current	Continuous @ T <sub>A</sub> =25°C	I <sub>DR</sub>	300
	Pulsed	I <sub>DMR</sub>	800
Maximum Power Dissipation	P <sub>D</sub>	300	mW
Operating Junction Temperature	T <sub>J</sub>	+150	°C
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**Thermal Performance**

Parameter	Symbol	Limit	Unit
Lead Temperature (1/8" from case)	T <sub>L</sub>	5	S
Junction to Ambient Thermal Resistance (PCB mounted)	R <sub>θJA</sub>	350	°C/W

**Notes:**

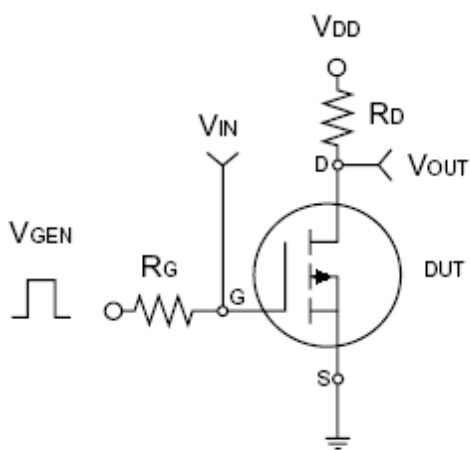
- a. Pulse width ≤300us, Duty cycle ≤2%
- b. When the device is mounted on a glass epoxy board with area measuring 1 x 0.75 x 0.62 inch.
- c. The power dissipation of the package may result in a continuous drain current.

### Electrical Specifications (Ta = 25°C, unless otherwise noted)

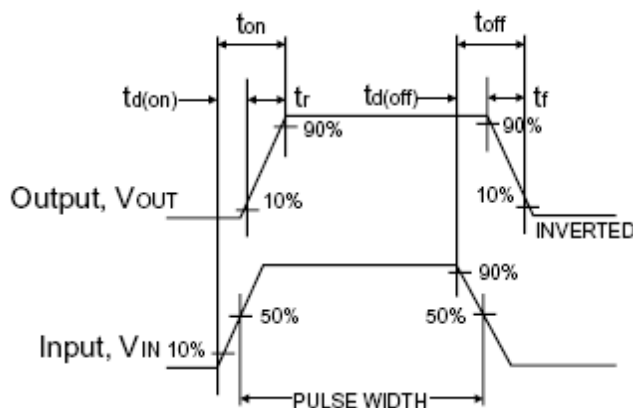
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	$BV_{DSS}$	60	--	--	V
Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	$V_{GS(TH)}$	1.0	1.5	2.5	V
Gate Body Leakage	$V_{GS}=\pm 20V, V_{DS}=0V$	$I_{GSS}$	--	--	$\pm 10$	$\mu A$
Zero Gate Voltage Drain Current	$V_{DS}=60V, V_{GS}=0V$	$I_{DSS}$	--	--	1.0	$\mu A$
Drain-Source On-State Resistance	$V_{GS}=10V, I_D=300mA$	$R_{DS(ON)}$	--	1.2	2	$\Omega$
	$V_{GS}=4.5V, I_D=200mA$		--	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
<b>Dynamic<sup>b</sup></b>						
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	--	
<b>Switching<sup>c</sup></b>						
Turn-On Delay Time	$V_{DD}=30V, R_G=10\Omega$	$t_{d(on)}$	--	--	25	nS
Turn-Off Delay Time	$I_D=200mA, V_{GEN}=10V,$	$t_{d(off)}$	--	--	35	

#### Notes:

- a. pulse test: PW  $\leq 300\mu s$ , duty cycle  $\leq 2\%$
- b. For DESIGN AID ONLY, not subject to production testing.
- c. Switching time is essentially independent of operating temperature.



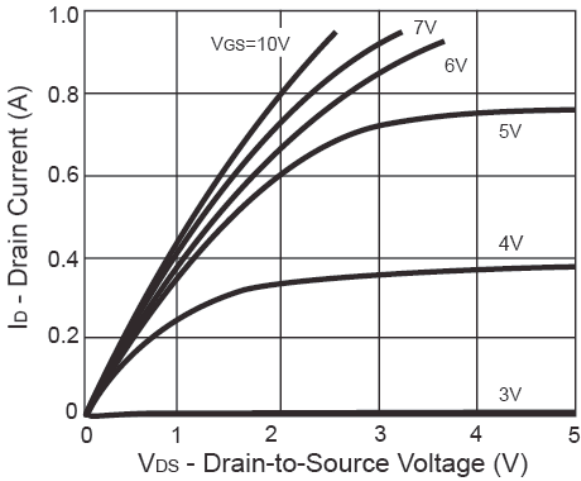
Switching Test Circuit



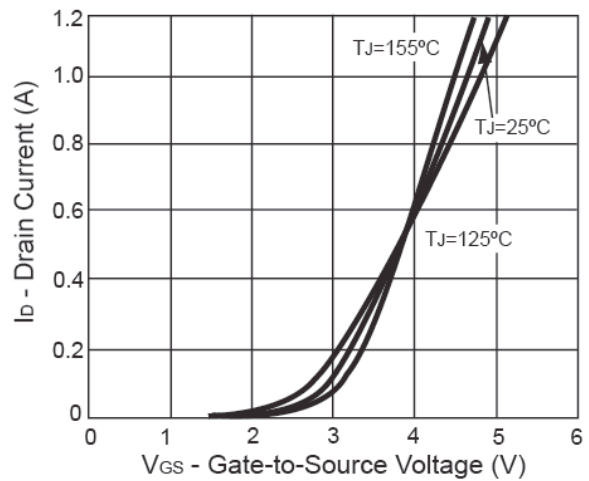
Switchin Waveforms

**Electrical Characteristics Curve** (Ta = 25°C, unless otherwise noted)

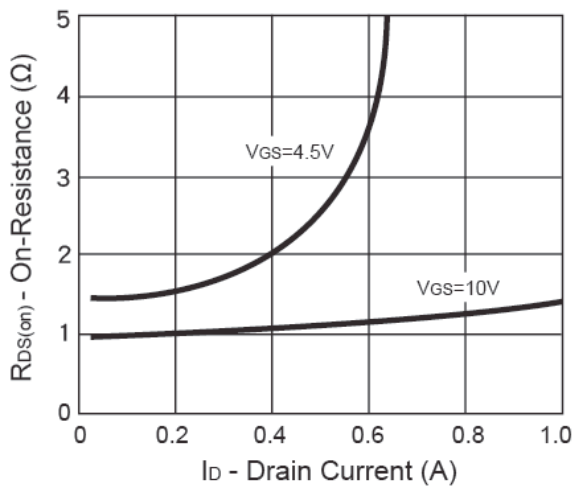
**Output Characteristics**



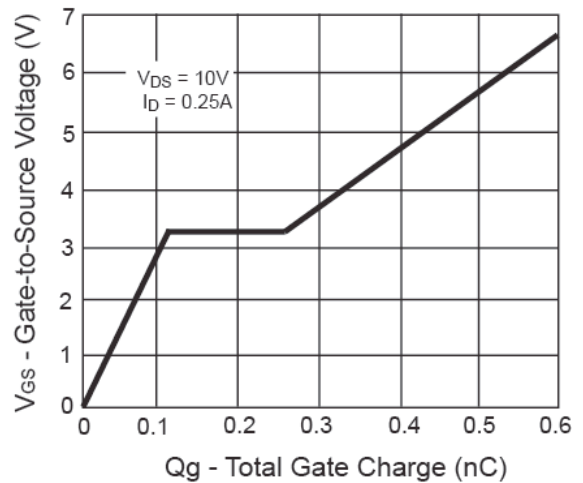
**Transfer Characteristics**



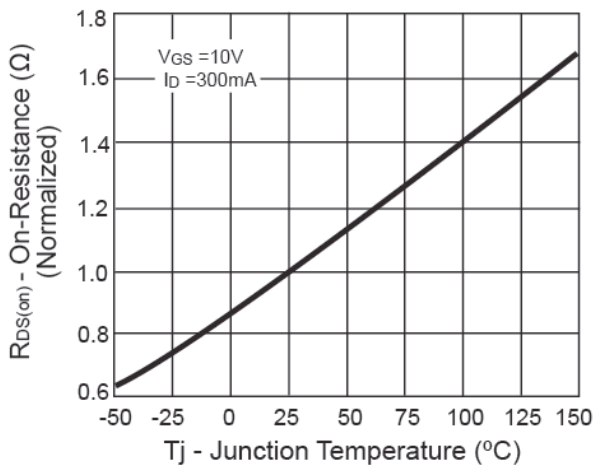
**On-Resistance vs. Drain Current**



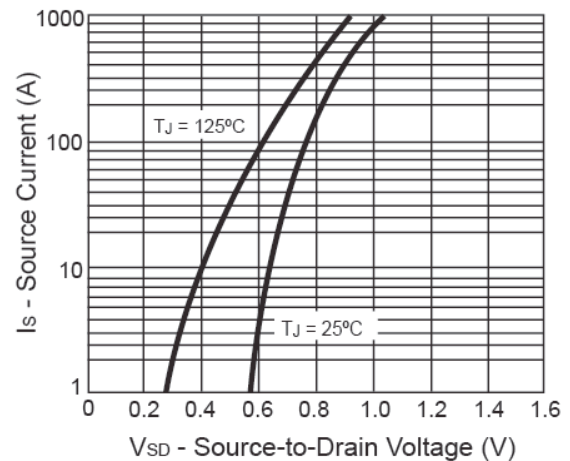
**Gate Charge**



**On-Resistance vs. Junction Temperature**

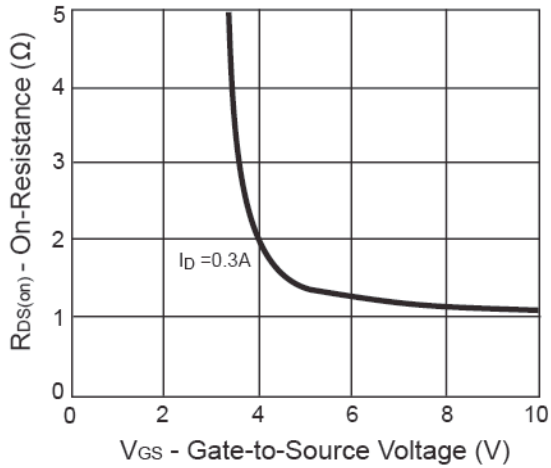


**Source-Drain Diode Forward Voltage**

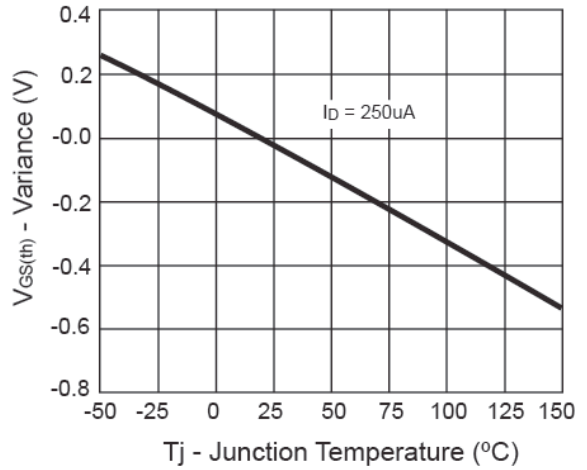


**Electrical Characteristics Curve** ( $T_a = 25^\circ\text{C}$ , unless otherwise noted)

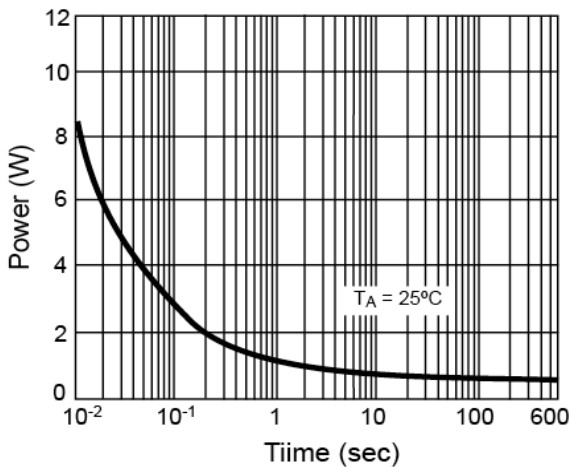
**On-Resistance vs. Gate-Source Voltage**



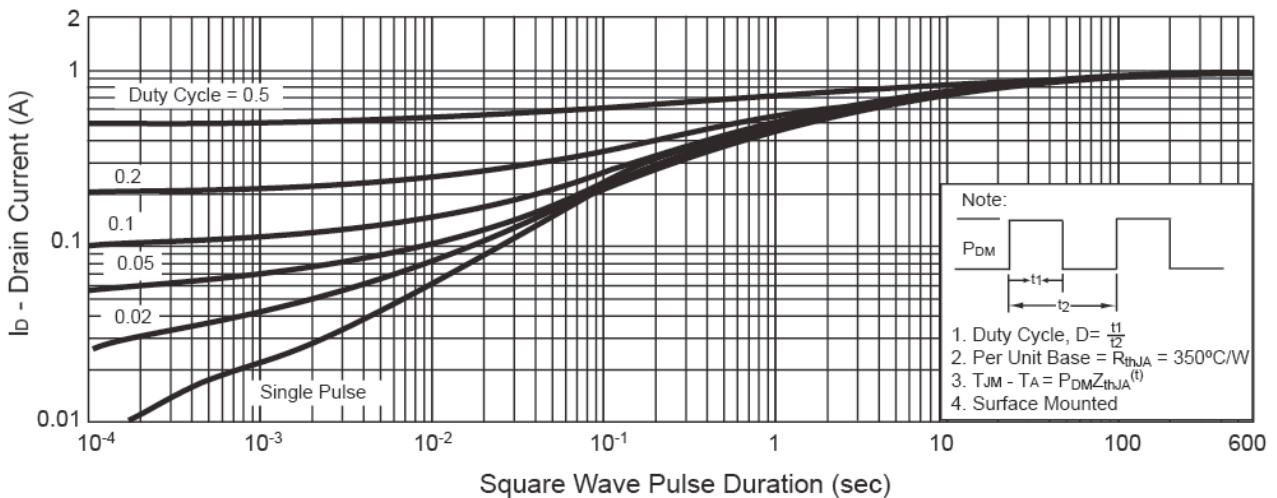
**Threshold Voltage**



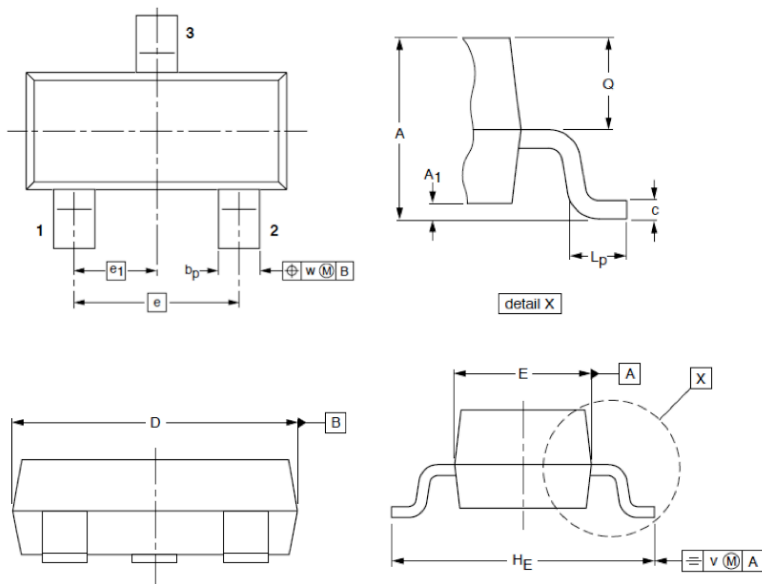
**Single Pulse Power**



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

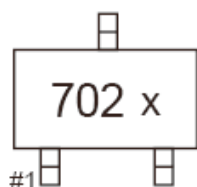


**SOT-23 Mechanical Drawing**



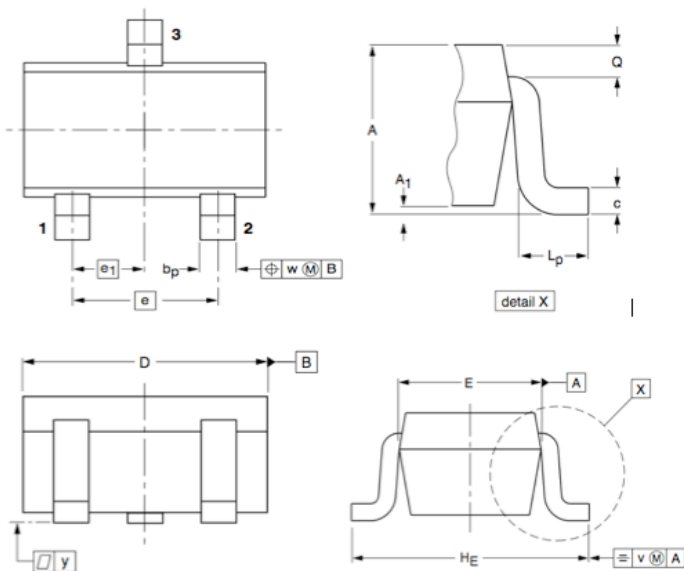
SOT-23 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX.
A	1.00 BSC		0.039 BSC	
A1	--	0.10	--	0.004
bp	0.37	0.42	0.014	0.016
C	0.09	0.15	0.004	0.005
D	2.80	3.00	0.110	0.118
E	1.20	1.40	0.047	0.055
e	1.9 BSC		0.075 BSC	
e1	0.95 BSC		0.037 BSC	
H <sub>E</sub>	2.35	2.45	0.093	0.096
L <sub>P</sub>	0.15	0.45	0.005	0.018
Q	0.45	0.55	0.018	0.022
V	0.2 BSC		0.007 BSC	
W	0.1 BSC		0.004 BSC	

**Marking Diagram**



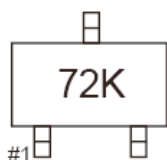
**702** = TSM2N7002KCX Device Code  
**x** = Internal Code

**SOT-323 Mechanical Drawing**



SOT-323 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.80	1.10	0.031	0.043
A1	--	0.10	--	0.004
bp	0.30	0.40	0.012	0.016
C	0.10	0.25	0.004	0.010
D	1.80	2.20	0.071	0.087
E	1.15	1.35	0.045	0.053
e	1.30 BSC		0.051 BSC	
e1	0.65 BSC		0.026 BSC	
HE	2.00	2.20	0.079	0.087
Lp	0.15	0.45	0.006	0.018
Q	0.20 BSC		0.007 BSC	
W	0.20 BSC		0.007 BSC	

**Marking Diagram**



**72K** = TSM2N7002KCU Device Code

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