

TSM2N7002K

60V N-Channel MOSFET

SOT-23

SOT-323

Pin Definition:

1. Gate
2. Source
3. Drain

PRODUCT SUMMARY

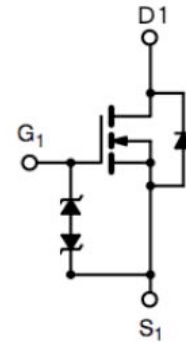
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (mA)
60	2 @ $V_{GS} = 10V$	300
	4 @ $V_{GS} = 4.5V$	200

Features

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

Ordering Information

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

Block Diagram


N-Channel MOSFET

Absolute Maximum Rating ($T_a = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current	Continuous @ $T_A = 25^\circ\text{C}$	I_D	300
	Pulsed	I_{DM}	800
Drain Reverse Current	Continuous @ $T_A = 25^\circ\text{C}$	I_{DR}	300
	Pulsed	I_{DMR}	800
Maximum Power Dissipation	P_D	300	mW
Operating Junction Temperature	T_J	+150	$^\circ\text{C}$
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

Thermal Performance

Parameter	Symbol	Limit	Unit
Lead Temperature (1/8" from case)	T_L	5	S
Junction to Ambient Thermal Resistance (PCB mounted)	$R_{\theta JA}$	350	$^\circ\text{C/W}$

Notes:

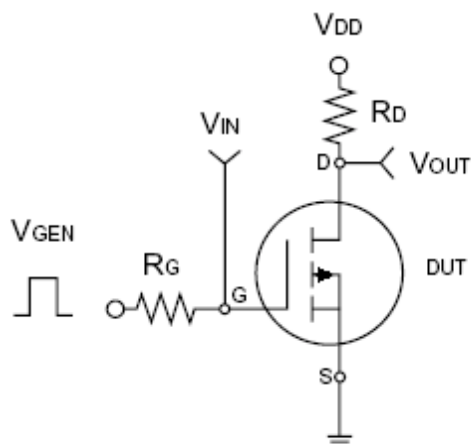
- a. Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$
- b. When the device is mounted on a glass epoxy board with area measuring 1 x 0.75 x 0.62 inch.
- c. The power dissipation of the package may result in a continuous drain current.

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

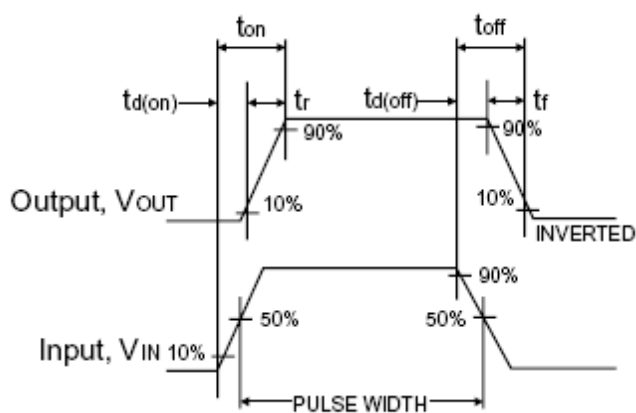
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	BV_{DSS}	60	--	--	V
Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	$V_{GS(TH)}$	1.0	1.5	2.5	V
Gate Body Leakage	$V_{GS}=\pm 20V, V_{DS}=0V$	I_{GSS}	--	--	± 10	μA
Zero Gate Voltage 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
	$V_{GS}=4.5V, I_D=100mA$		--	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 ^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	--	
Switching ^c						
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:

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



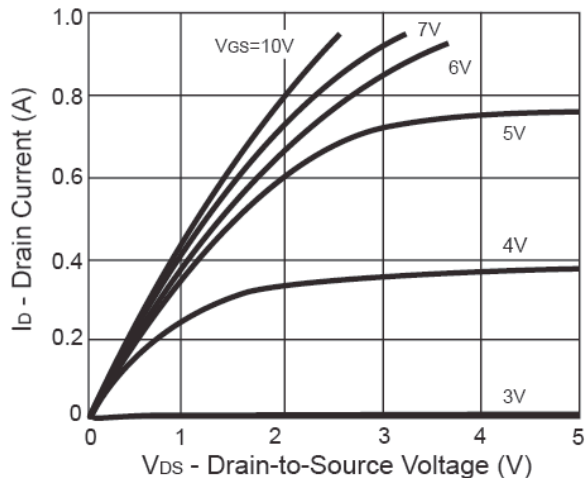
Switching Test Circuit



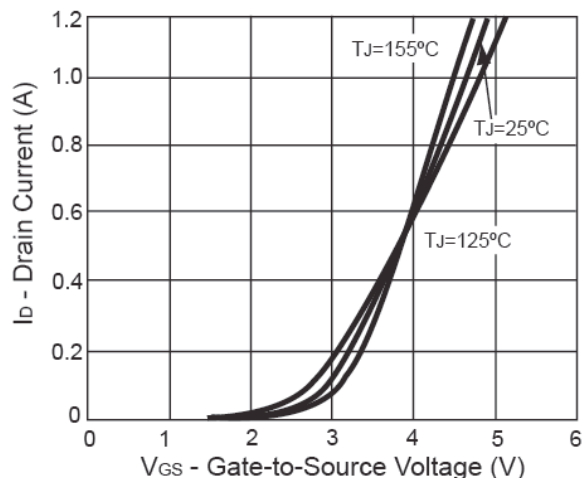
Switchin Waveforms

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

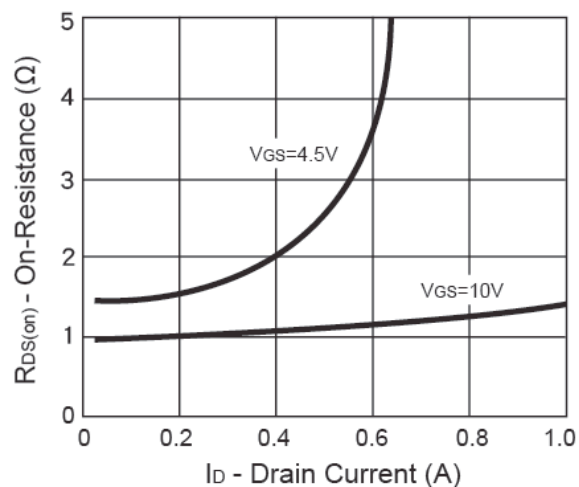
Output Characteristics



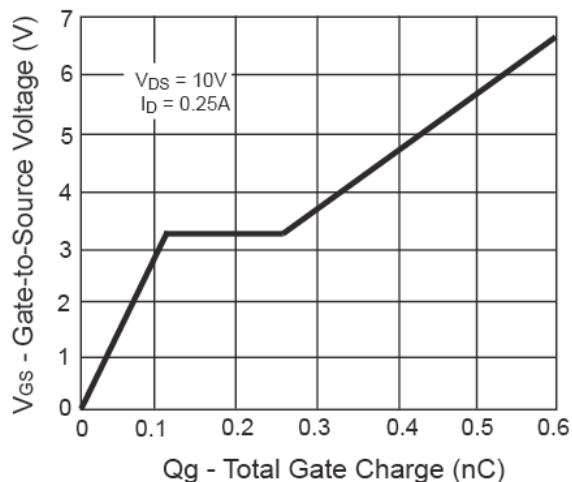
Transfer Characteristics



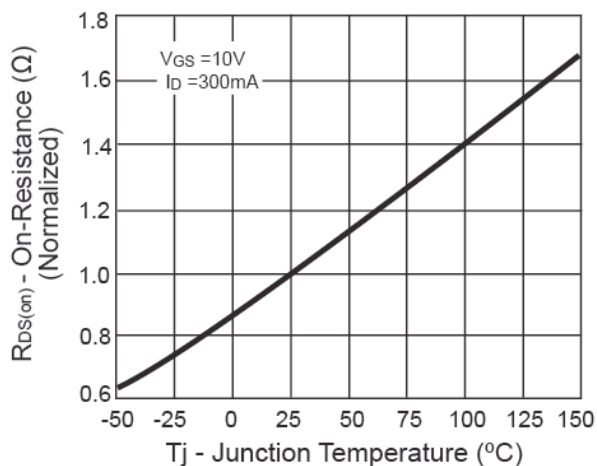
On-Resistance vs. Drain Current



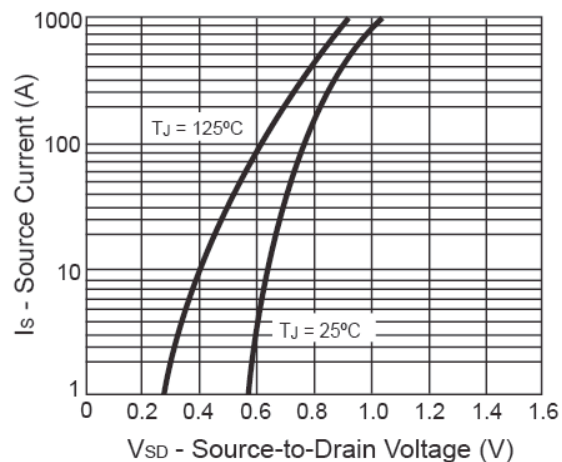
Gate Charge



On-Resistance vs. Junction Temperature

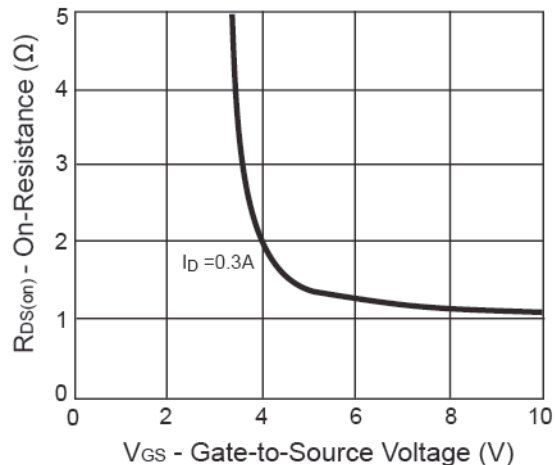


Source-Drain Diode Forward Voltage

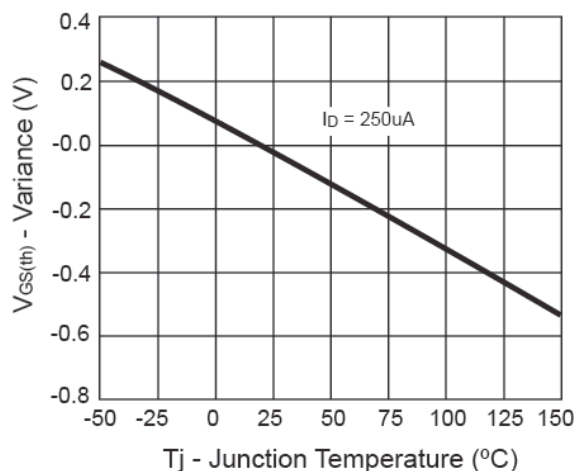


Electrical Characteristics Curve (Ta = 25°C, unless otherwise noted)

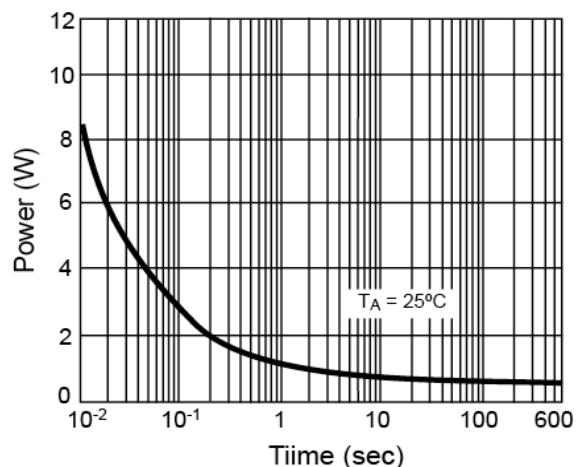
On-Resistance vs. Gate-Source Voltage



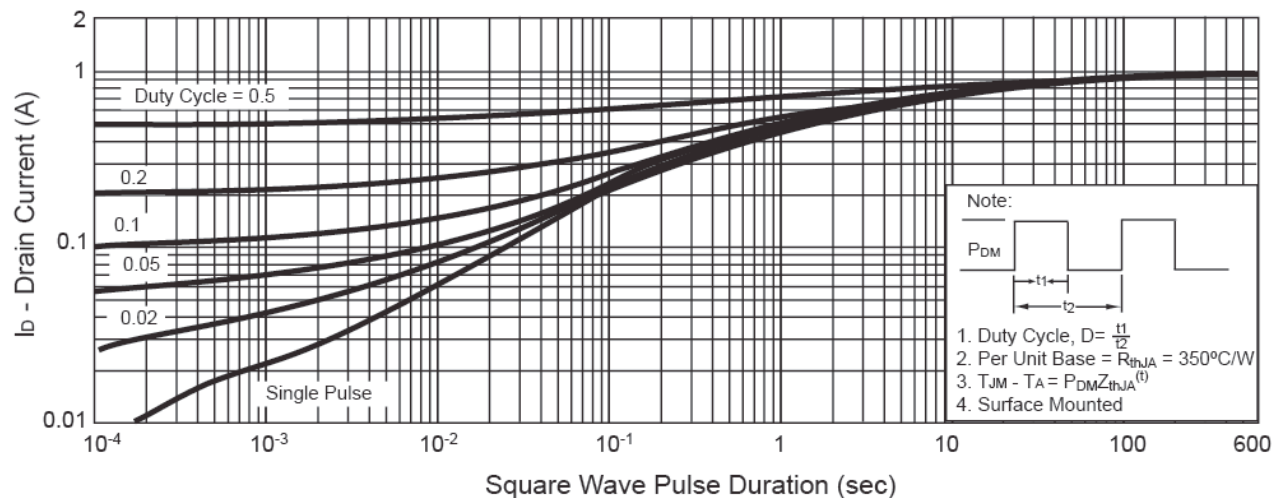
Threshold Voltage



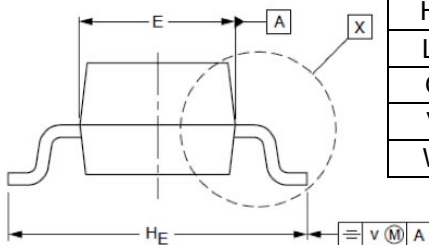
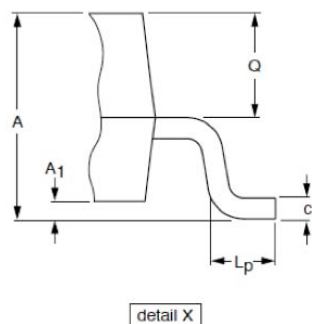
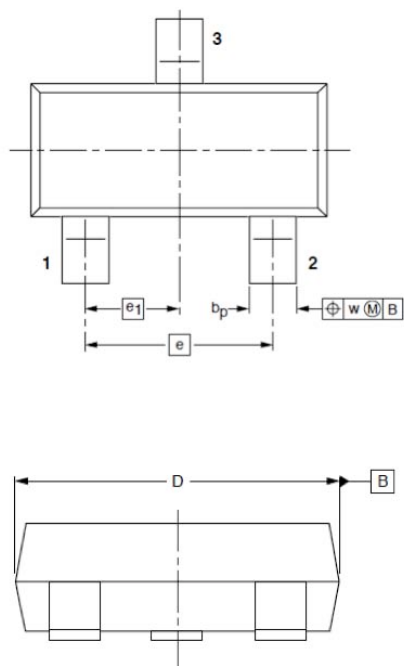
Single Pulse Power



Normalized Thermal Transient Impedance, Junction-to-Ambient

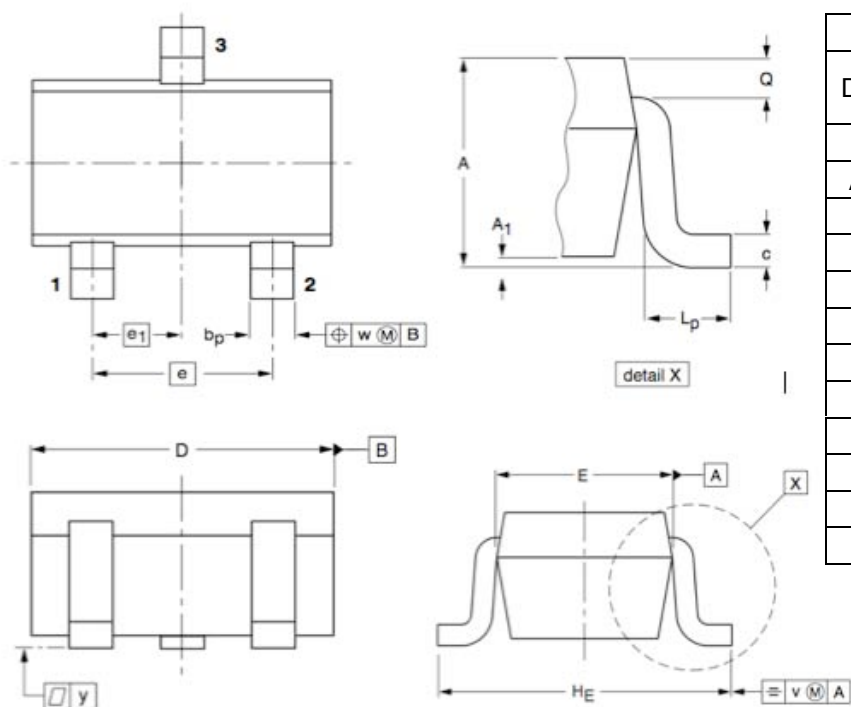


SOT-23 Mechanical Drawing



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	0.15	0.09	0.005	0.004
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 _E	2.35	2.45	0.093	0.096
L _P	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	

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	
H _E	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	

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