

**TO-92**

**Pin Definition:**

1. Source
2. Gate
3. Drain

**PRODUCT SUMMARY**

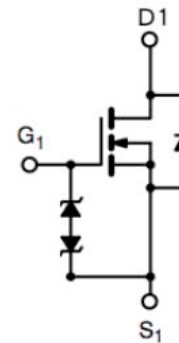
$V_{DS}$ (V)	$R_{DS(on)}$ ( $\Omega$ )	$I_D$ (mA)
60	5 @ $V_{GS} = 10V$	100
	5.5 @ $V_{GS} = 5V$	100

**Features**

- Low On-Resistance
- ESD Protection
- High Speed Switching
- Low Voltage Drive

**Ordering Information**

Part No.	Package	Packing
TSM2N7000KCT B0	TO-92	1Kpcs / Bulk
TSM2N7000KCT A3	TO-92	2Kpcs / Ammo

**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	$V_{GS}$	$\pm 20$	V
Drain Current	Continuous @ $T_A=25^\circ\text{C}$	$I_D$	300
	Pulsed	$I_{DM}$	700
Drain Reverse Current	Continuous @ $T_A=25^\circ\text{C}$	$I_{DR}$	300
	Pulsed	$I_{DMR}$	700
Maximum Power Dissipation	$P_D$	400	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)	$T_L$	10	S
Junction to Ambient Thermal Resistance (PCB mounted)	$R\theta_{JA}$	357	$^\circ\text{C/W}$

**Notes:**

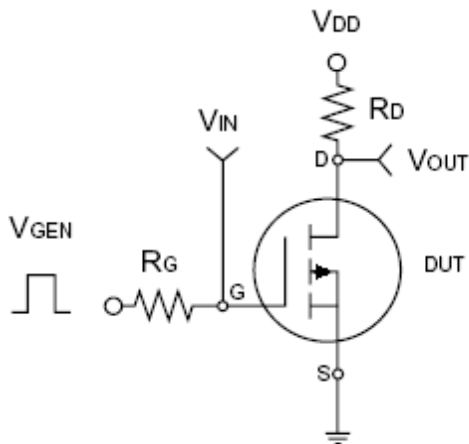
- a. Pulse width limited by the Maximum junction temperature
- b. Surface Mounted on FR4 Board,  $t \leq 5$  sec.

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

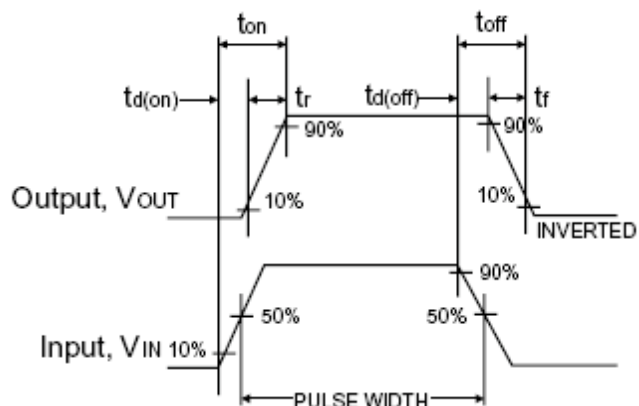
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>GS</sub> = 0V, I <sub>D</sub> = 10μA	BV <sub>DSS</sub>	60	--	--	V
Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	V <sub>GS(TH)</sub>	1.0	--	2.5	V
Gate Body Leakage	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V	I <sub>GSS</sub>	--	--	±10	μA
Zero Gate Voltage Drain Current	V <sub>DS</sub> = 60V, V <sub>GS</sub> = 0V	I <sub>DSS</sub>	--	--	1.0	μA
Drain-Source On-State Resistance	V <sub>GS</sub> = 10V, I <sub>D</sub> = 100mA	R <sub>DS(ON)</sub>	--	3	5	Ω
	V <sub>GS</sub> = 5V, I <sub>D</sub> = 100mA		--	3.6	5.5	
Forward Transconductance	V <sub>DS</sub> = 10V, I <sub>D</sub> = 200mA	g <sub>fs</sub>	100	--	--	mS
Diode Forward Voltage	I <sub>S</sub> = 300mA, V <sub>GS</sub> = 0V	V <sub>SD</sub>	--	0.9	1.2	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	V <sub>DS</sub> = 10V, I <sub>D</sub> = 250mA, V <sub>GS</sub> = 4.5V	Q <sub>g</sub>	--	0.4	--	nC
Input Capacitance	V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V, f = 1.0MHz	C <sub>iss</sub>	--	7.32	--	pF
Output Capacitance		C <sub>oss</sub>	--	3.42	--	
Reverse Transfer Capacitance		C <sub>rss</sub>	--	7.63	--	
<b>Switching<sup>c</sup></b>						
Turn-On Delay Time	V <sub>DD</sub> = 30V, R <sub>G</sub> = 10Ω	t <sub>d(on)</sub>	--	25	--	nS
Turn-Off Delay Time	I <sub>D</sub> = 100mA, V <sub>GEN</sub> = 10V,	t <sub>d(off)</sub>	--	35	--	

Notes:

- a. pulse test: PW ≤ 300μs, duty cycle ≤ 2%
- b. For DESIGN AID ONLY, not subject to production testing.
- b. Switching time is essentially independent of operating temperature.



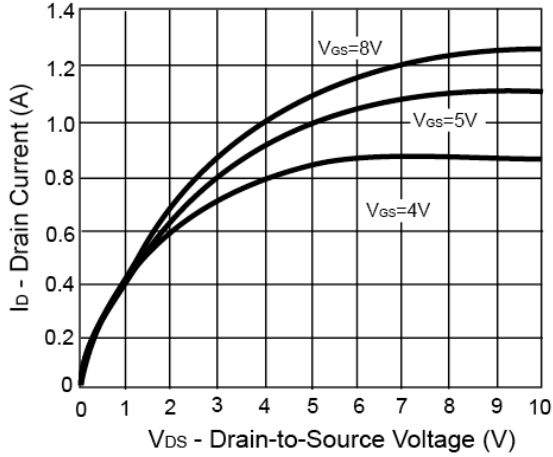
Switching Test Circuit



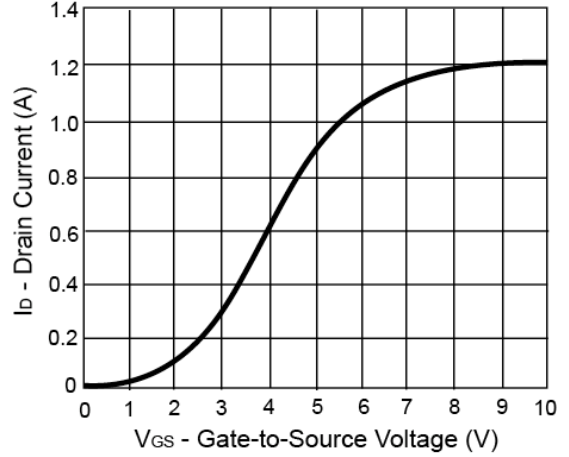
Switchin Waveforms

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

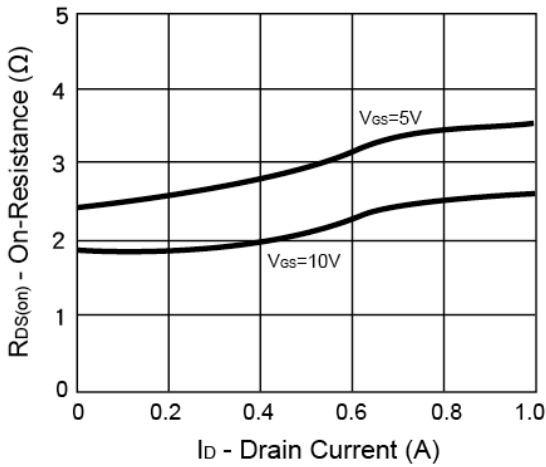
**Output Characteristics**



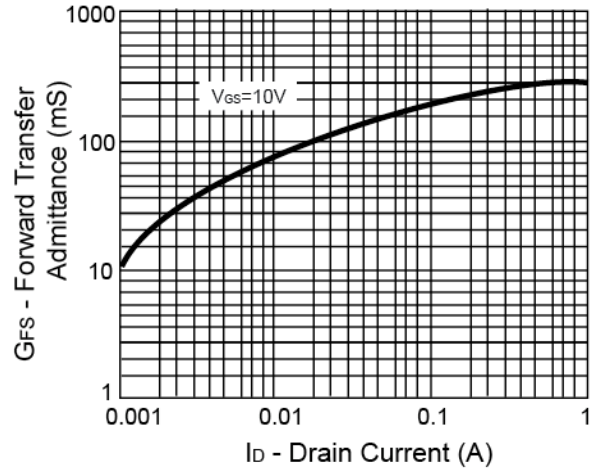
**Transfer Characteristics**



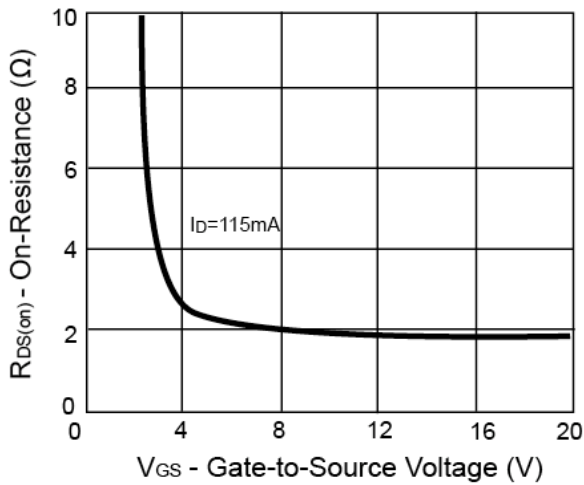
**On-Resistance vs. Drain Current**



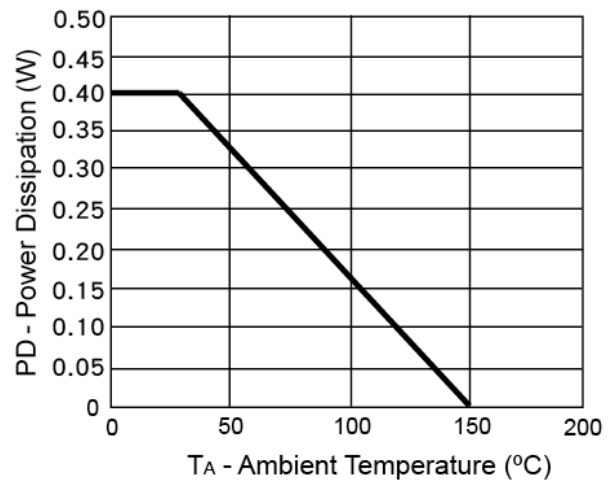
**Forward Transfer Admittance vs. Drain Current**



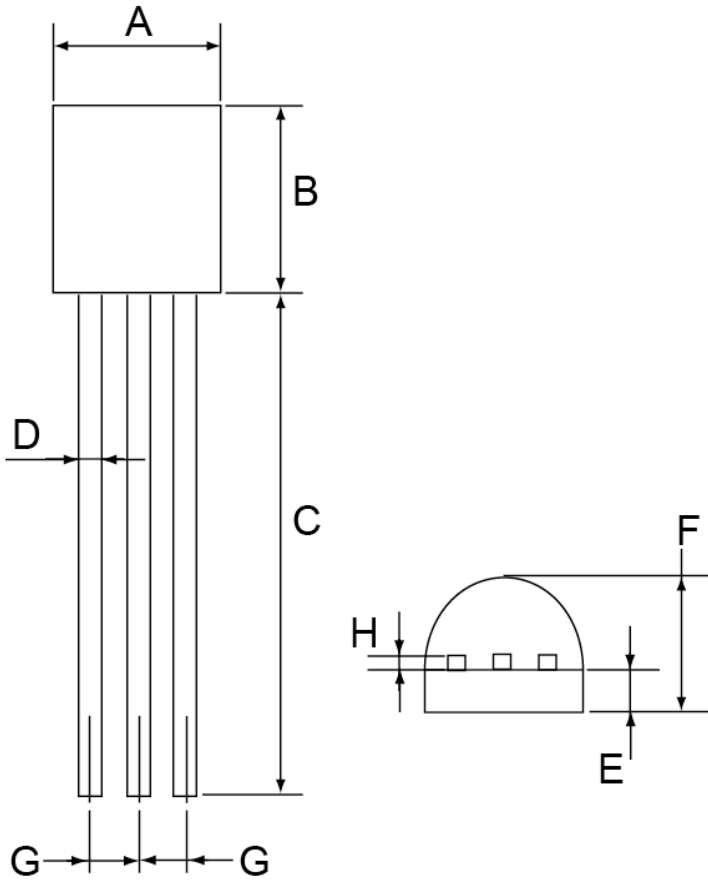
**On-Resistance vs. Gate-Source Voltage**



**Power Derating Curve**



**TO-92 Mechanical Drawing**



TO-92 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.30	4.70	0.169	0.185
B	4.30	4.70	0.169	0.185
C	13.53 (typ)		0.532 (typ)	
D	0.39	0.49	0.015	0.019
E	1.18	1.28	0.046	0.050
F	3.30	3.70	0.130	0.146
G	1.27	1.31	0.050	0.051
H	0.33	0.43	0.013	0.017

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