

### 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

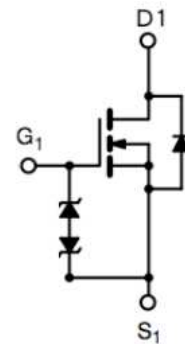
### Features

- 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 ( $T_a = 25^\circ C$ 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 @ $T_A=25^\circ C$	$I_D$	300
	Pulsed	$I_{DM}$	700
Drain Reverse Current	Continuous @ $T_A=25^\circ C$	$I_{DR}$	300
	Pulsed	$I_{DMR}$	700
Maximum Power Dissipation	$P_D$	400	mW
Operating Junction Temperature	$T_J$	+150	$^\circ C$
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ C$

### 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	$^\circ C/W$

#### Notes:

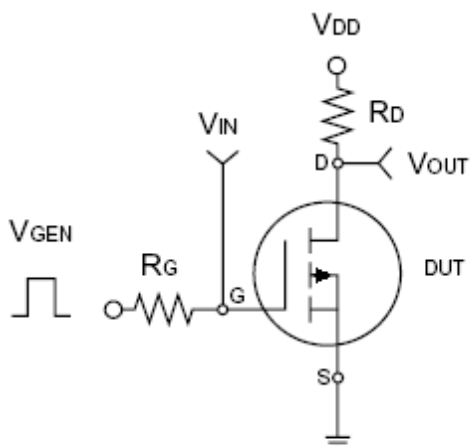
- a. Pulse width limited by the Maximum junction temperature
- b. Surface Mounted on FR4 Board,  $t \leq 5$  sec.

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

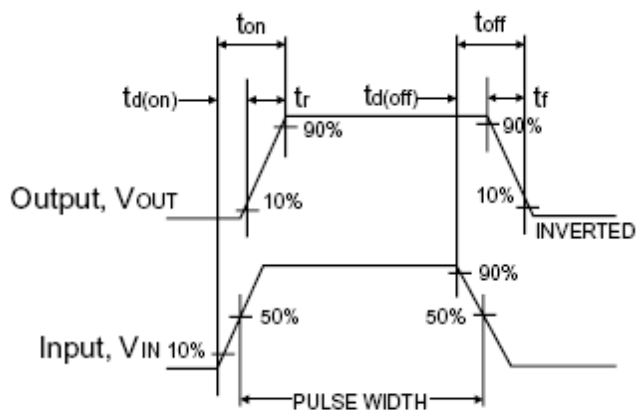
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 10\mu A$	$BV_{DSS}$	60	--	--	V
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	$V_{GS(TH)}$	1.0	--	2.5	V
Gate Body Leakage	$V_{GS} = \pm 20V, V_{DS} = 0V$	$I_{GSS}$	--	--	$\pm 10$	$\mu A$
Zero Gate Voltage Drain Current	$V_{DS} = 60V, V_{GS} = 0V$	$I_{DSS}$	--	--	1.0	$\mu A$
Drain-Source On-State Resistance	$V_{GS} = 10V, I_D = 100mA$	$R_{DS(ON)}$	--	3	5	$\Omega$
	$V_{GS} = 5V, I_D = 100mA$		--	3.6	5.5	
Forward Transconductance	$V_{DS} = 10V, I_D = 200mA$	$g_{fs}$	100	--	--	mS
Diode Forward Voltage	$I_S = 300mA, V_{GS} = 0V$	$V_{SD}$	--	0.9	1.2	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	$V_{DS} = 10V, I_D = 250mA,$ $V_{GS} = 4.5V$	$Q_g$	--	0.4	--	nC
Input Capacitance	$V_{DS} = 25V, V_{GS} = 0V,$ $f = 1.0MHz$	$C_{iss}$	--	7.32	--	pF
Output Capacitance		$C_{oss}$	--	3.42	--	
Reverse Transfer Capacitance		$C_{rss}$	--	7.63	--	
<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	$I_D = 100mA, V_{GEN} = 10V,$	$t_{d(off)}$	--	35	--	

#### Notes:

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



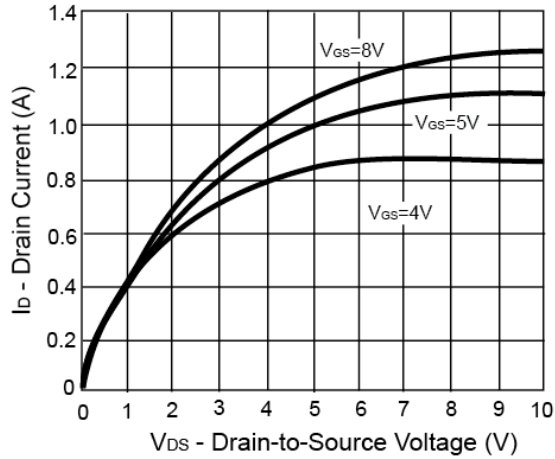
Switching Test Circuit



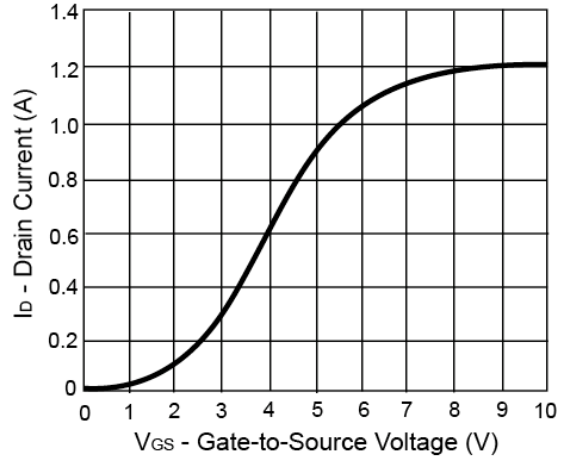
Switchin Waveforms

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

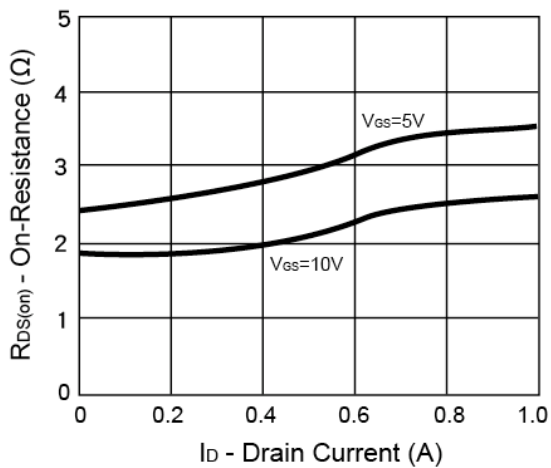
**Output Characteristics**



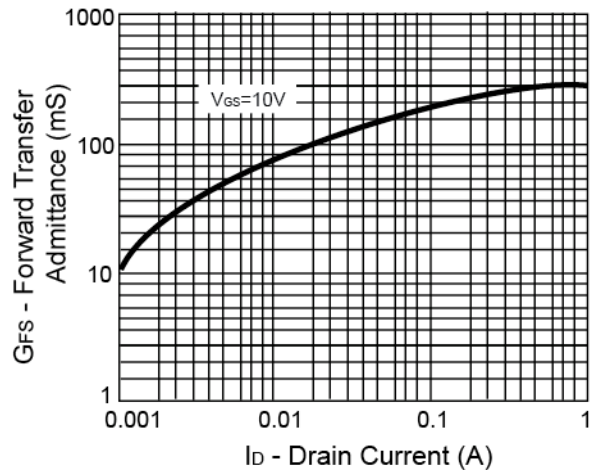
**Transfer Characteristics**



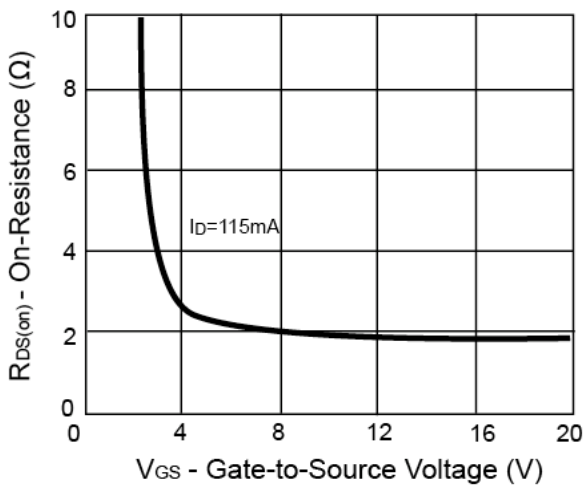
**On-Resistance vs. Drain Current**



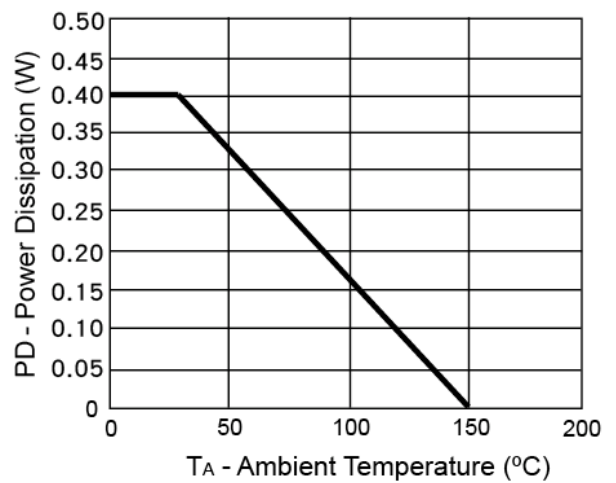
**Forward Transfer Admittance vs. Drain Current**



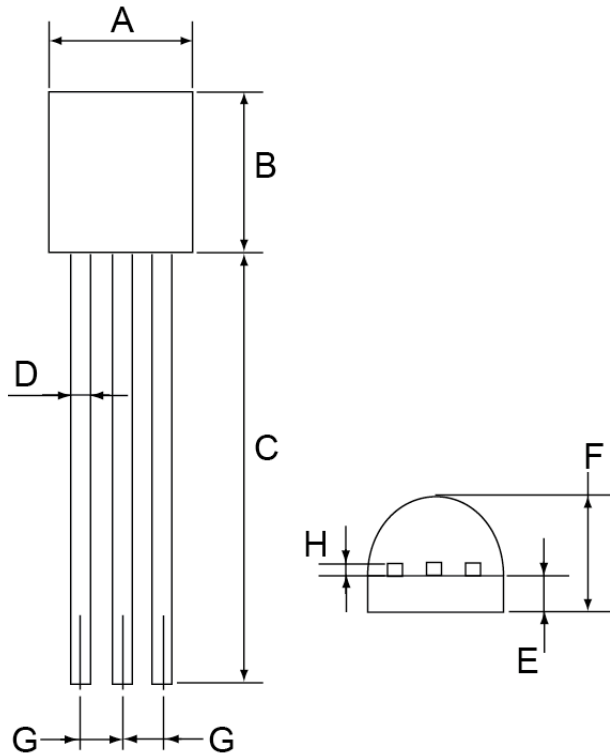
**On-Resistance vs. Gate-Source Voltage**



**Power Derating Curve**

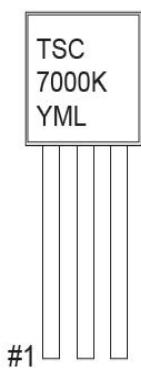


**TO-92 Mechanical Drawing**



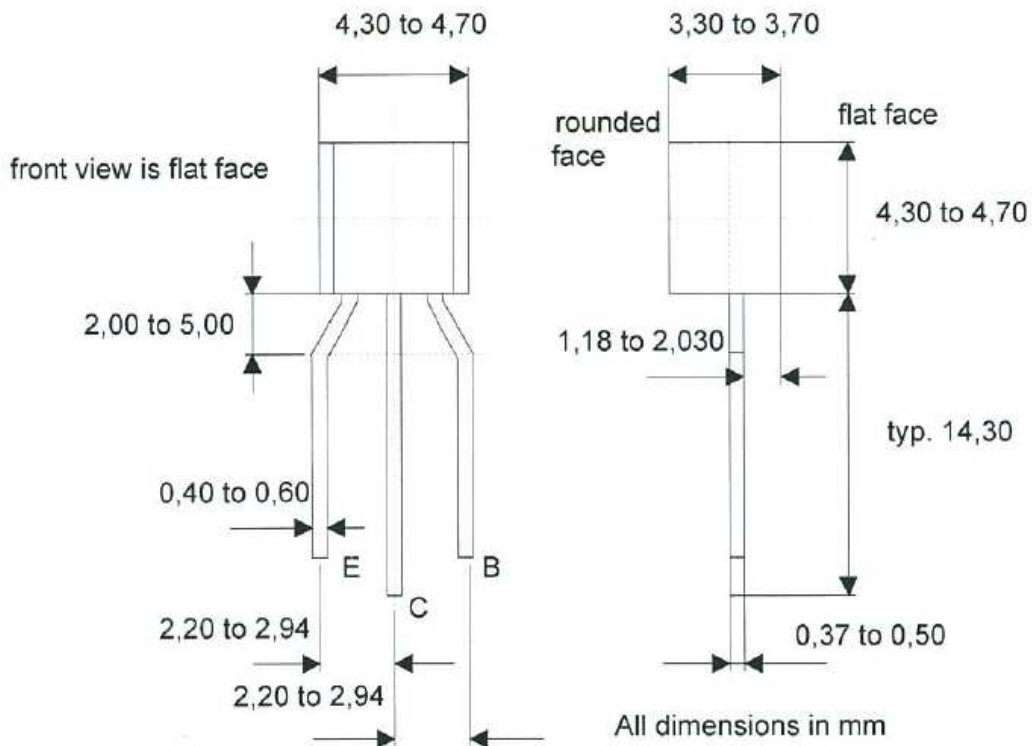
TO-92 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.30	4.70	0.169	0.185
B	4.30	4.70	0.169	0.185
C	13.53 (typ)		0.532 (typ)	
D	0.39	0.49	0.015	0.019
E	1.18	1.28	0.046	0.050
F	3.30	3.70	0.130	0.146
G	1.27	1.31	0.050	0.051
H	0.33	0.43	0.013	0.017

**Marking Diagram**



- Y** = Year Code
- M** = Month Code  
(**A**=Jan, **B**=Feb, **C**=Mar, **D**=Apr, **E**=May, **F**=Jun, **G**=Jul, **H**=Aug, **I**=Sep, **J**=Oct, **K**=Nov, **L**=Dec)
- L** = Lot Code

**TO-92 Ammo Pack Mechanical Drawing**



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