

TO-92



Pin Definition:

1. Source
2. Gate
3. Drain

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (mA)
60	5 @ $V_{GS} = 10V$	75

Features

- Fast Switching Speed
- Low Input and Output Leakage

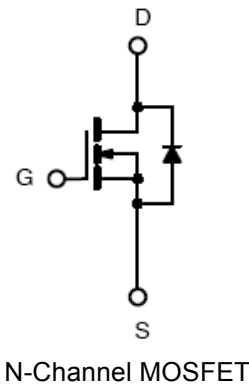
Application

- Direct Logic-Level Interface: TTL/CMOS
- Solid-State Relays

Ordering Information

Part No.	Package	Packing
TSM2N7000CT B0	TO-92	1Kpcs / Bulk
TSM2N7000CT A3	TO-92	2Kpcs / Ammo

Block Diagram



Absolute Maximum Rating (Ta = 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	I_D	200	mA
Pulsed Drain Current	I_{DM}	500	mA
Continuous Source Current (Diode Conduction) ^{a,b}	I_S	500	mA
Maximum Power Dissipation	P_D	Ta = 25°C	350
		Ta = 75°C	280
Operating Junction Temperature	T_J	+150	°C
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°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	°C/W

Notes:

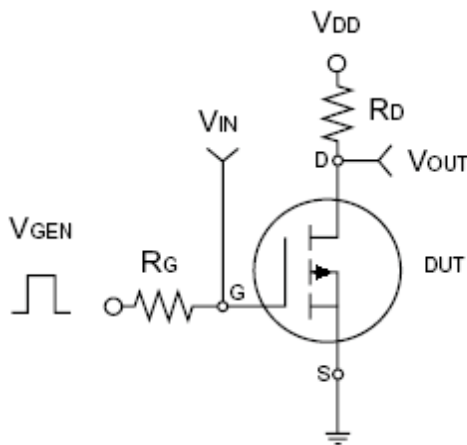
- a. Pulse width limited by the Maximum junction temperature
- b. Surface Mounted on FR4 Board, $t \leq 5$ sec.

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

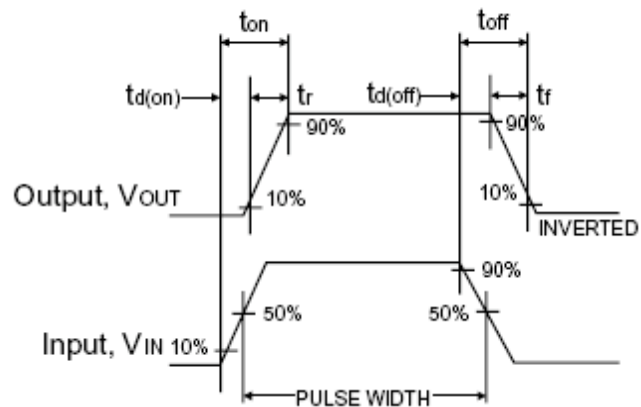
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 10\mu A$	BV_{DSS}	60	--	--	V
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 1mA$	$V_{GS(TH)}$	0.8	--	3.0	V
Gate Body Leakage	$V_{GS} = \pm 15V, V_{DS} = 0V$	I_{GSS}	--	--	± 10	nA
Zero Gate Voltage Drain Current	$V_{DS} = 48V, V_{GS} = 0V$	I_{DSS}	--	--	1.0	μA
Drain-Source On-State Resistance	$V_{GS} = 10V, I_D = 75mA$	$R_{DS(ON)}$	--	--	5.3	Ω
	$V_{GS} = 4.5V, I_D = 75mA$		--	--	5	
Forward Transconductance	$V_{DS} = 10V, I_D = 200mA$	g_{fs}	100	--	--	mS
Diode Forward Voltage	$I_S = 200mA, V_{GS} = 0V$	V_{SD}	--	1.3	1.5	V
Dynamic^b						
Input Capacitance	$V_{DS} = 25V, V_{GS} = 0V,$ $f = 1.0MHz$	C_{iss}	--	60	--	pF
Output Capacitance		C_{oss}	--	25	--	
Reverse Transfer Capacitance		C_{rss}	--	5	--	
Switching^c						
Turn-On Rise Time	$V_{DD} = 15V, R_L = 30\Omega,$ $I_D = 200mA,$ $V_{GEN} = 10V, R_G = 25\Omega$	t_r	--	10	--	nS
Turn-Off Fall Time		t_f	--	10	--	

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.



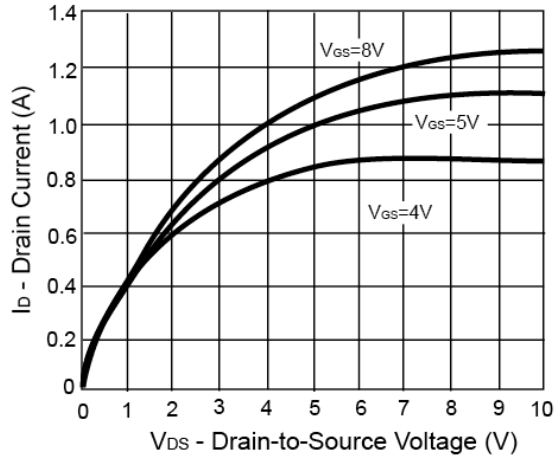
Switching Test Circuit



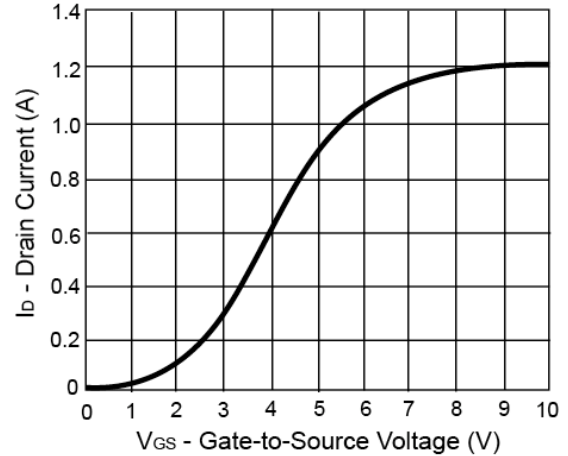
Switchin Waveforms

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

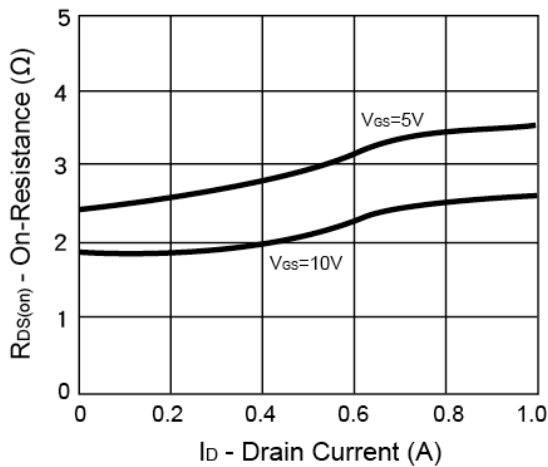
Output Characteristics



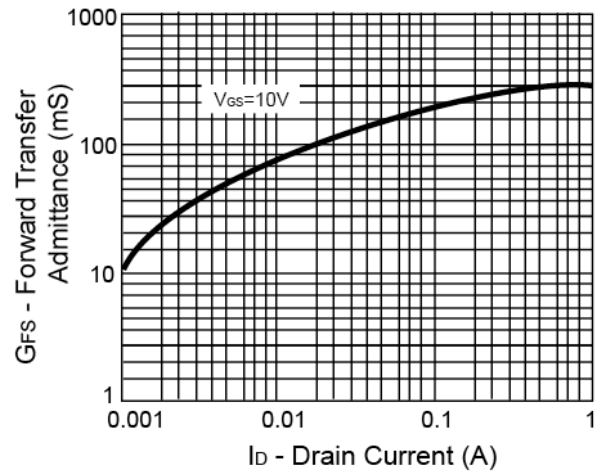
Transfer Characteristics



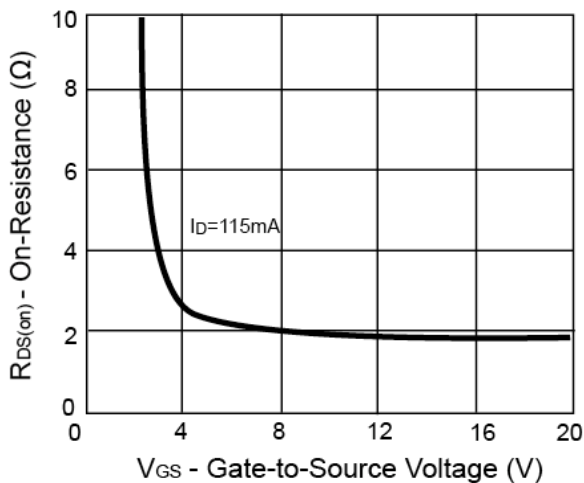
On-Resistance vs. Drain Current



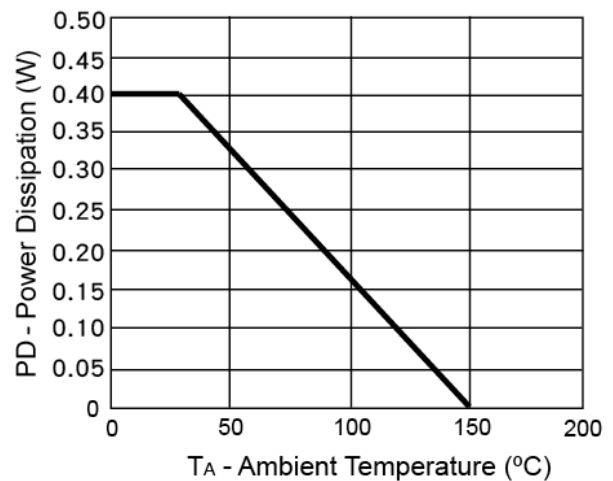
Forward Transfer Admittance vs. Drain Current



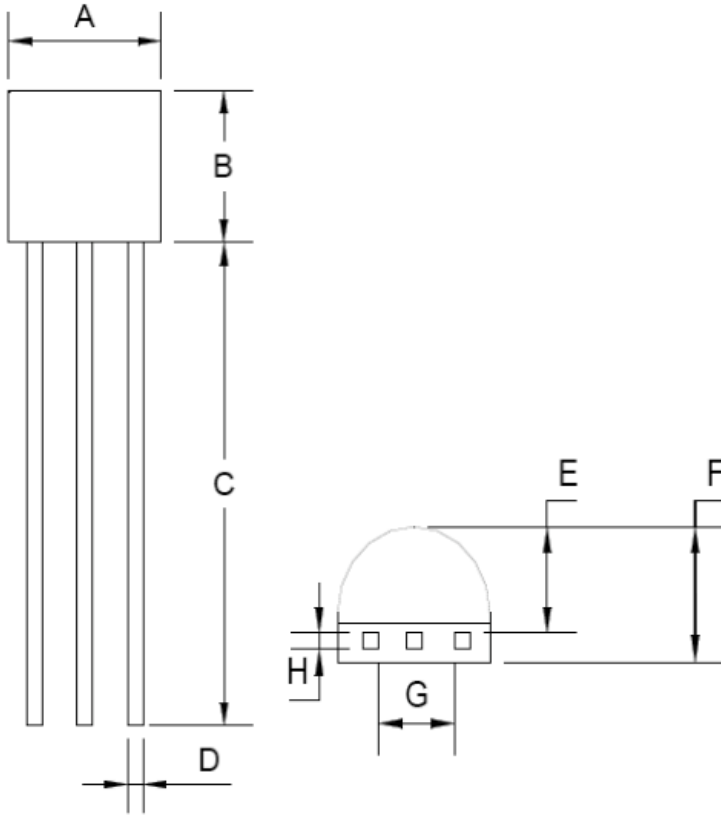
On-Resistance vs. Gate-Source Voltage



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	14.30(typ)		0.563(typ)	
D	0.43	0.49	0.017	0.019
E	2.19	2.81	0.086	0.111
F	3.30	3.70	0.130	0.146
G	2.42	2.66	0.095	0.105
H	0.37	0.43	0.015	0.017

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