



ITO-220



Pin Definition:

1. Gate
2. Drain
3. Source

PRODUCT SUMMARY

V _{DS} (V)	R _{DS(on)} (Ω)(max)	I _D (A)
700	0.9 @ V _{GS} =10V	8

General Description

The TSM8N70 N-Channel enhancement mode Power MOSFET is produced by planar stripe DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.

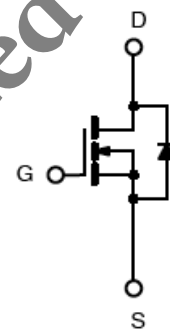
Features

- Low R_{DS(ON)} 0.75Ω (Typ.)
- Low gate charge typical @ 32nC (Typ.)
- Low Crss typical @ 13.7pF (Typ.)
- Fast Switching

Ordering Information

Part No.	Package	Packing
TSM8N70CI C0	ITO-220	50pcs / Tube
TSM8N70CI C0G	ITO-220	50pcs / Tube

Block Diagram



N-Channel MOSFET

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V _{DS}	700	V
Gate-Source Voltage	V _{GS}	±30	V
Continuous Drain Current	I _D	T _C = 25°C	8
		T _C = 100°C	4.8
Pulsed Drain Current *	I _{DM}	32	A
Single Pulse Avalanche Energy (Note 2)	E _{AS}	266	mJ
Avalanche Current (Repetitive) (Note 2)	I _{AS}	8	A
Single Pulse Avalanche Energy (Note 1)	E _{AR}	11.6	mJ
Avalanche Current (Repetitive) (Note 1)	I _{AR}	8	A
Total Power Dissipation @ T _C = 25°C	P _{TOT}	40	W
Operating Junction Temperature	T _J	150	°C
Storage Temperature Range	T _{STG}	-55 to +150	°C

Note: Limited by maximum junction temperature

Thermal Performance

Parameter	Symbol	Limit	Unit
Thermal Resistance - Junction to Case	R _{θJC}	3.1	°C/W
Thermal Resistance - Junction to Ambient	R _{θJA}	62.5	°C/W

Notes: Surface mounted on FR4 board t ≤ 10sec

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}	700	--	--	V
Drain-Source On-State Resistance	$V_{GS} = 10V, I_D = 4A$	$R_{DS(ON)}$	--	0.75	0.9	Ω
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	$V_{GS(TH)}$	2.0	--	4.0	V
Zero Gate Voltage Drain Current	$V_{DS} = 700V, V_{GS} = 0V$	I_{DSS}	--	--	1	μA
Gate Body Leakage	$V_{GS} = \pm 30V, V_{DS} = 0V$	I_{GSS}	--	--	± 10	μA
Forward Transfer Conductance	$V_{DS} = 10V, I_D = 4A$	g_{fs}	--	11	--	S
Dynamic						
Total Gate Charge	$V_{DS} = 560V, I_D = 8A,$ $V_{GS} = 10V$	Q_g	--	32	--	nC
Gate-Source Charge		Q_{gs}	--	9	--	
Gate-Drain Charge		Q_{gd}	--	8	--	
Input Capacitance	$V_{DS} = 25V, V_{GS} = 0V,$ $f = 1.0MHz$	C_{iss}	--	2006	--	pF
Output Capacitance		C_{oss}	--	148	--	
Reverse Transfer Capacitance		C_{rss}	--	13.7	--	
Switching						
Turn-On Delay Time	$V_{GS} = 10V, I_D = 10A,$ $V_{DD} = 300V, R_G = 25\Omega$	$t_{d(on)}$	--	23	--	nS
Turn-On Rise Time		t_r	--	69	--	
Turn-Off Delay Time		$t_{d(off)}$	--	144	--	
Turn-Off Fall Time		t_f	--	77	--	
Source-Drain Diode Ratings and Characteristics						
Source Current	Integral reverse diode in the MOSFET	I_S	--	--	8	A
Source Current (Pulse)		I_{SM}	--	--	32	A
Diode Forward Voltage	$I_S = 8A, V_{GS} = 0V$	V_{SD}	--	--	1.4	V
Reverse Recovery Time	$V_{GS} = 0V, I_S = 8A,$	t_{fr}	--	420	--	nS
Reverse Recovery Charge	$di_F/dt = 100A/\mu s$	Q_{fr}	--	4.2	--	μC

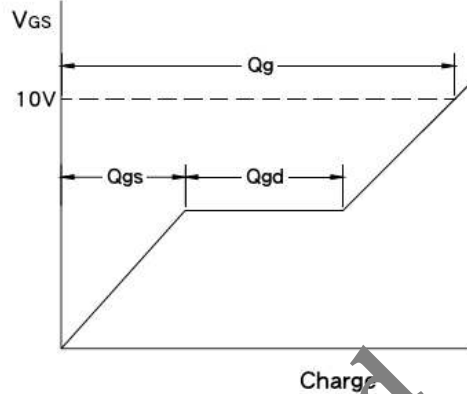
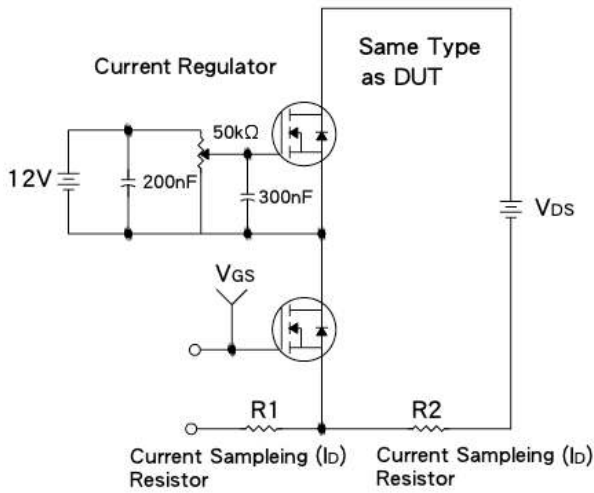
Note 1: Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

Note 2: $V_{DD} = 50V, I_{AS} = 8A, L = 7.74mH, R_G = 25\Omega$, Starting $T_J = 25^\circ C$

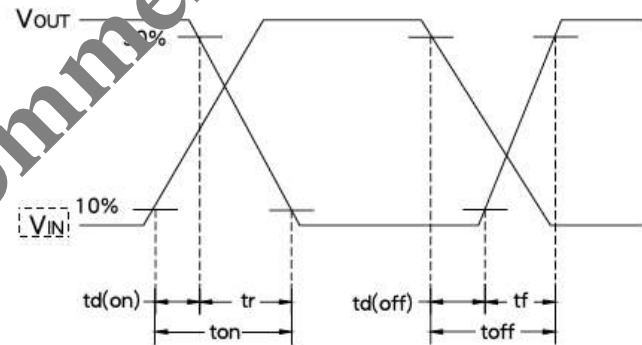
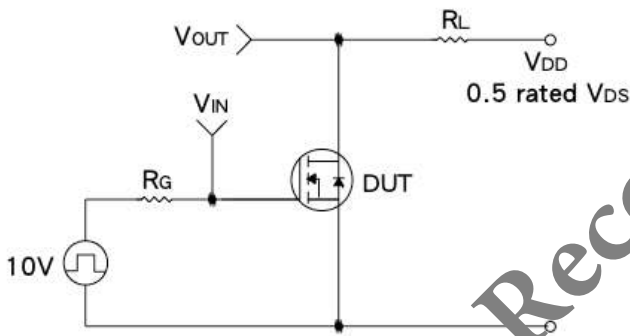
Note 3: Pulse test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$

Note 4: Essentially Independent of Operating Temperature

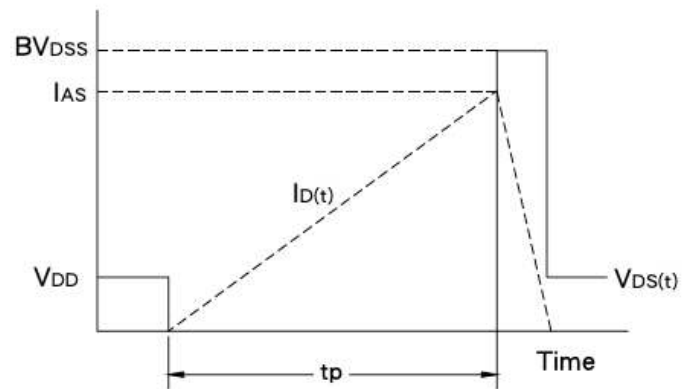
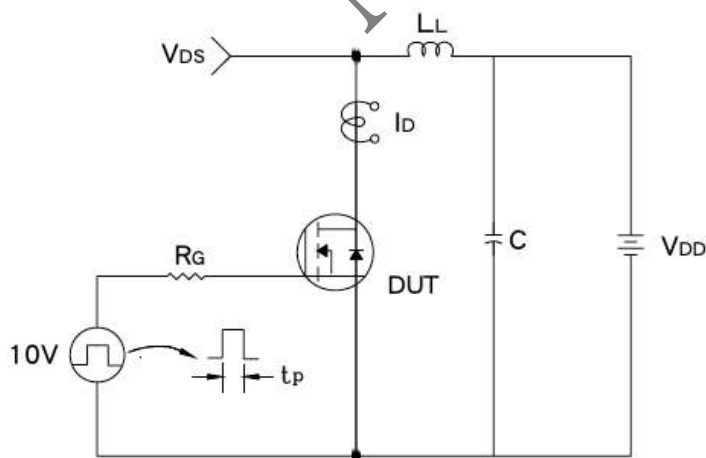
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform

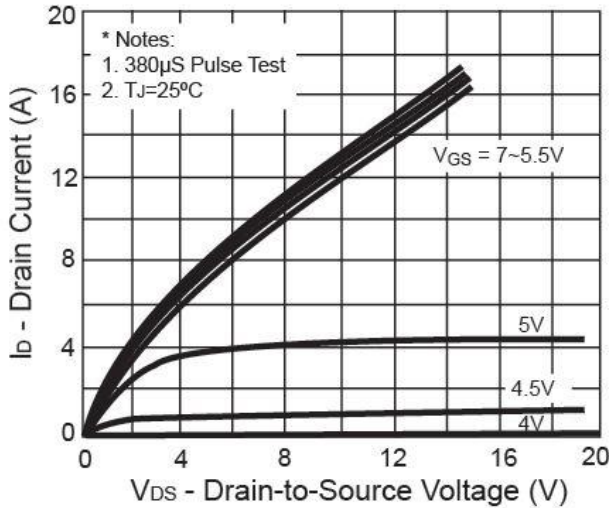


E_{AS} Test Circuit & Waveform

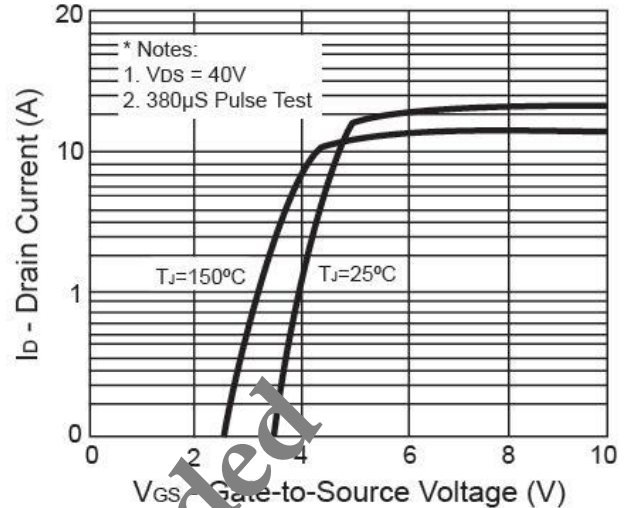


Electrical Characteristics Curve (Ta = 25°C, unless otherwise noted)

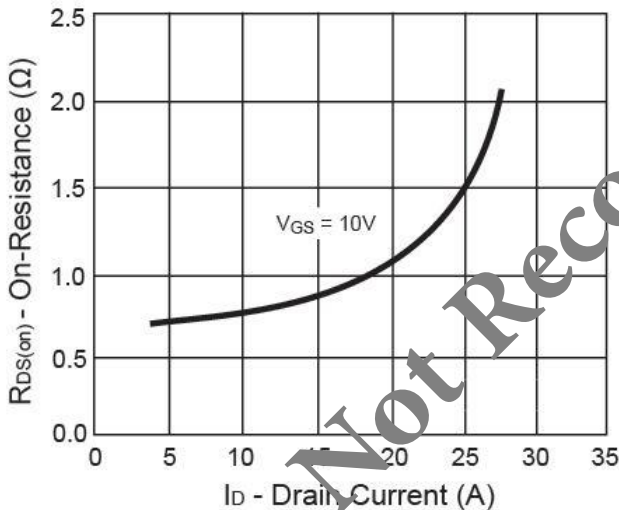
Output Characteristics



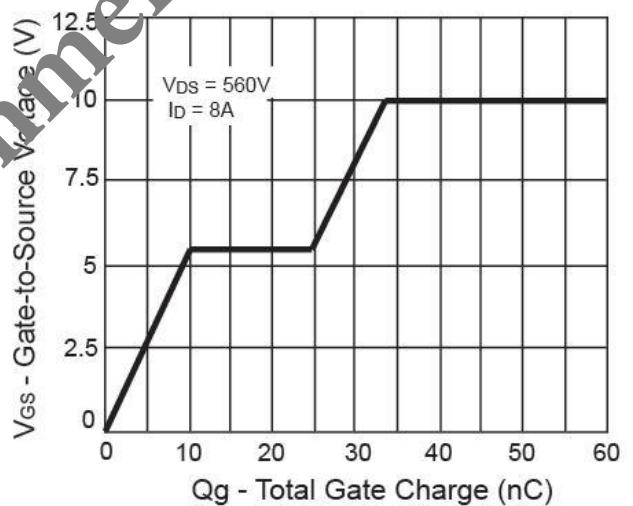
Transfer Characteristics



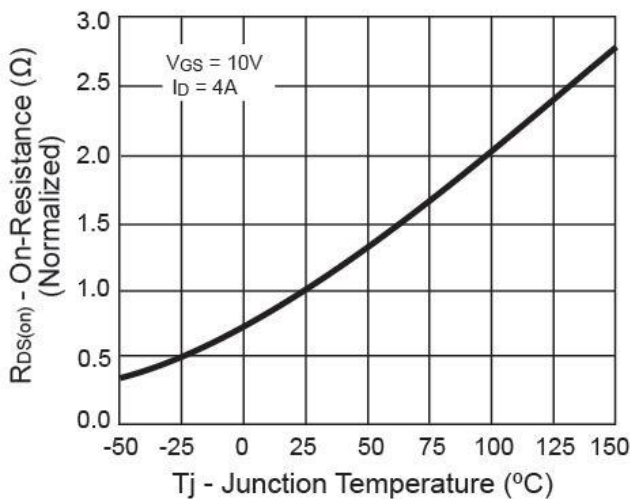
On-Resistance vs. Drain Current



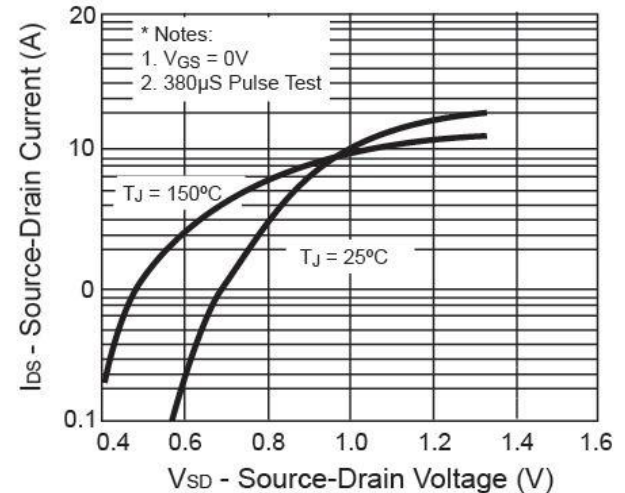
Gate Charge



On-Resistance vs. Junction Temperature

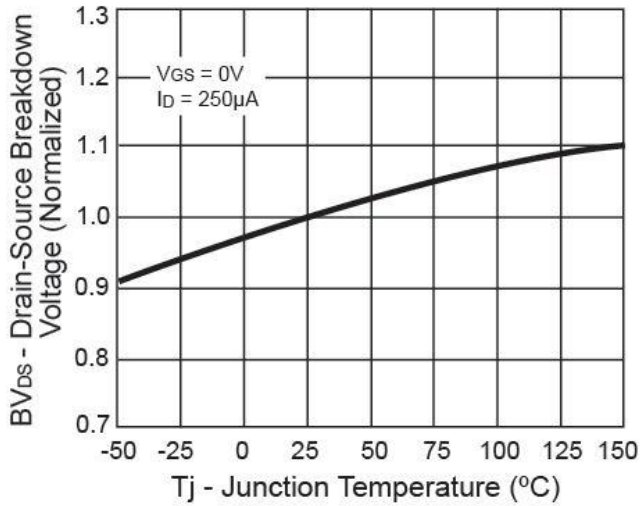


Source-Drain Diode Forward Voltage

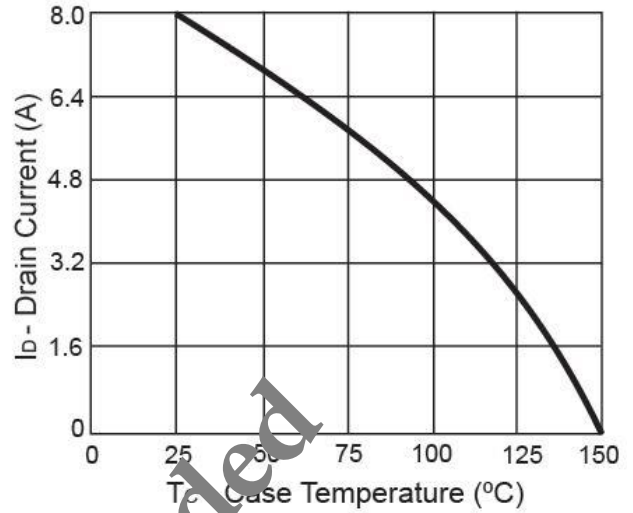


Electrical Characteristics Curve ($T_a = 25^\circ\text{C}$, unless otherwise noted)

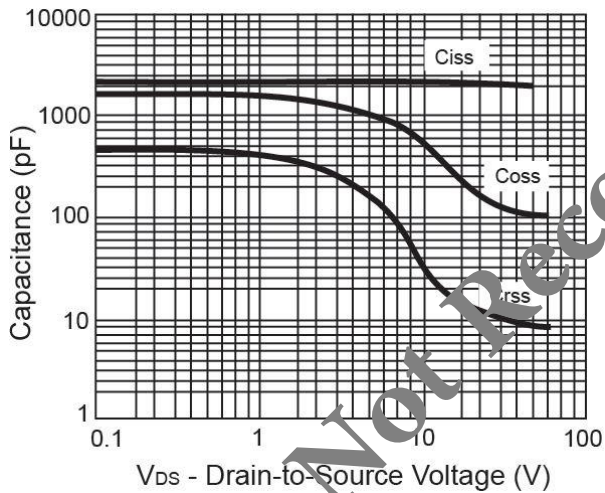
BV_{DS} vs. Junction Temperature



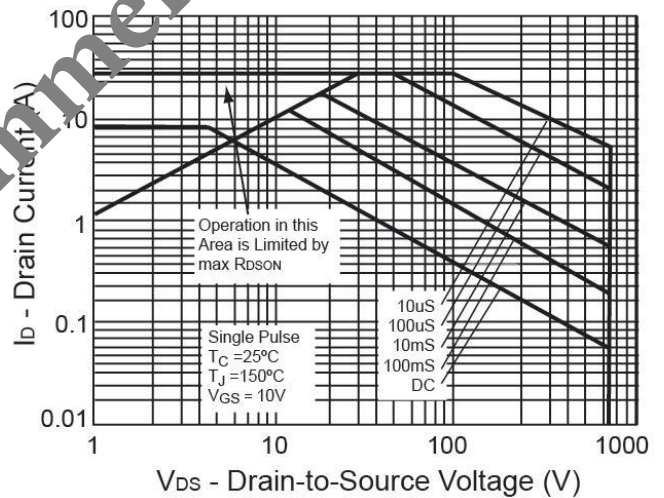
Drain Current vs., Case Temperature



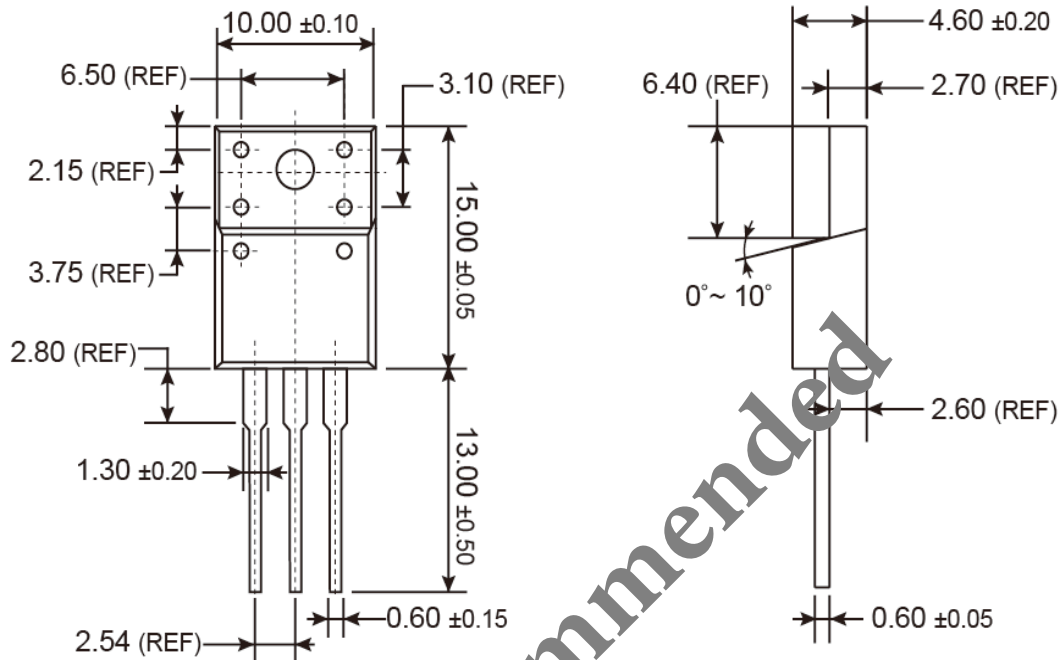
Capacitance



Maximum Safe Operating Area

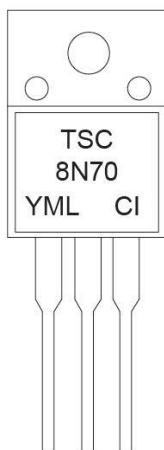


ITO-220 Mechanical Drawing



Unit: Millimeters

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

Not Recommended

Notice

Specifications of the products displayed herein are subject to change without notice. TSC or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies.

Information contained herein is intended to provide a product description only. No license, express or implied, to any intellectual property rights is granted by this document. Except as provided in TSC's terms and conditions of sale for such products, TSC assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of TSC products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify TSC for any damages resulting from such improper use or sale.