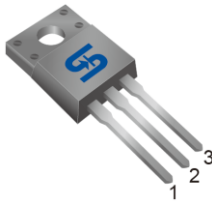


ITO-220



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.

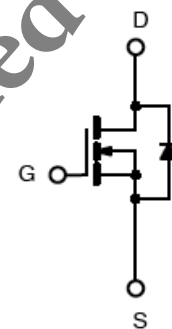
Features

- Low $R_{DS(on)}$ 0.75Ω (Typ.)
- Low gate charge typical @ 32nC (Typ.)
- Low C_{rss} 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 ($T_a = 25^\circ\text{C}$ 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	8	A
		4.8	A
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 @ $T_c = 25^\circ\text{C}$	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	$R_{\theta_{JC}}$	3.1	°C/W
Thermal Resistance - Junction to Ambient	$R_{\theta_{JA}}$	62.5	°C/W

Notes: Surface mounted on FR4 board $t \leq 10\text{sec}$

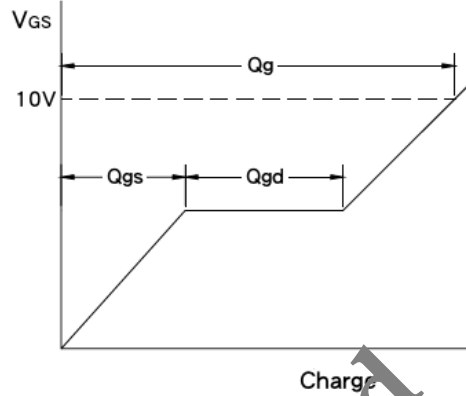
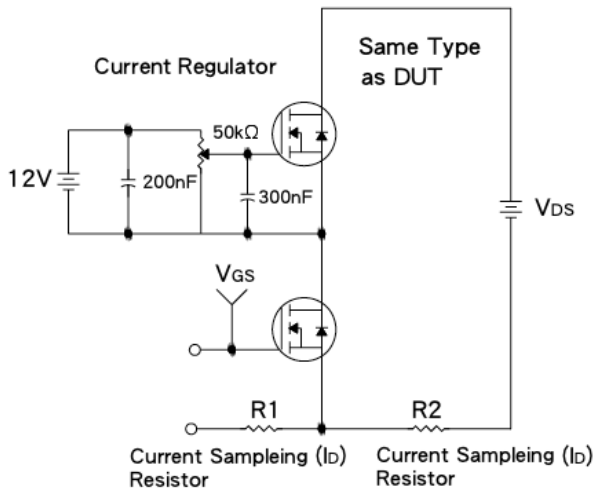
Electrical Specifications (Ta = 25°C unless otherwise noted)

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	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

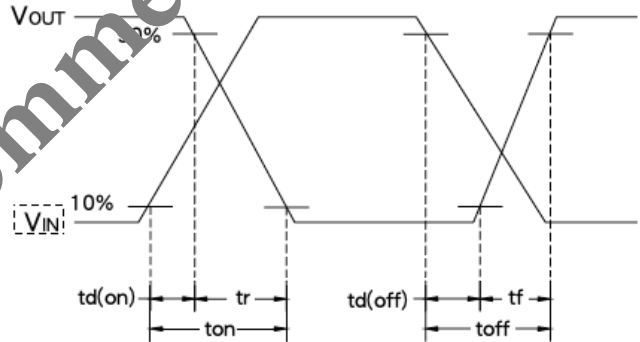
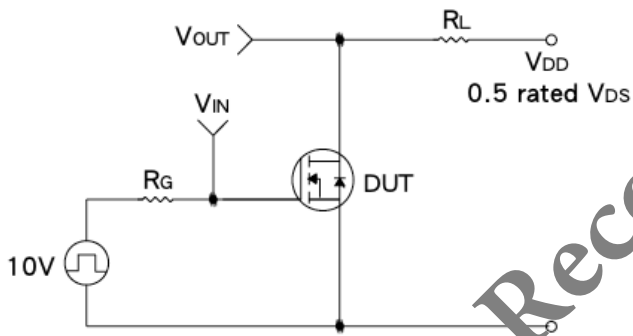
Note 1: Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

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

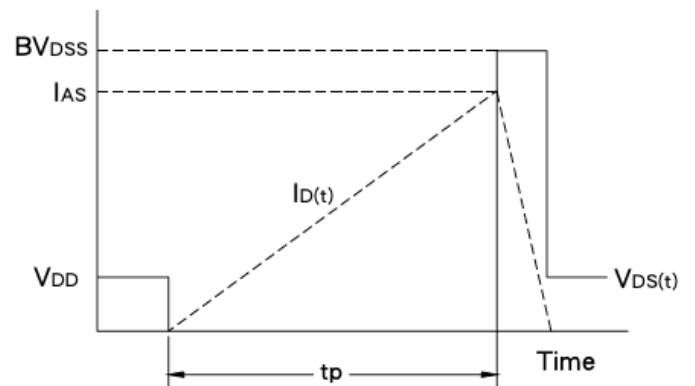
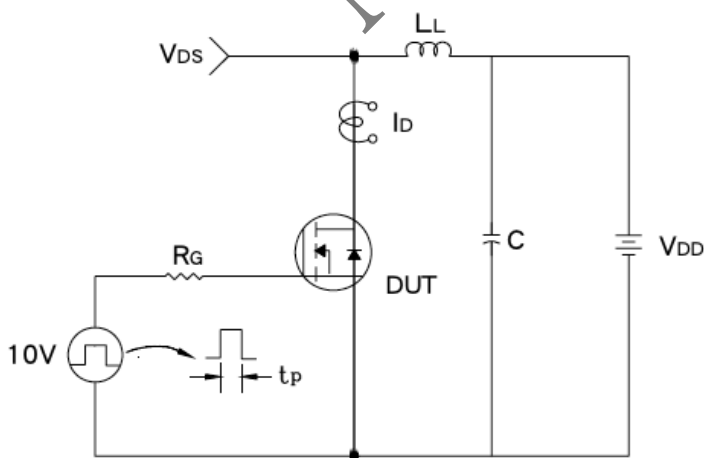
Gate Charge Test Circuit & Waveform



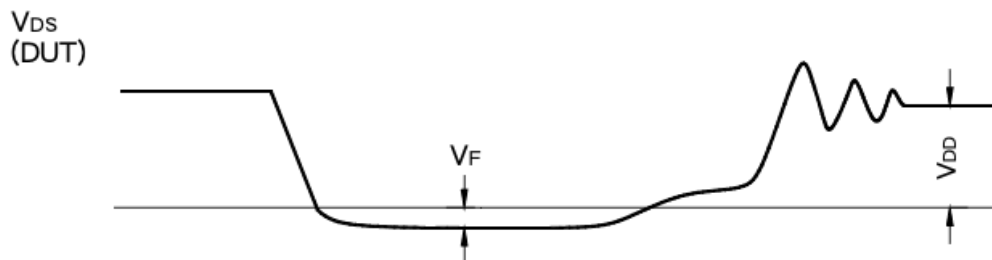
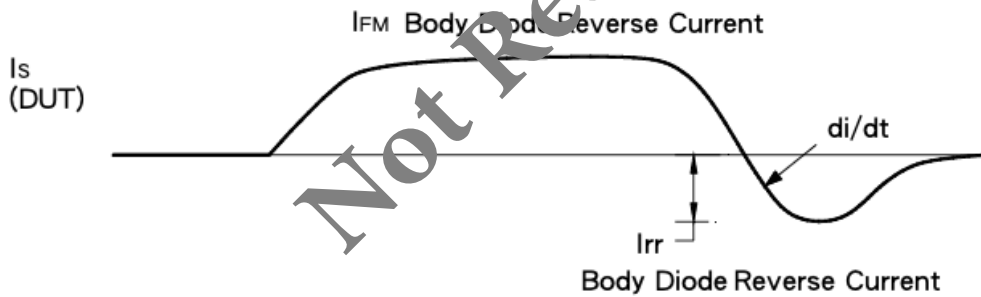
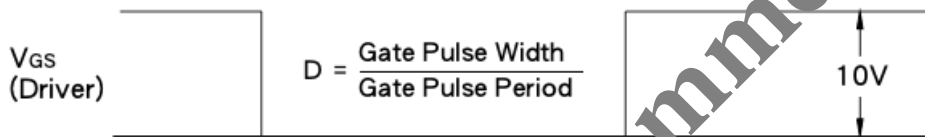
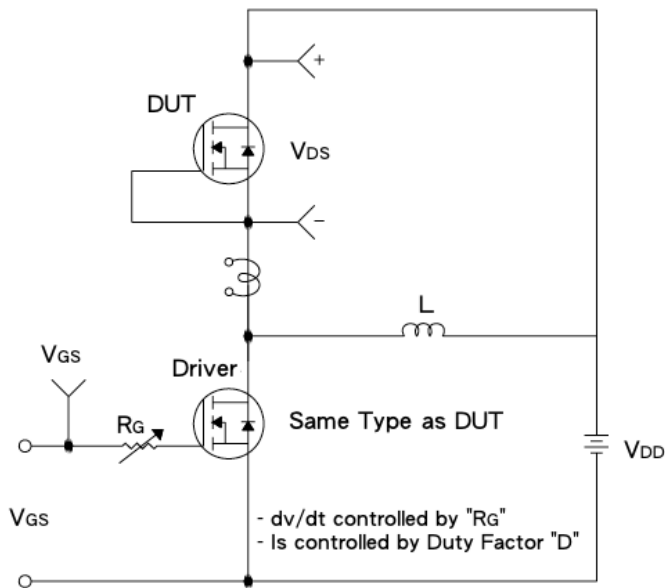
Resistive Switching Test Circuit & Waveform



E_{AS} Test Circuit & Waveform

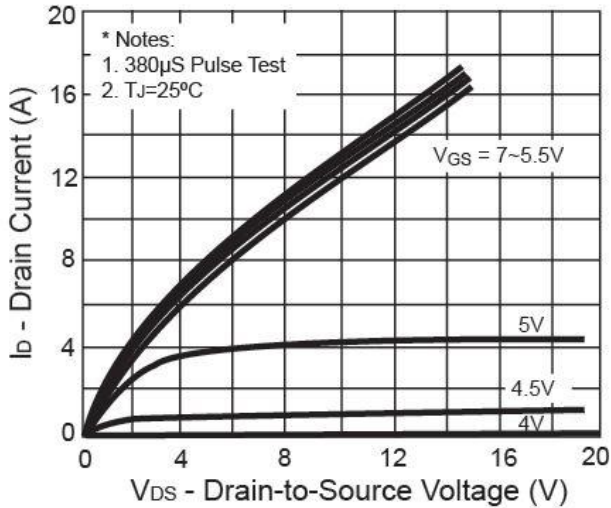


Diode Reverse Recovery Time Test Circuit & Waveform

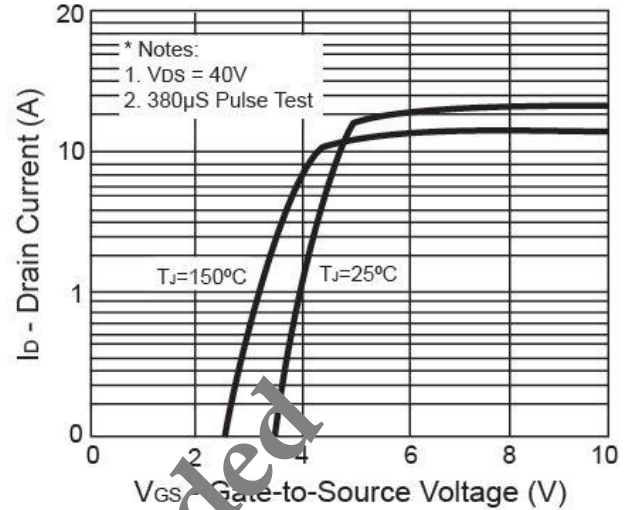


Electrical Characteristics Curve (Ta = 25°C, unless otherwise noted)

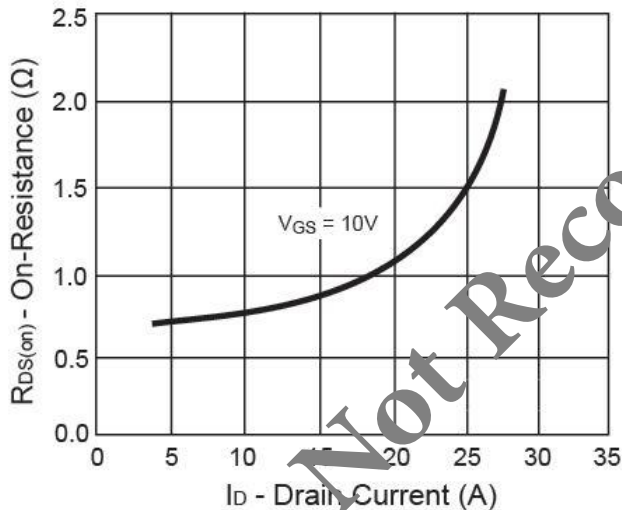
Output Characteristics



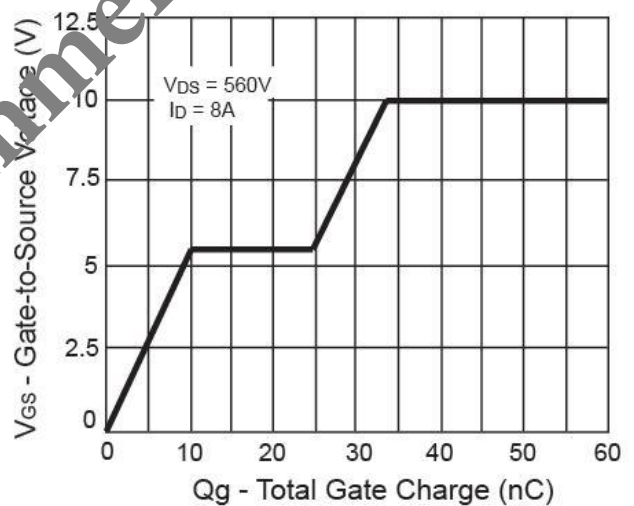
Transfer Characteristics



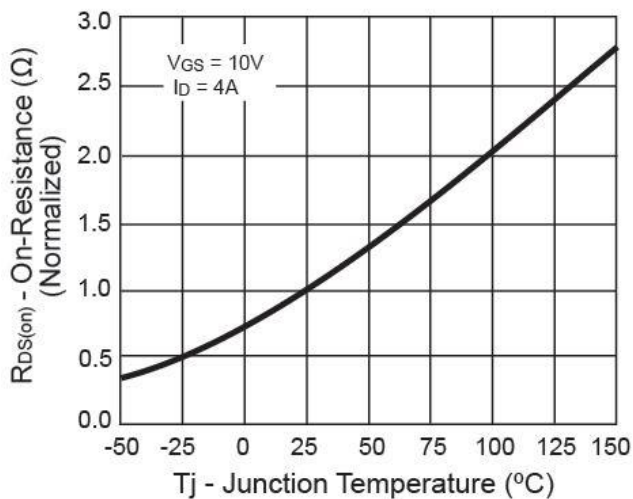
On-Resistance vs. Drain Current



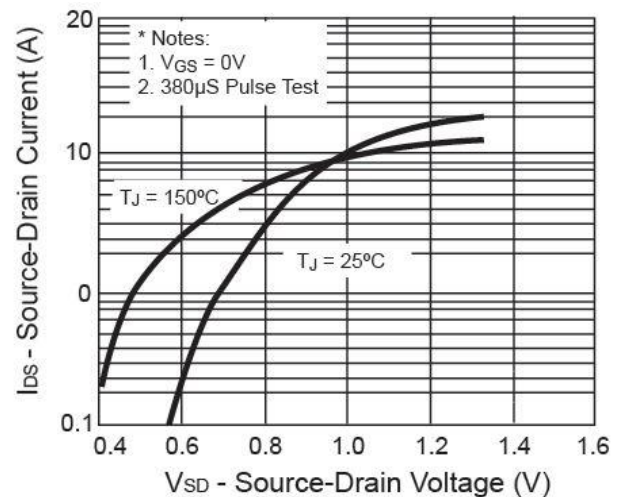
Gate Charge



On-Resistance vs. Junction Temperature

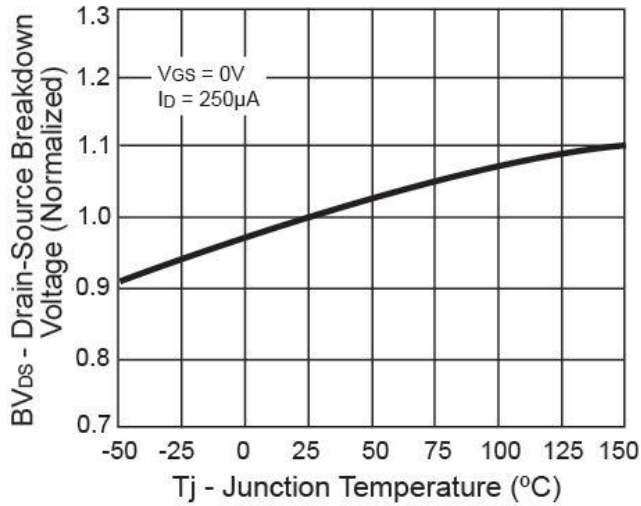


Source-Drain Diode Forward Voltage

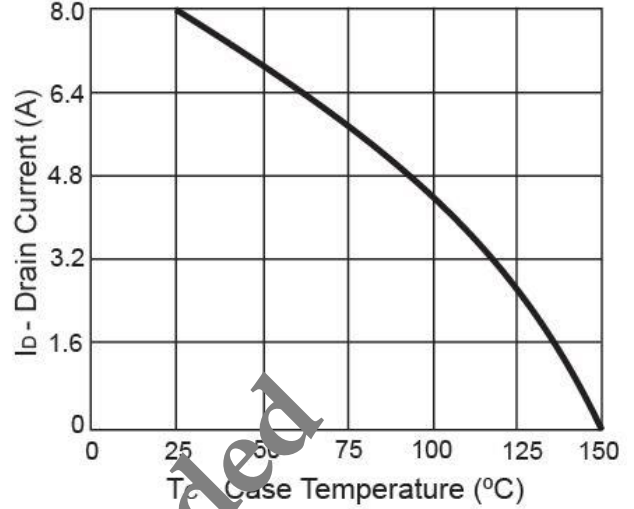


Electrical Characteristics Curve ($T_a = 25^\circ\text{C}$, unless otherwise noted)

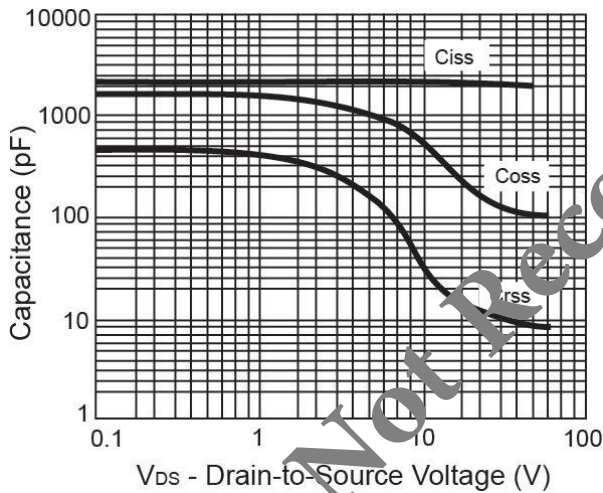
BV_{DS} vs. Junction Temperature



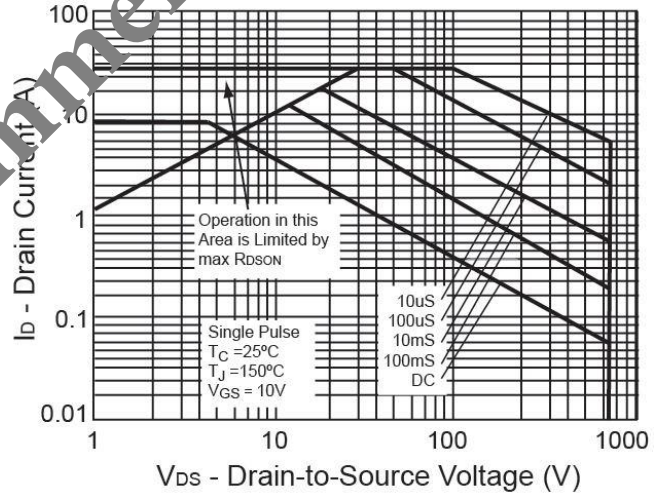
Drain Current vs., Case Temperature



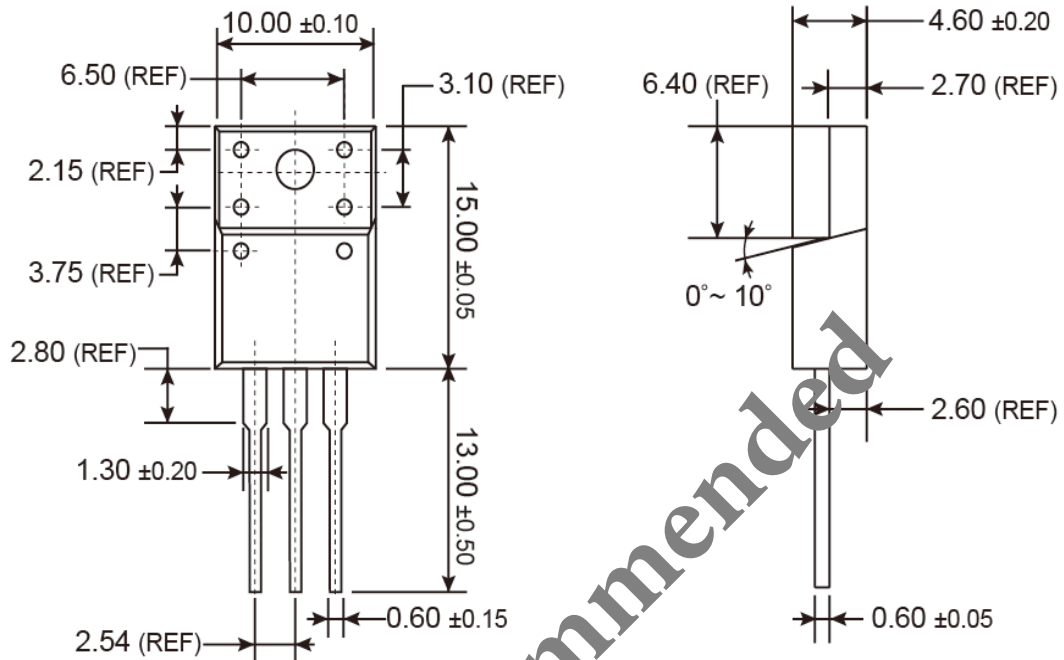
Capacitance



Maximum Safe Operating Area

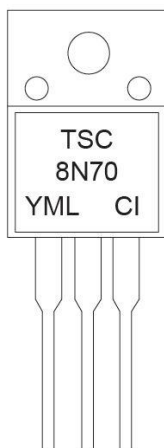


ITO-220 Mechanical Drawing



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

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