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TAIWAN SEMICONDUCTOR

RoHS COMPLIANCE

TSM8N70

700V N-Channel Power MOSFET

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

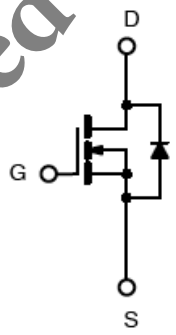
General Description

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

Block Diagram



N-Channel MOSFET

Ordering Information

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

Absolute Maximum Rating (Ta = 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	Tc = 25ºC	I_D	8	A
	Tc = 100ºC		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°C		P_{TOT}	40	W
Operating Junction Temperature		T_J	150	ºC
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 ≤ 10sec

TSM8N70

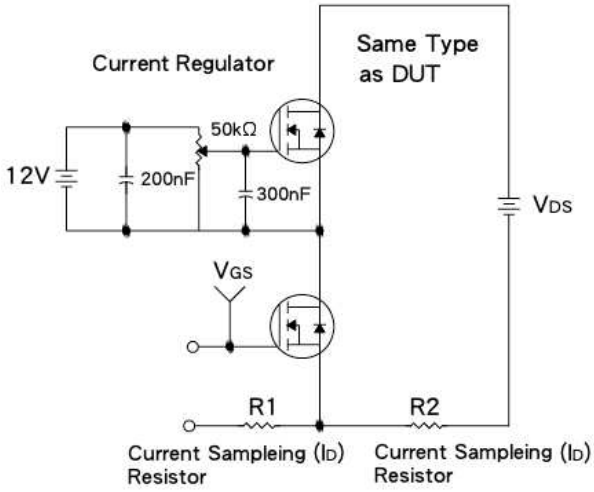
700V N-Channel Power MOSFET

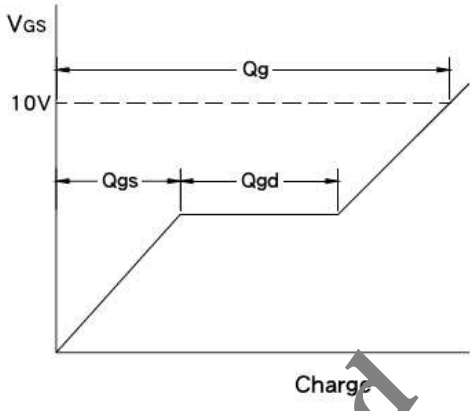
Electrical Specifications (Ta = 25°C unless otherwise noted)

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250uA	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 = 250uA	$V_{GS(TH)}$	2.0	--	4.0	V
Zero Gate Voltage Drain Current	V_{DS} = 700V, V_{GS} = 0V	I_{DSS}	--	--	1	uA
Gate Body Leakage	V_{GS} = ±30V, V_{DS} = 0V	I_{GSS}	--	--	±10	uA
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 = 25Ω	$t_{d(on)}$	--	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, dI_F/dt = 100A/us	t_{fr}	--	420	--	nS
Reverse Recovery Charge		Q_{fr}	--	4.2	--	uC

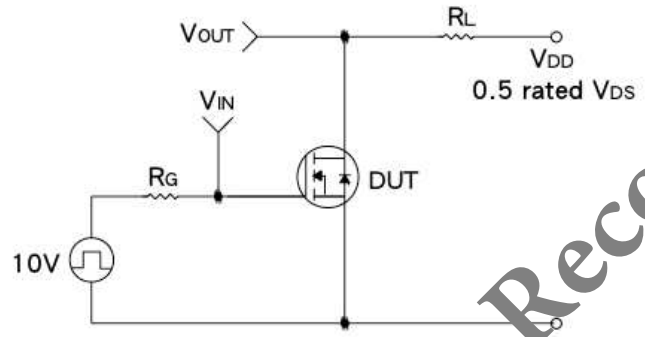
Note 1: Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
Note 2: V_{DD} = 50V, I_{AS}=8A, L=7.74mH, R_G =25Ω, Starting T_J=25ºC
Note 3: Pulse test: pulse width ≤300uS, duty cycle ≤2%
Note 4: Essentially Independent of Operating Temperature

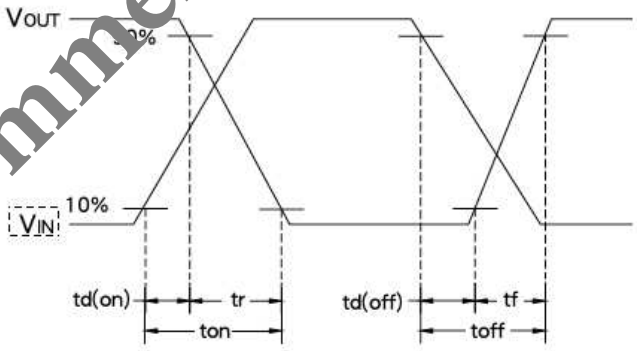
Gate Charge Test Circuit & Waveform



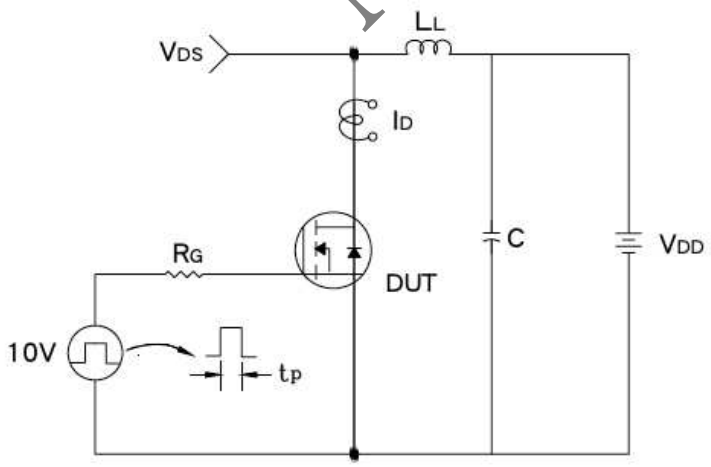


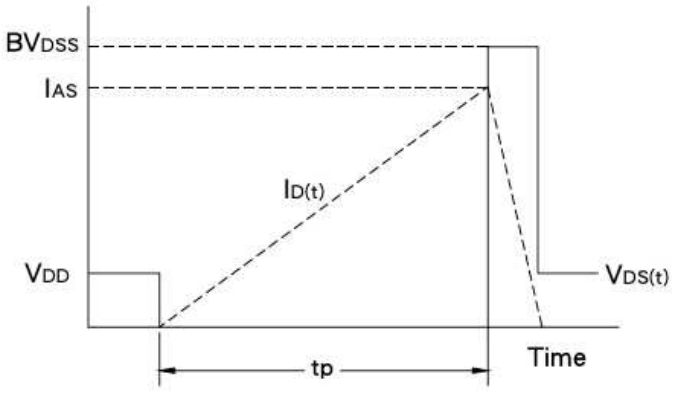
Resistive Switching Test Circuit & Waveform



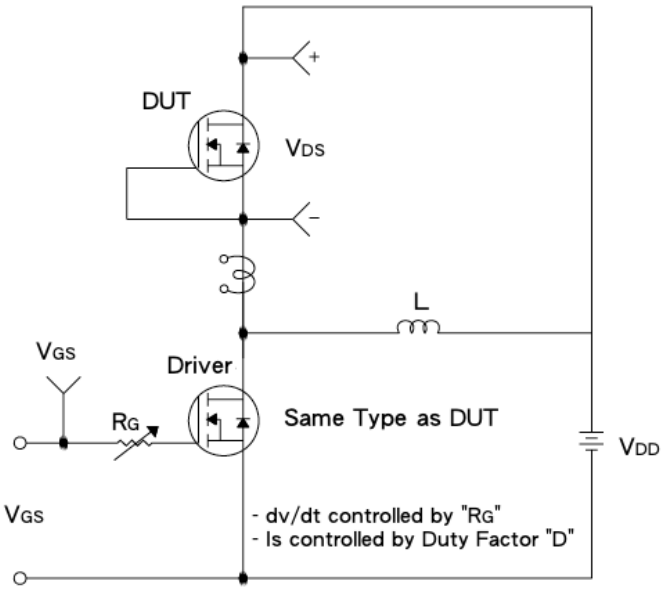


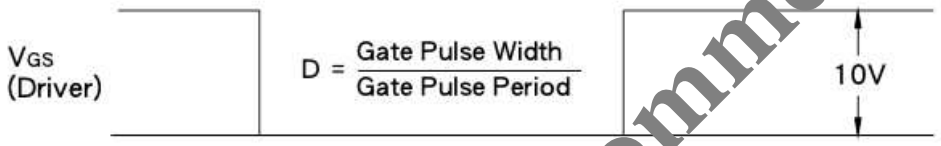
E_{AS} Test Circuit & Waveform

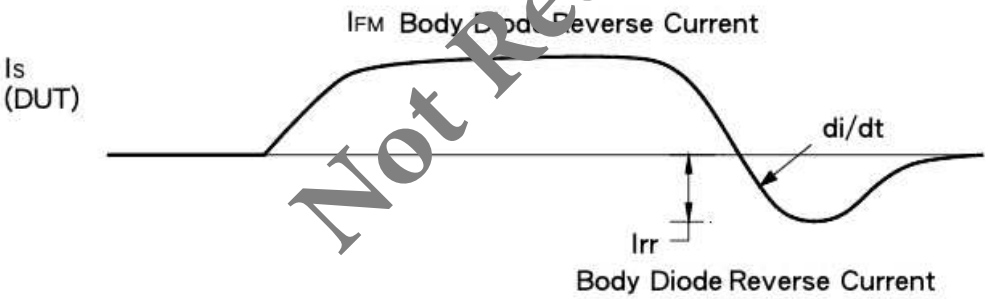


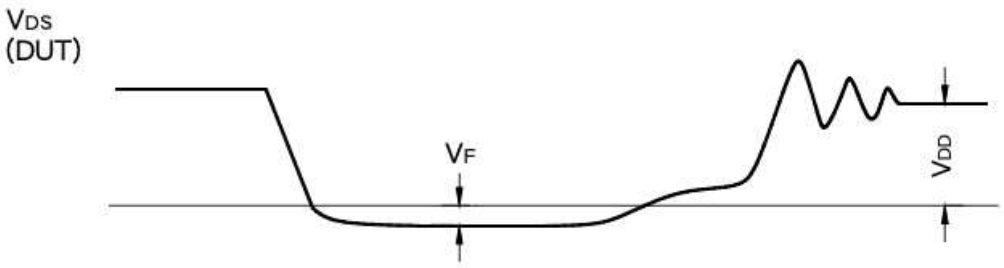


Diode Reverse Recovery Time Test Circuit & Waveform



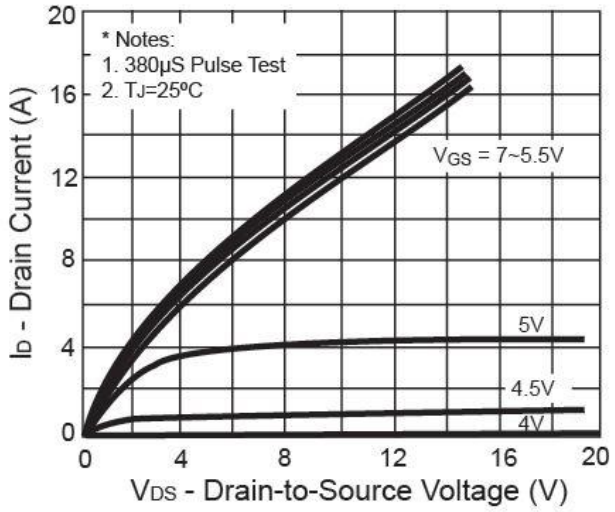




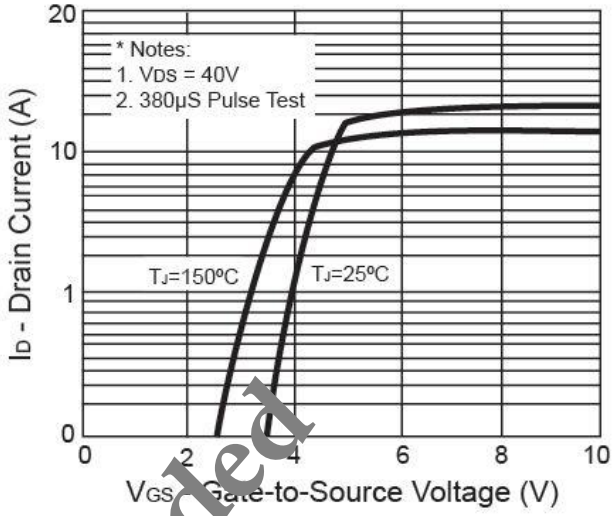


Electrical Characteristics Curve (Ta = 25°C, unless otherwise noted)

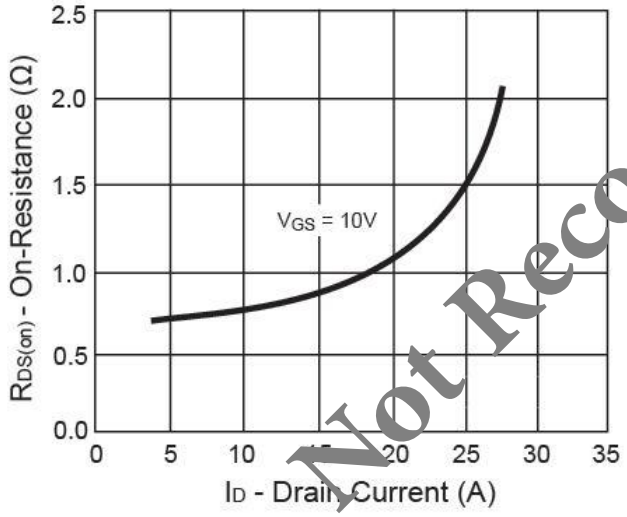
Output Characteristics



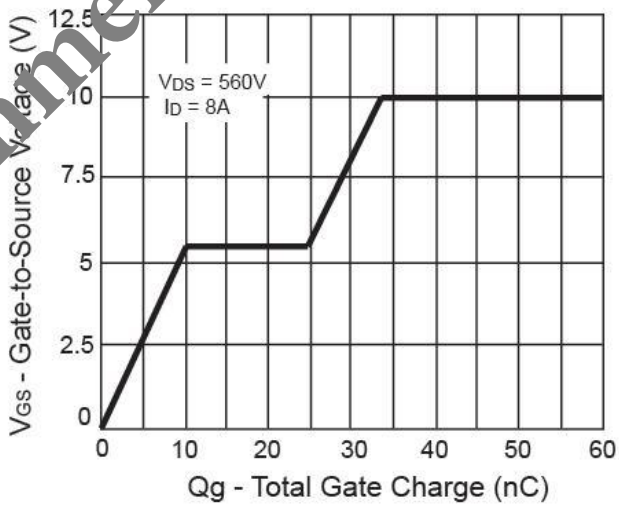
Transfer Characteristics



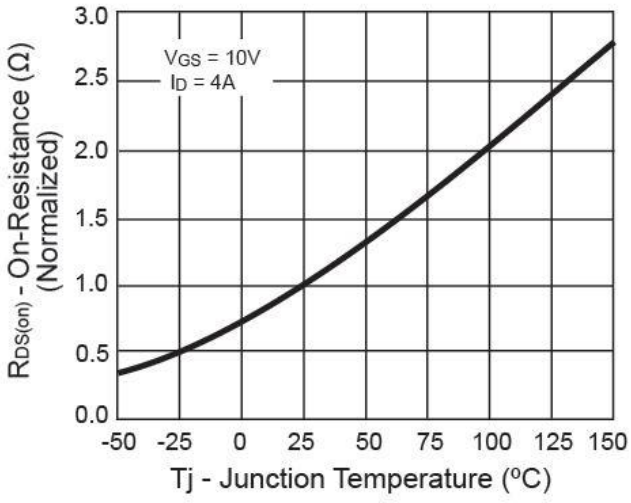
On-Resistance vs. Drain Current



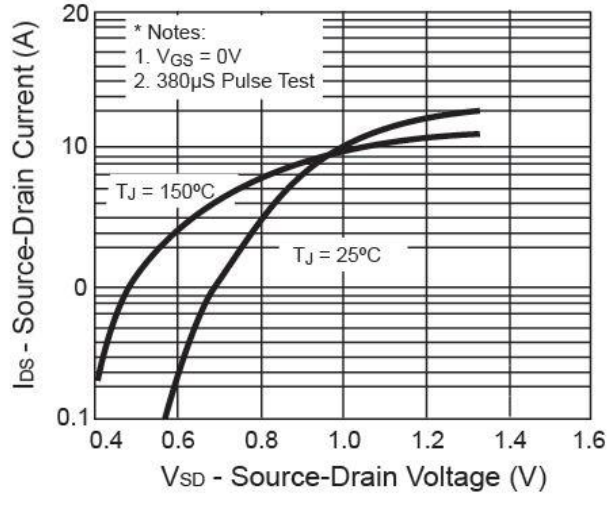
Gate Charge



On-Resistance vs. Junction Temperature

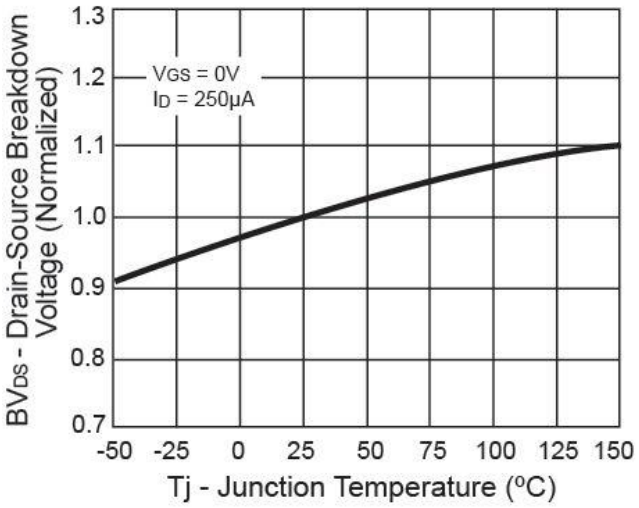


Source-Drain Diode Forward Voltage

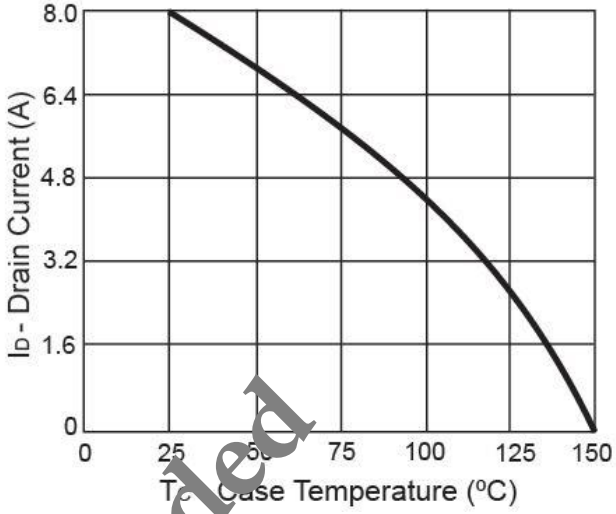


Electrical Characteristics Curve (Ta = 25°C, unless otherwise noted)

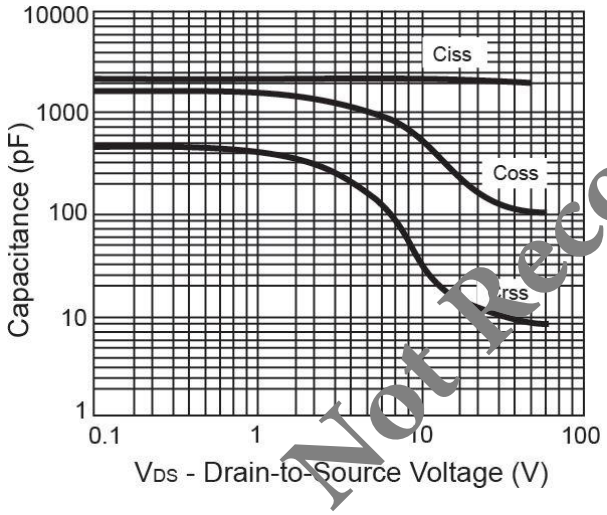
BV_{DS} vs. Junction Temperature



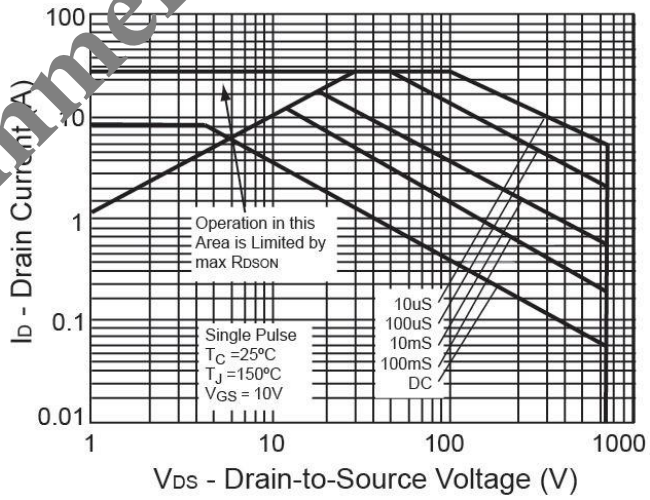
Drain Current vs., Case Temperature



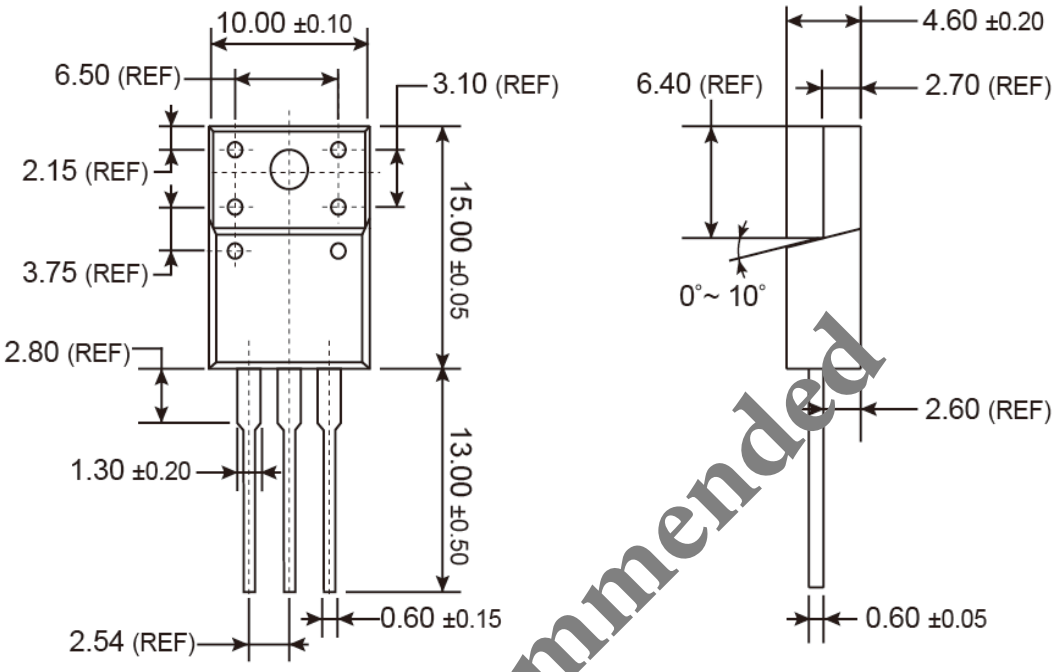
Capacitance



Maximum Safe Operating Area

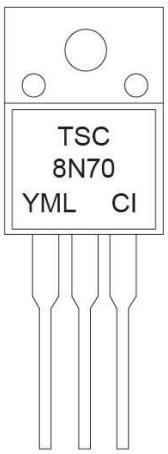


ITO-220 Mechanical Drawing



Unit: Millimeters

Marking Diagram



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

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