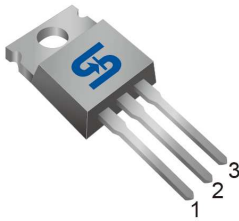
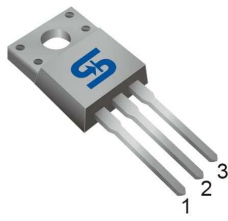


TO-220



ITO-220



Pin Definition:

1. Gate
2. Drain
3. Source

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)(max)	I_D (A)
600	0.75 @ $V_{GS}=10V$	10

Features

- Advanced high dense cell design.
- High Power and Current handing capability.

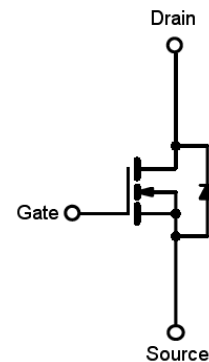
Application

- Power Supply.
- Lighting.

Ordering Information

Part No.	Package	Packing
TSM10N60CZ C0	TO-220	50pcs / Tube
TSM10N60CI C0	ITO-220	50pcs / Tube

Block Diagram



N-Channel MOSFET

Absolute Maximum Rating ($T_C = 25^\circ C$ unless otherwise noted)

Parameter		Symbol	Limit		Unit
			TO-220	ITO-220	
Drain-Source Voltage		V _{DS}	600		V
Gate-Source Voltage		V _{GS}	±30		V
Continuous Drain Current	T _C = 25 °C	I _D ^a	10		A
	T _C = 100 °C		6		
Pulsed Drain Current ^b		I _{DM} ^a	40		A
Total Power Dissipation @ T _C =25C		P _{DTOT}	166	50	W
Single Pulsed Avalanche Energy ^c		E _{AS}	41		mJ
Operating Junction and Storage Temperature Range		T _J , T _{STG}	- 55 to +150		°C

Thermal Performance

Parameter	Symbol	Limit		Unit
Junction to Case Thermal Resistance	$R\theta_{JC}$	0.75	2.5	$^\circ C/W$
Junction to Ambient Thermal Resistance	$R\theta_{JA}$	63		$^\circ C/W$

Notes a: Current limited by package

Notes b: Pulse width limited by the Maximum junction temperature

Notes c: $L=0.75mH$, $I_{AS}=10A$, $V_{DD}=50V$, $R_G=25\Omega$, Starting $T_J=25^\circ C$

Specifications (Ta = 25°C unless otherwise noted)

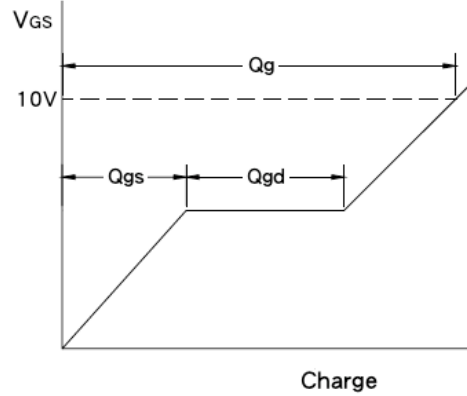
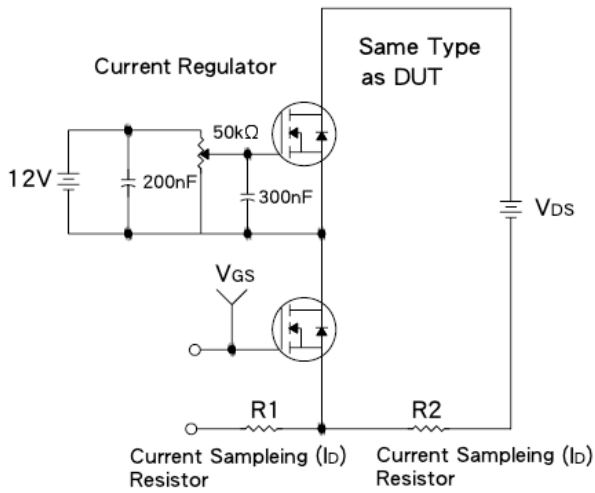
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static ^a						
Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250uA	BV _{DSS}	600	--	--	V
Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	V _{GS(TH)}	2	3.1	4	V
Gate Body Leakage	V _{GS} = ±30V, V _{DS} = 0V	I _{GSS}	--	--	±100	nA
Zero Gate Voltage Drain Current	V _{DS} = 600V, V _{GS} = 0V	I _{DSS}	--	--	20	μA
Drain-Source On-State Resistance	V _{GS} = 10V, I _D = 5A	R _{DS(ON)}	--	0.61	0.75	Ω
Dynamic ^b						
Total Gate Charge	V _{DS} = 300V, I _D = 10A, V _{GS} = 10V	Q _g	--	45.8	--	nC
Gate-Source Charge		Q _{gs}	--	11.5	--	
Gate-Drain Charge		Q _{gd}	--	16	--	
Input Capacitance	V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHZ	C _{iss}	--	1738	--	pF
Output Capacitance		C _{oss}	--	195	--	
Reverse Transfer Capacitance		C _{rss}	--	26.3	--	
Switching ^b						
Turn-On Delay Time	V _{DD} = 300V, R _G = 10Ω, I _D = 10A, V _{GS} = 10V,	t _{d(on)}	--	33.6	--	nS
Turn-On Rise Time		t _r	--	7.4	--	
Turn-Off Delay Time		t _{d(off)}	--	68	--	
Turn-Off Fall Time		t _f	--	15.2	--	
Source-Drain Diode ^a						
Forward On Voltage	I _S =10A, V _{GS} =0V	VSD	--	0.8	1.5	V

Notes a: Pulse test: PW $\leq 300\mu s$, duty cycle $\leq 2\%$

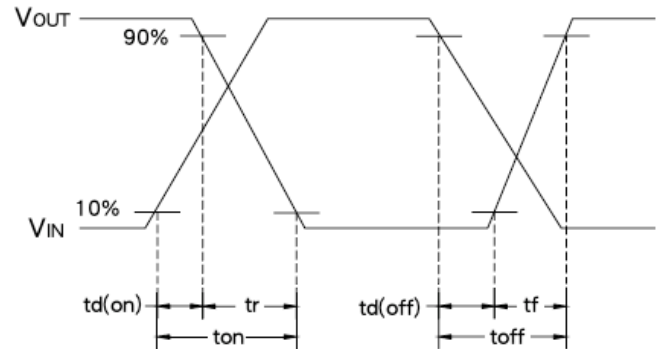
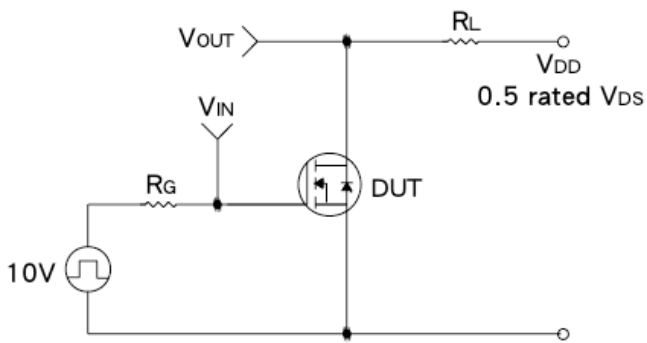
Notes b: For DESIGN AID ONLY, not subject to production testing.

Notes c: Switching time is essentially independent of operating temperature.

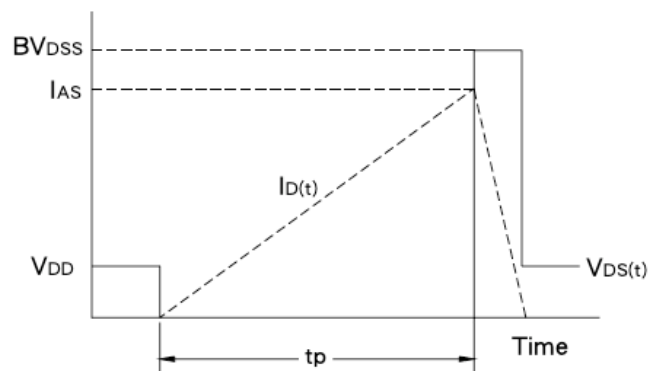
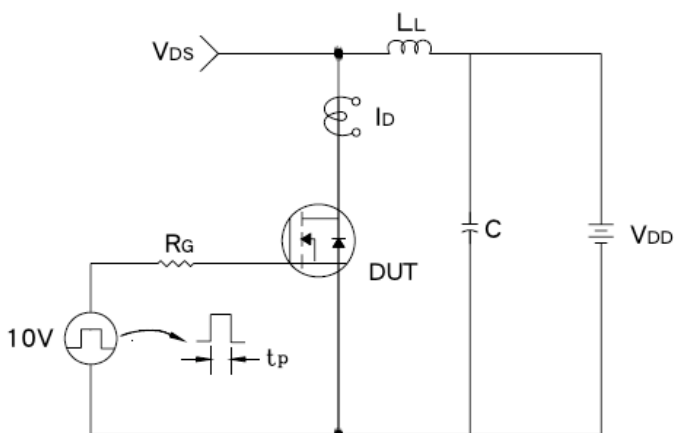
Gate Charge Test Circuit & Waveform



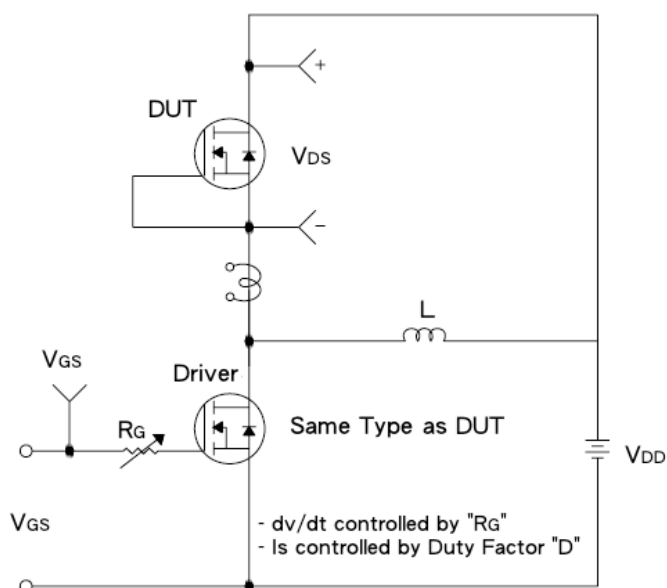
Resistive Switching Test Circuit & Waveform



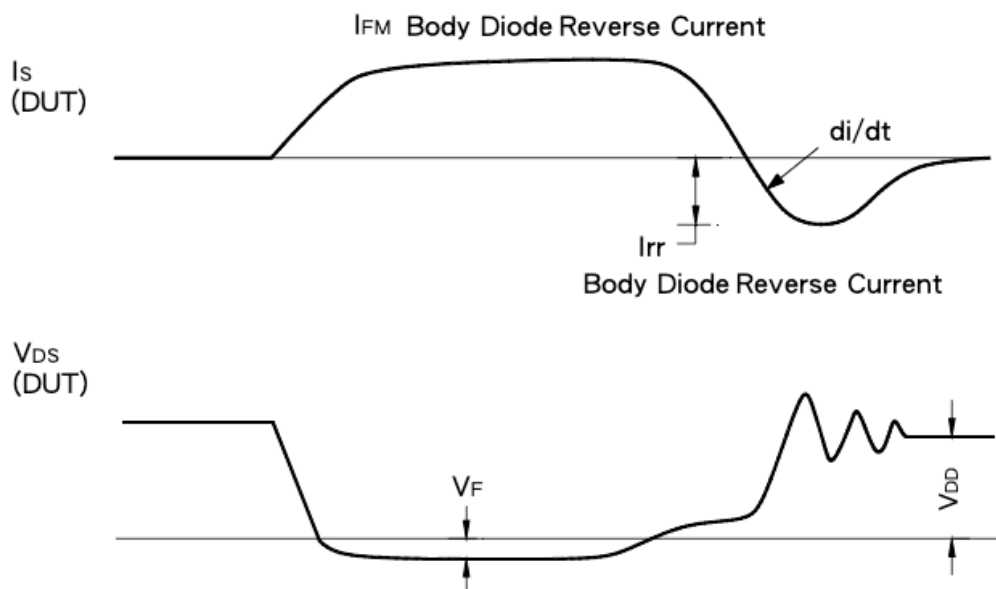
E_{AS} Test Circuit & Waveform



Diode Reverse Recovery Time Test Circuit & Waveform

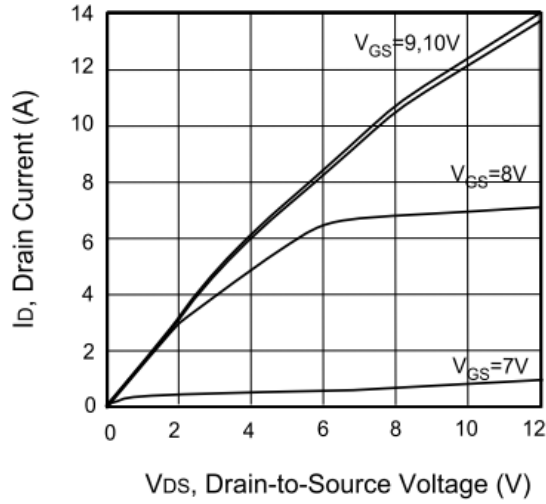


$D = \frac{\text{Gate Pulse Width}}{\text{Gate Pulse Period}}$

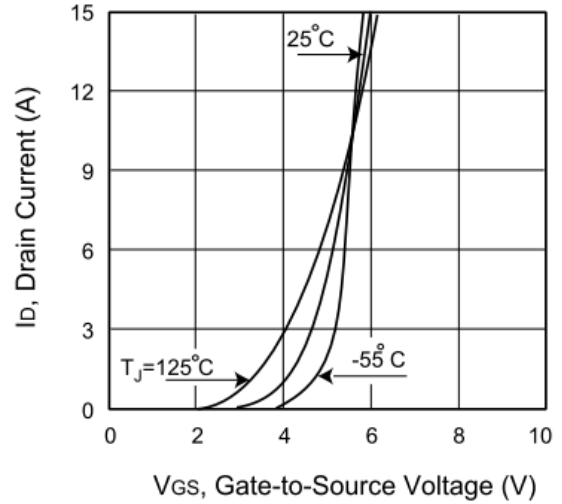


Electrical Characteristics Curve ($T_a = 25^\circ\text{C}$, unless otherwise noted)

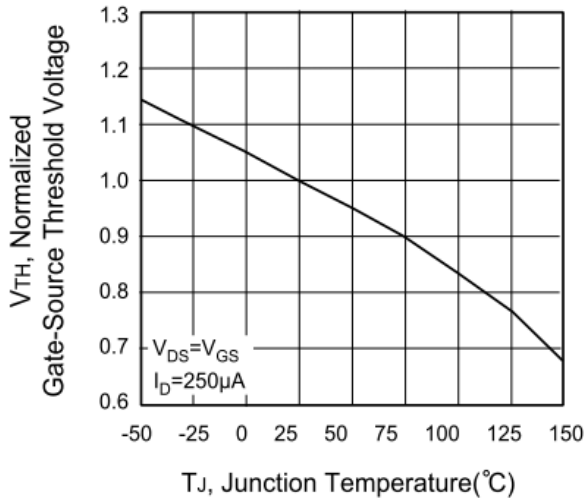
Output Characteristics



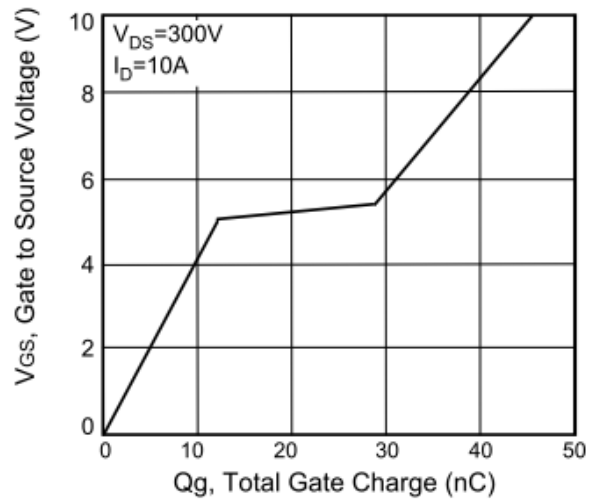
Transfer Characteristics



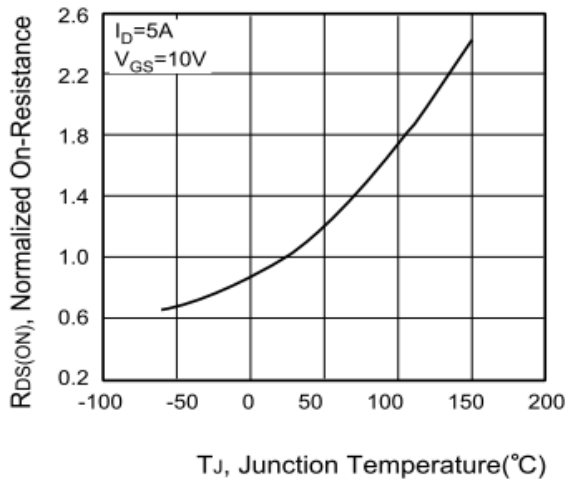
Threshold Voltage



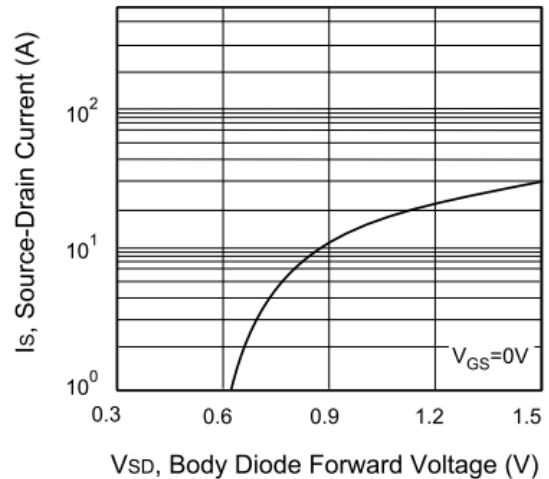
Gate Charge



On-Resistance vs. Junction Temperature

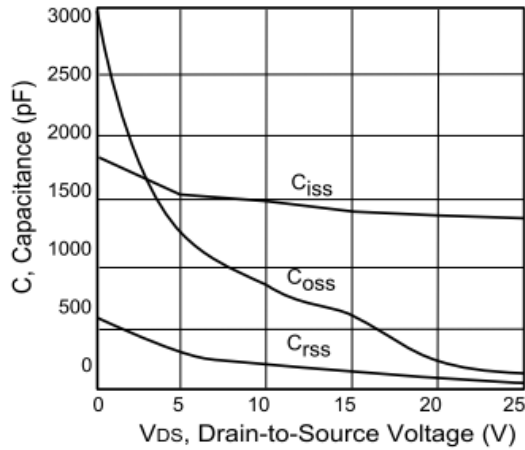


Source-Drain Diode Forward Voltage

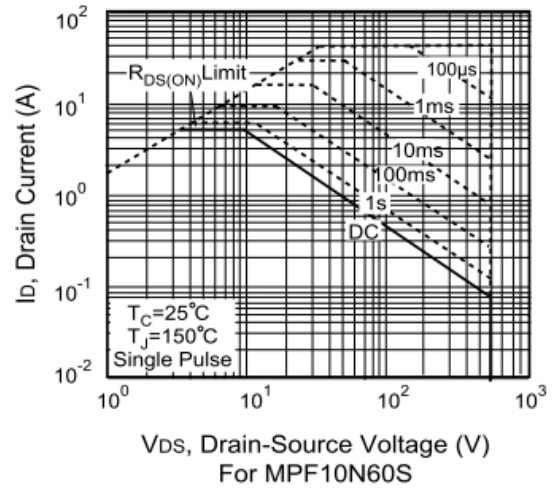


Electrical Characteristics Curve (Ta = 25°C, unless otherwise noted)

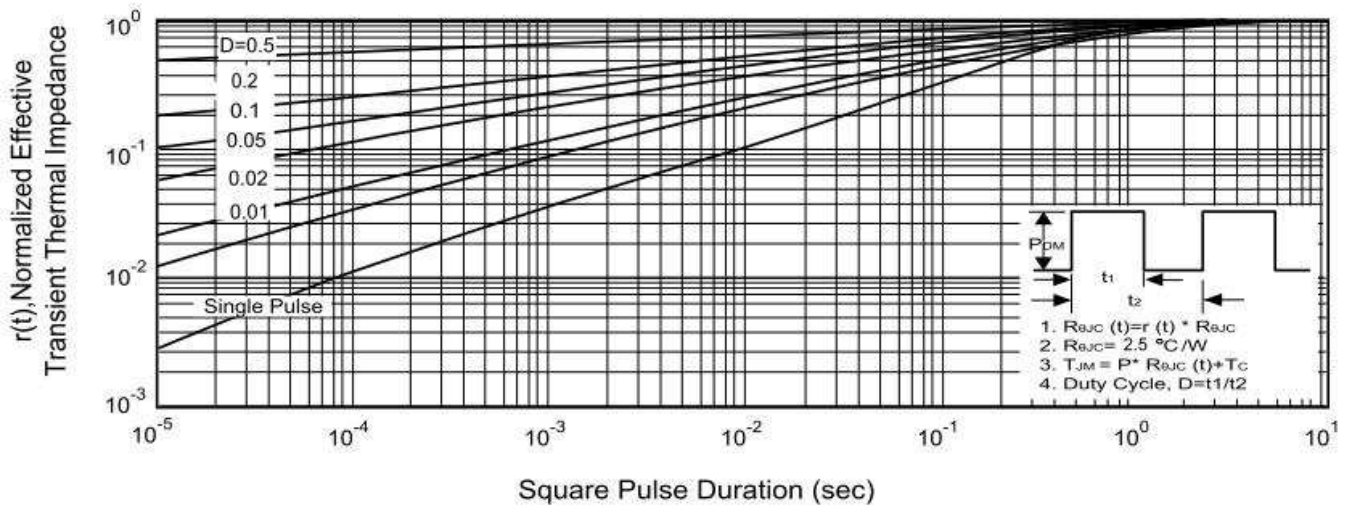
Capacitance Characteristics



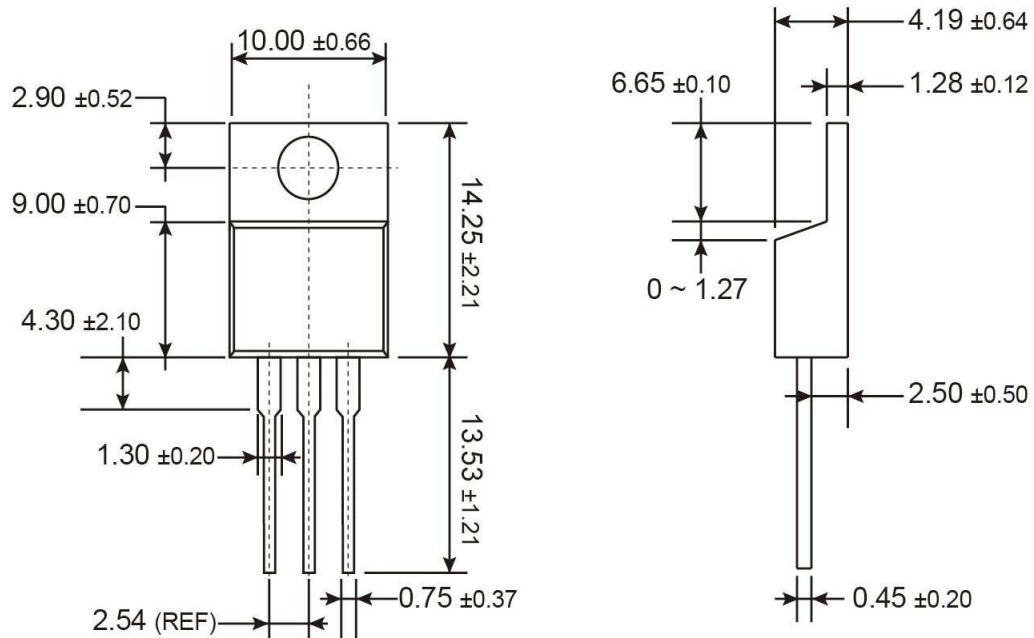
Maximum Safe Operating Area - ITO-220



Normalized Thermal Transient Impedance, Junction-to-Ambient

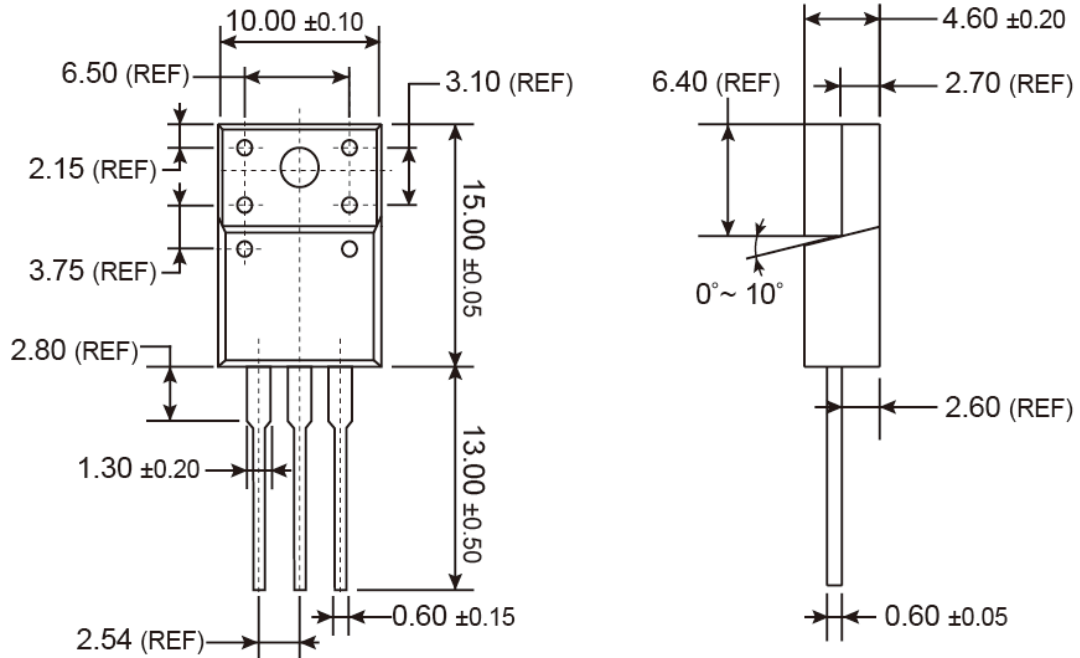


TO-220 Mechanical Drawing



Unit: Millimeters

ITO-220 Mechanical Drawing



Unit: Millimeters

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