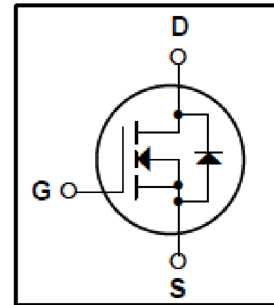
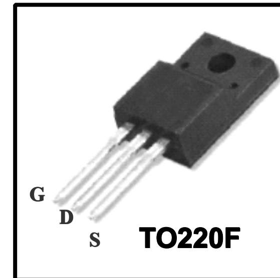
Silicon N-Channel MOSFET



Features

- 12A, 600V,$R_{DS(on)}$(Max 0.65Ω)@V_{GS}=10V
- Ultra-low Gate Charge(Typical 39nC)
- Fast Switching Capability
- 100%Avalanche Tested
- Isolation Voltage (V_{ISO} = 4000V AC)
- Maximum Junction Temperature Range(150℃)



General Description

This Power MOSFET is produced using Winsemi's advanced planar stripe, VDMOS technology. This latest technology has been especially designed to minimize on-state resistance, have a high rugged avalanche characteristics. This devices is specially well suited for high efficiency switch model power supplies, power factor correction and half bridge and full bridge resonant topology line a Electronic lamp ballast.

Absolute Maximum Ratings

Symbol	Parameter	Value	Units
V_{DSS}	Drain Source Voltage	600	V
I_D	Continuous Drain Current(@Tc=25℃)	12*	A
	Continuous Drain Current(@Tc=100℃)	7.6*	A
I_{DM}	Drain Current Pulsed (Note1)	48*	A
V_{GS}	Gate to Source Voltage	±30	V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	880	mJ
E_{AR}	Repetitive Avalanche Energy (Note 1)	25	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	4.5	V/ns
P_D	Total Power Dissipation(@Tc=25℃)	51	W
	Derating Factor above 25℃	0.41	W/℃
T_J, T_{stg}	Junction and Storage Temperature	-55~150	℃
T_L	Maximum lead Temperature for soldering purposes	300	℃

*Drain current limited by maximum junction temperature

Thermal Characteristics

Symbol	Parameter	Value			Units
		Min	Typ	Max	
R_{QJC}	Thermal Resistance, Junction-to-Case	-	-	2.45	℃/W
R_{QCS}	Thermal Resistance, Case to Sink	-	0.5	-	℃/W
R_{QJA}	Thermal Resistance, Junction-to-Ambient	-	-	62.5	℃/W

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Electrical Characteristics (Tc = 25°C)

Characteristics		Symbol	Test Condition	Min	Type	Max	Unit
Gate leakage current		I_{GSS}	V_{GS} = ±30 V, VDS = 0 V	-	-	±100	nA
Gate−source breakdown voltage		$V_{(BR)GSS}$	I_G = ±10 μA, VDS = 0 V	±30	-	-	V
Drain cut−off current		I_{DSS}	V_{DS} = 600 V, VGS = 0 V	-	-	1	μA
Drain−source breakdown voltage		$V_{(BR)DSS}$	I_D = 250 μA, VGS = 0 V	600	-	-	V
Break Voltage Temperature Coefficient		$\Delta BV_{DSS}/\Delta T_J$	I_D=250μA, Referenced to 25℃	-	0.5	-	V/℃
Gate threshold voltage		$V_{GS(th)}$	V_{DS} = 10 V, ID =250 μA	3	-	4.5	V
Drain−source ON resistance		$R_{DS(ON)}$	V_{GS} = 10 V, ID =6.0A	-	-	0.65	Ω
Forward Transconductance		gfs	V_{DS} = 50 V, ID =6.0A	-	15		S
Input capacitance		C_{iss}	V_{DS} = 25 V,	-	1790	2355	pF
Reverse transfer capacitance		C_{rss}	V_{GS} = 0 V,	-	175	232	
Output capacitance		C_{oss}	f = 1 MHz	-	23	31	
Switching time	Turn−on Rise time	t_r	V_{DD} =300 V,	-	133	175	ns
	Turn−on Delay time	t_{on}	I_D =12 A	-	80	100	
	Turn−off Fall time	t_f	R_G=9.1 Ω	-	100	160	
	Turn−off Delay time	t_{off}	R_D=31 Ω (Note4,5)	-	233	310	
Total gate charge (gate−source plus gate−drain)		Qg	V_{DD} = 400 V,	-	39	52	nC
Gate−source charge		Qgs	V_{GS} = 10 V,	-	8.5	-	
Gate−drain ("miller") Charge		Qgd	I_D =1 A (Note4,5)	-	19	-	

Source−Drain Ratings and Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Type	Max	Unit
Continuous drain reverse current	I_{DR}	-	-	-	12	A
Pulse drain reverse current	I_{DRP}	-	-	-	48	A
Forward voltage (diode)	V_{DSF}	I_{DR} = 12 A, VGS = 0 V	-	-	1.4	V
Reverse recovery time	t_{rr}	I_{DR} = 12 A, VGS = 0 V,	-	418	-	ns
Reverse recovery charge	Q_{rr}	dI_{DR} / dt = 100 A / μs	-	4.85	-	μC

Note 1.Repeativity rating :pulse width limited by junction temperature

2.L=11.2mH,I_{AS}=12A,V_{DD}=50V,R_G=25Ω,Starting T_J=25℃

3.I_{SD}≤12A,di/dt≤300A/us, V_{DD}<BV_{DSS},STARTING TJ=25℃

4.Pulse Test: Pulse Width≤300us,Duty Cycle≤2%

5.Essentially independent of operating temperature.

This transistor is an electrostatic sensitive device

Please handle with caution

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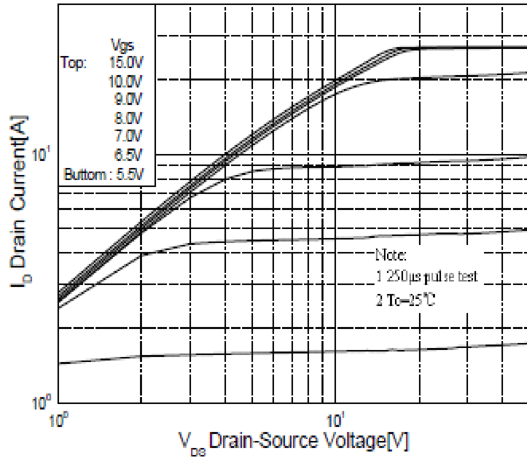

Fig. 1 On-State Characteristics

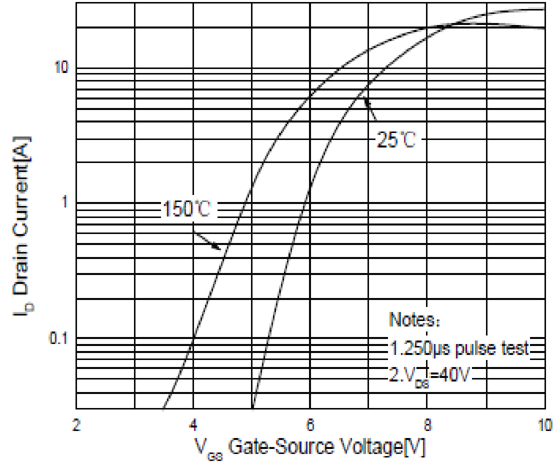

Fig.2 Transfer Characteristics

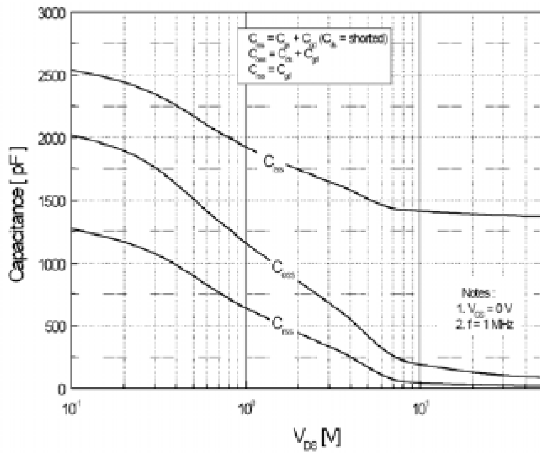

Fig.3 Capacitance Variation vs Drain Voltage

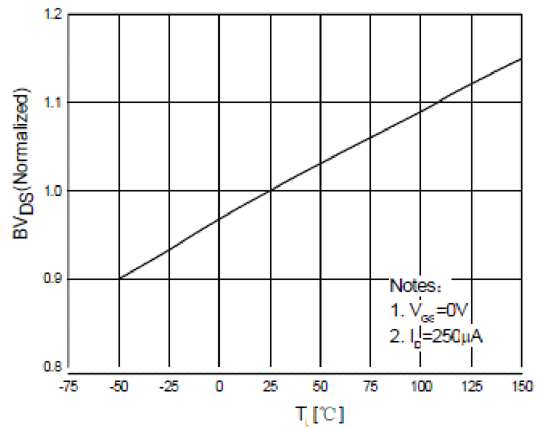

Fig.4 Breakdown Voltage Variation vs Temperature

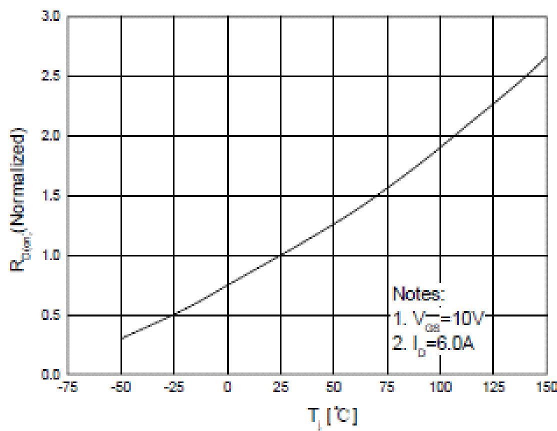

Fig.5 On-Resistance Variation vs Junction Temperature

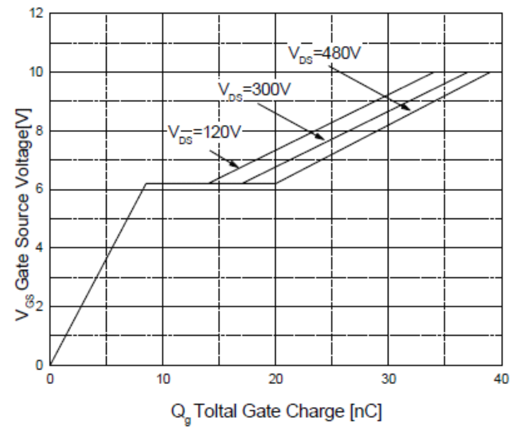

Fig.6 Gate Charge Characteristics

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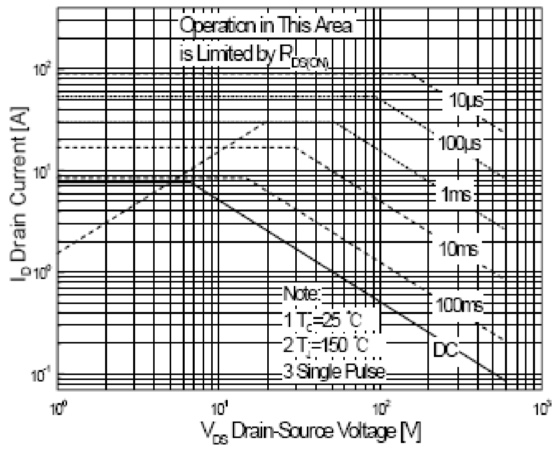

Fig.7 Maximum Safe Operation Area

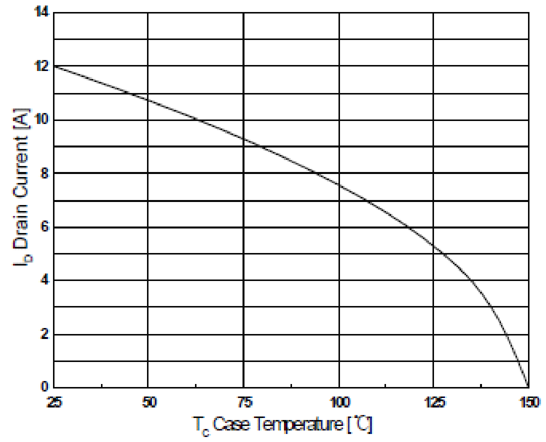

Fig.8 Maximum Drain Current vs Case Temperature

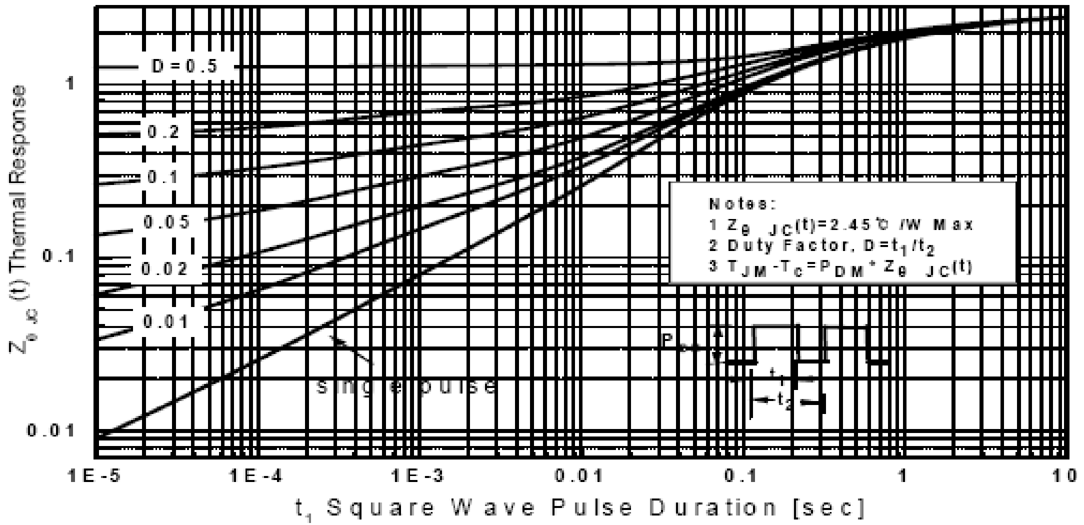

Fig.9 Transient Thermal Response Curve

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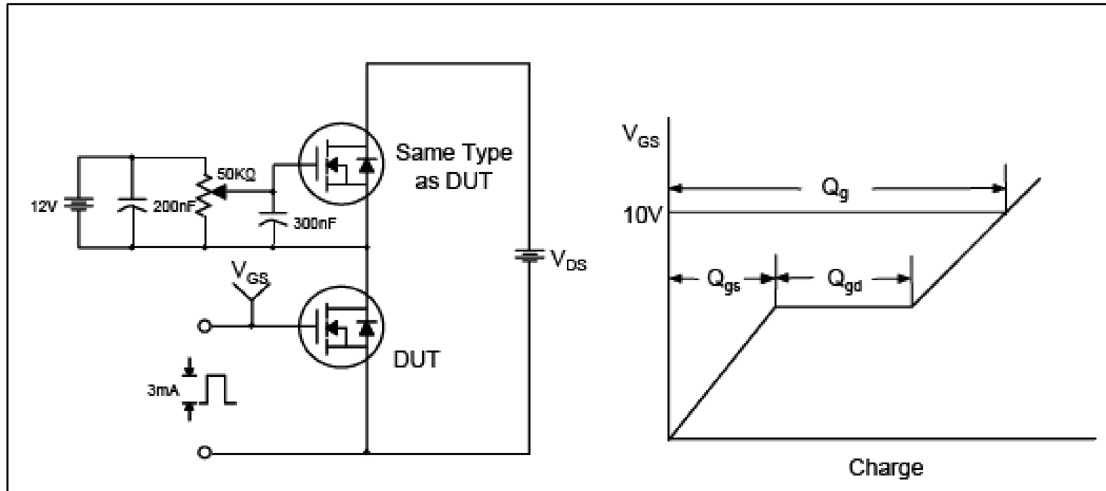

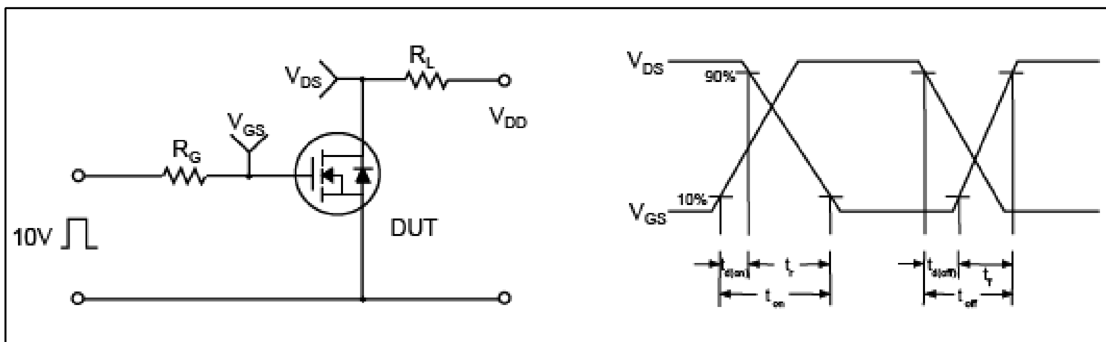

Fig.11 Resistive Switching Test Circuit & Waveform

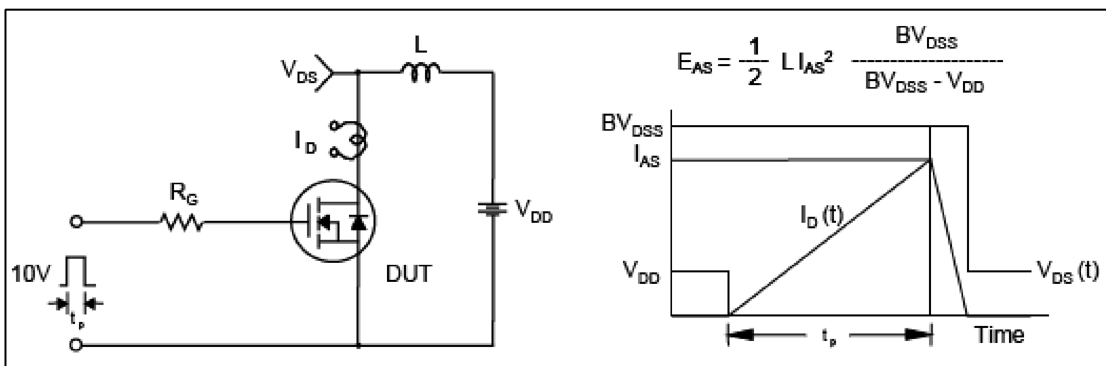

Fig.12 Unclamped Inductive Switching Test Circuit & Waveform

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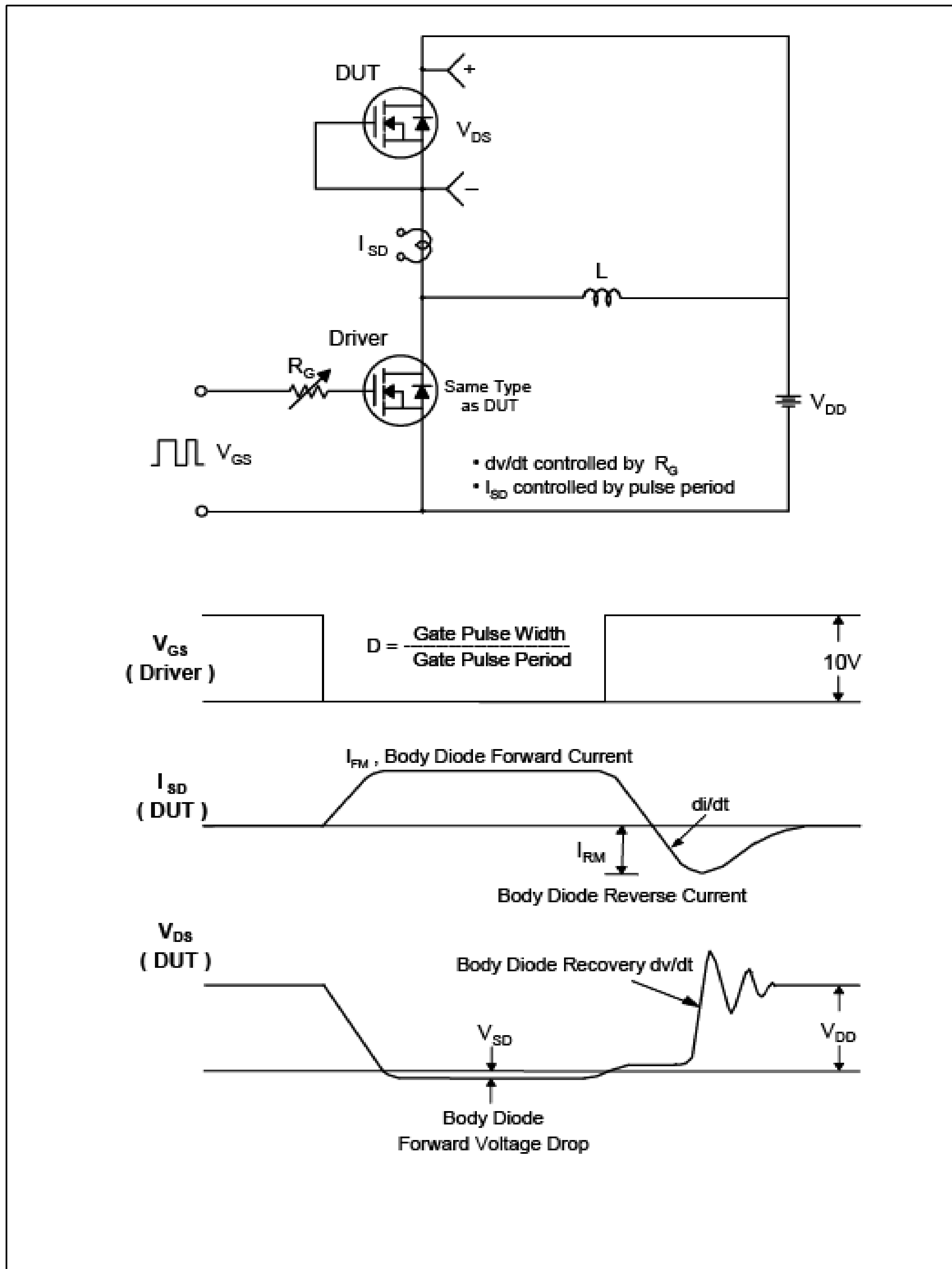

Fig.13 Peak Diode Recovery dv/dt Test Circuit & Waveform

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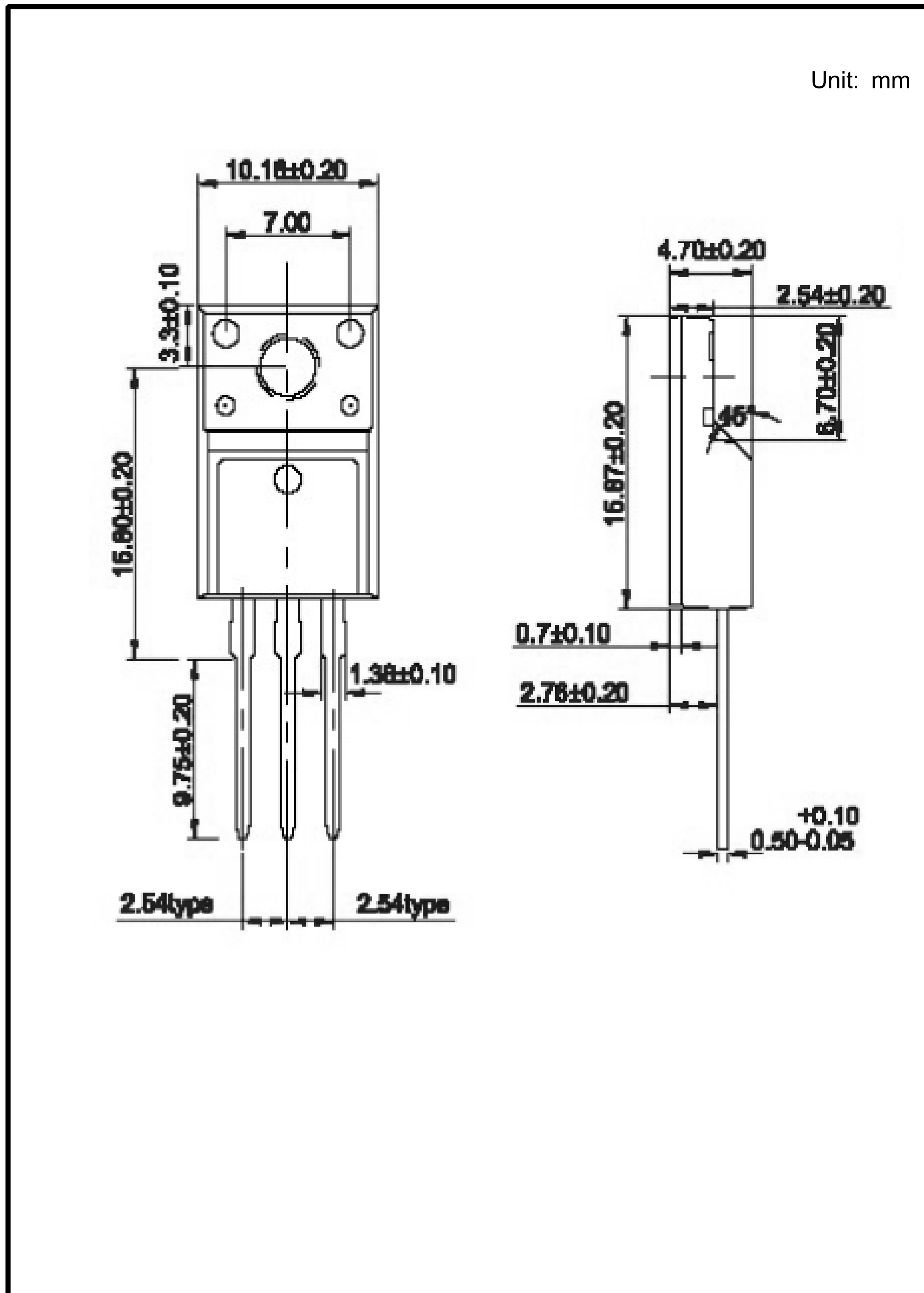
TO-220F Package Dimension



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