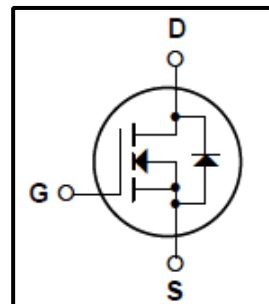


Silicon N-Channel MOSFET

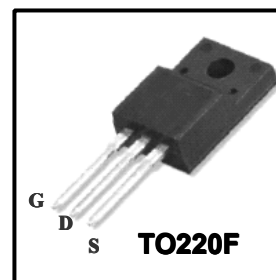
Features

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



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 (@ $T_c=25^\circ C$)	12*	A
	Continuous Drain Current (@ $T_c=100^\circ C$)	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 (@ $T_c=25^\circ C$)	51	W
	Derating Factor above $25^\circ C$	0.41	W/ $^\circ C$
T_J, T_{stg}	Junction and Storage Temperature	-55~150	$^\circ C$
T_L	Maximum lead Temperature for soldering purposes	300	$^\circ C$

*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	$^\circ C/W$
R_{QCS}	Thermal Resistance, Case to Sink	-	0.5	-	$^\circ C/W$
R_{QJA}	Thermal Resistance, Junction-to-Ambient	-	-	62.5	$^\circ C/W$

Electrical Characteristics (Tc = 25°C)

Characteristics		Symbol	Test Condition	Min	Type	Max	Unit
Gate leakage current		I_{GSS}	$V_{GS} = \pm 30 \text{ V}, V_{DS} = 0 \text{ V}$	-	-	± 100	nA
Gate-source breakdown voltage		$V_{(BR)GSS}$	$I_G = \pm 10 \mu\text{A}, V_{DS} = 0 \text{ V}$	± 30	-	-	V
Drain cut-off current		I_{DSS}	$V_{DS} = 600 \text{ V}, V_{GS} = 0 \text{ V}$	-	-	1	μA
Drain-source breakdown voltage		$V_{(BR)DSS}$	$I_D = 250 \mu\text{A}, V_{GS} = 0 \text{ V}$	600	-	-	V
Break Voltage Temperature Coefficient		$\frac{\Delta BV_{DSS}}{\Delta T_J}$	$I_D = 250 \mu\text{A}$, Referenced to 25°C	-	0.5	-	V/°C
Gate threshold voltage		$V_{GS(th)}$	$V_{DS} = 10 \text{ V}, I_D = 250 \mu\text{A}$	3	-	4.5	V
Drain-source ON resistance		$R_{DS(ON)}$	$V_{GS} = 10 \text{ V}, I_D = 6.0 \text{ A}$	-	-	0.65	Ω
Forward Transconductance		g_{fs}	$V_{DS} = 50 \text{ V}, I_D = 6.0 \text{ A}$	-	15		S
Input capacitance		C_{iss}	$V_{DS} = 25 \text{ V},$	-	1790	2355	pF
Reverse transfer capacitance		C_{rss}	$V_{GS} = 0 \text{ V},$	-	175	232	
Output capacitance		C_{oss}	$f = 1 \text{ MHz}$	-	23	31	
Switching time	Turn-on Rise time	t_r	$V_{DD} = 300 \text{ V},$	-	133	175	ns
	Turn-on Delay time	t_{on}	$I_D = 12 \text{ A}$	-	80	100	
	Turn-off Fall time	t_f	$R_G = 9.1 \Omega$	-	100	160	
	Turn-off Delay time	t_{off}	$R_D = 31 \Omega$ (Note4,5)	-	233	310	
Total gate charge (gate-source plus gate-drain)		Q_g	$V_{DD} = 400 \text{ V},$	-	39	52	nC
Gate-source charge		Q_{gs}	$V_{GS} = 10 \text{ V},$	-	8.5	-	
Gate-drain ("miller") Charge		Q_{gd}	$I_D = 1 \text{ A}$ (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}	$I_{DR} = 12 \text{ A}, V_{GS} = 0 \text{ V}$	-	-	1.4	V
Reverse recovery time	t_{rr}	$I_{DR} = 12 \text{ A}, V_{GS} = 0 \text{ V},$	-	418	-	ns
Reverse recovery charge	Q_{rr}	$dI_{DR} / dt = 100 \text{ A} / \mu\text{s}$	-	4.85	-	μC

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

2.L=11.2mH,IAS=12A,VDD=50V,RG=25Ω,Starting TJ=25°C

3.ISD≤12A,di/dt≤300A/us, VDD<BV_{DSS},STARTING TJ=25°C

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

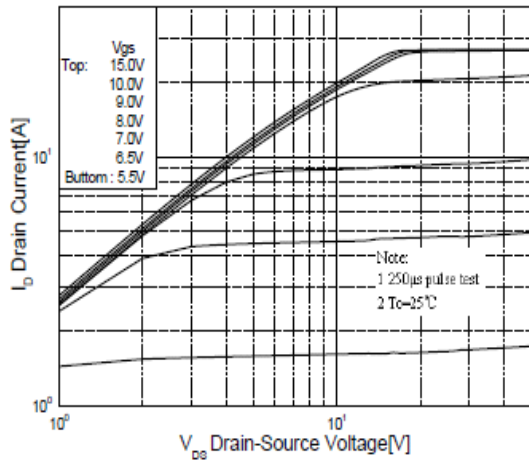


Fig. 1 On-State Characteristics

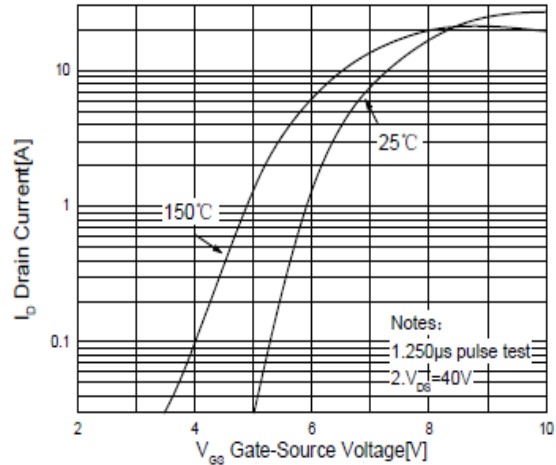


Fig. 2 Transfer Characteristics

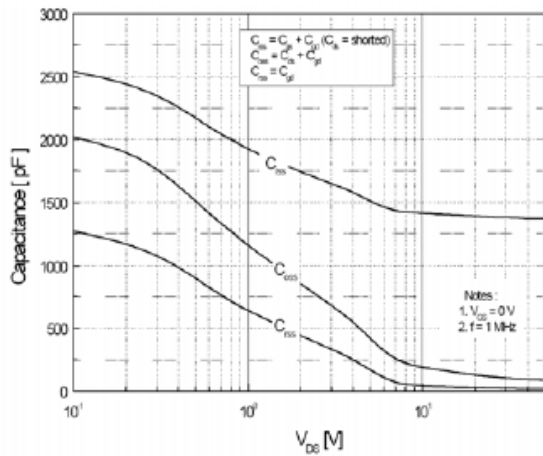


Fig. 3 Capacitance Variation vs Drain Voltage

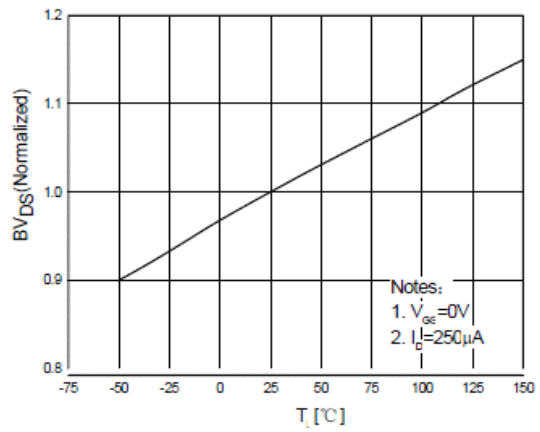


Fig. 4 Breakdown Voltage Variation vs Temperature

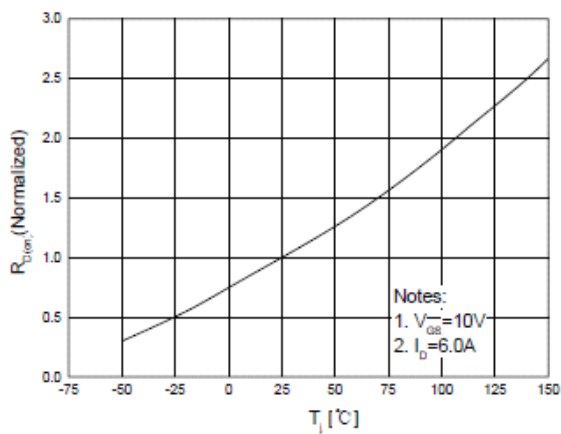


Fig. 5 On-Resistance Variation vs Junction Temperature

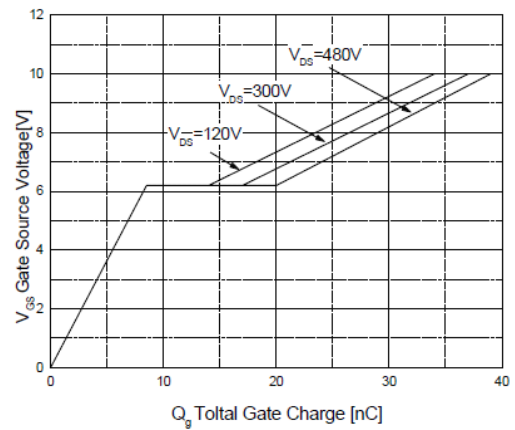


Fig. 6 Gate Charge Characteristics

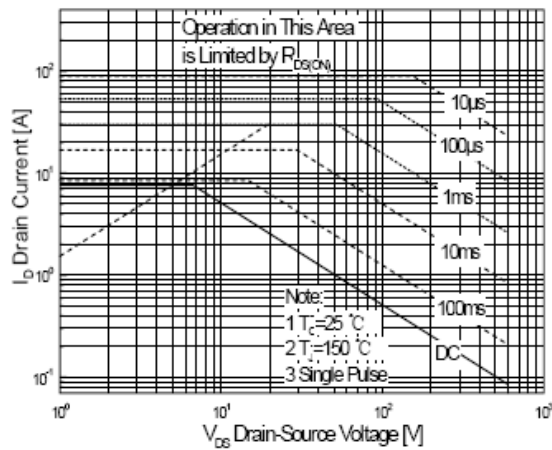


Fig.7 Maximum Safe Operation Area

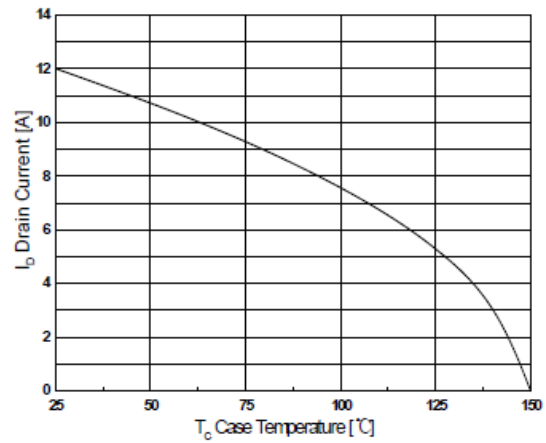


Fig.8 Maximum Drain Current vs Case Temperature

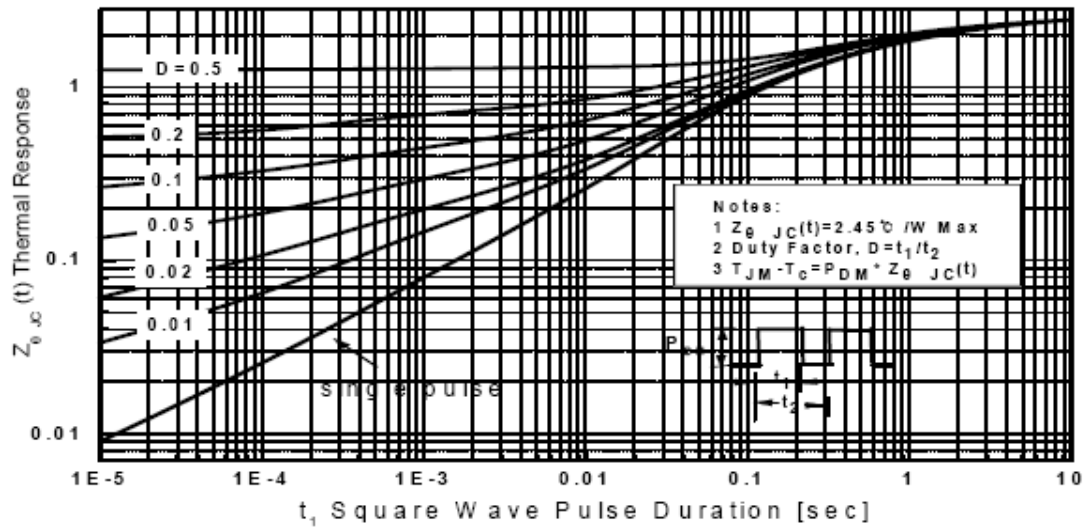


Fig.9 Transient Thermal Response Curve

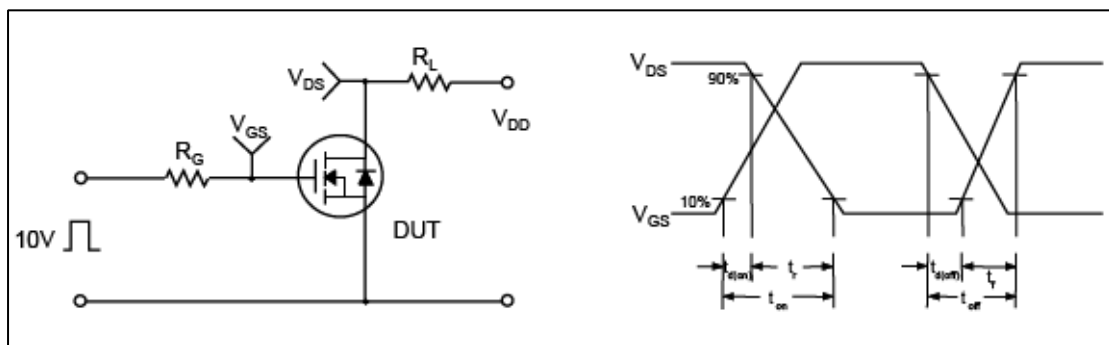
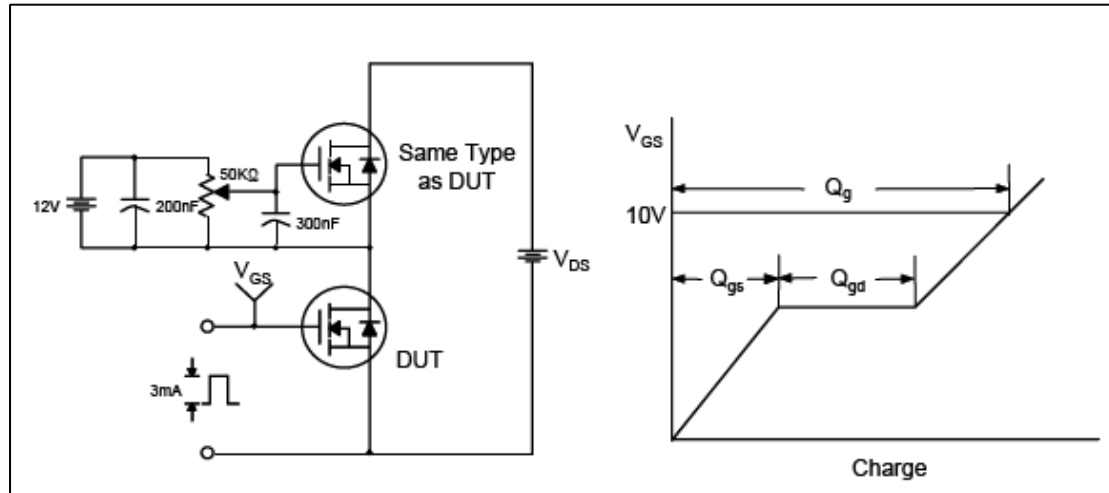


Fig.11 Resistive Switching Test Circuit & Waveform

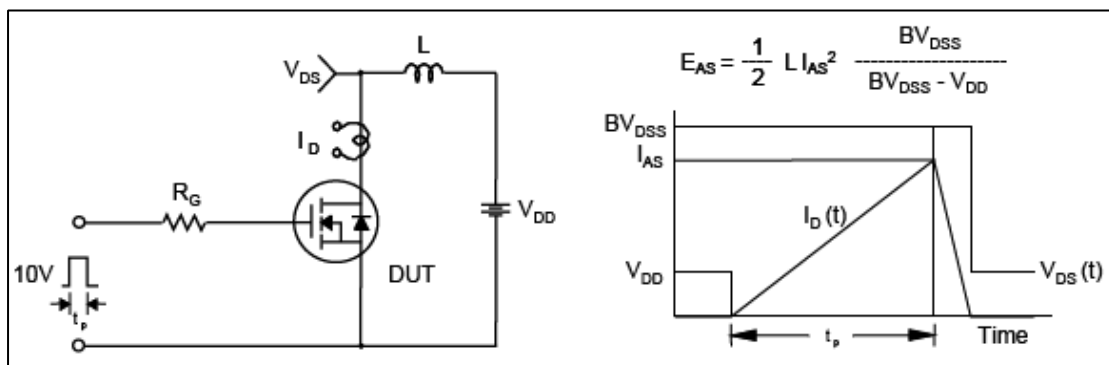


Fig.12 Unclamped Inductive Switching Test Circuit & Waveform

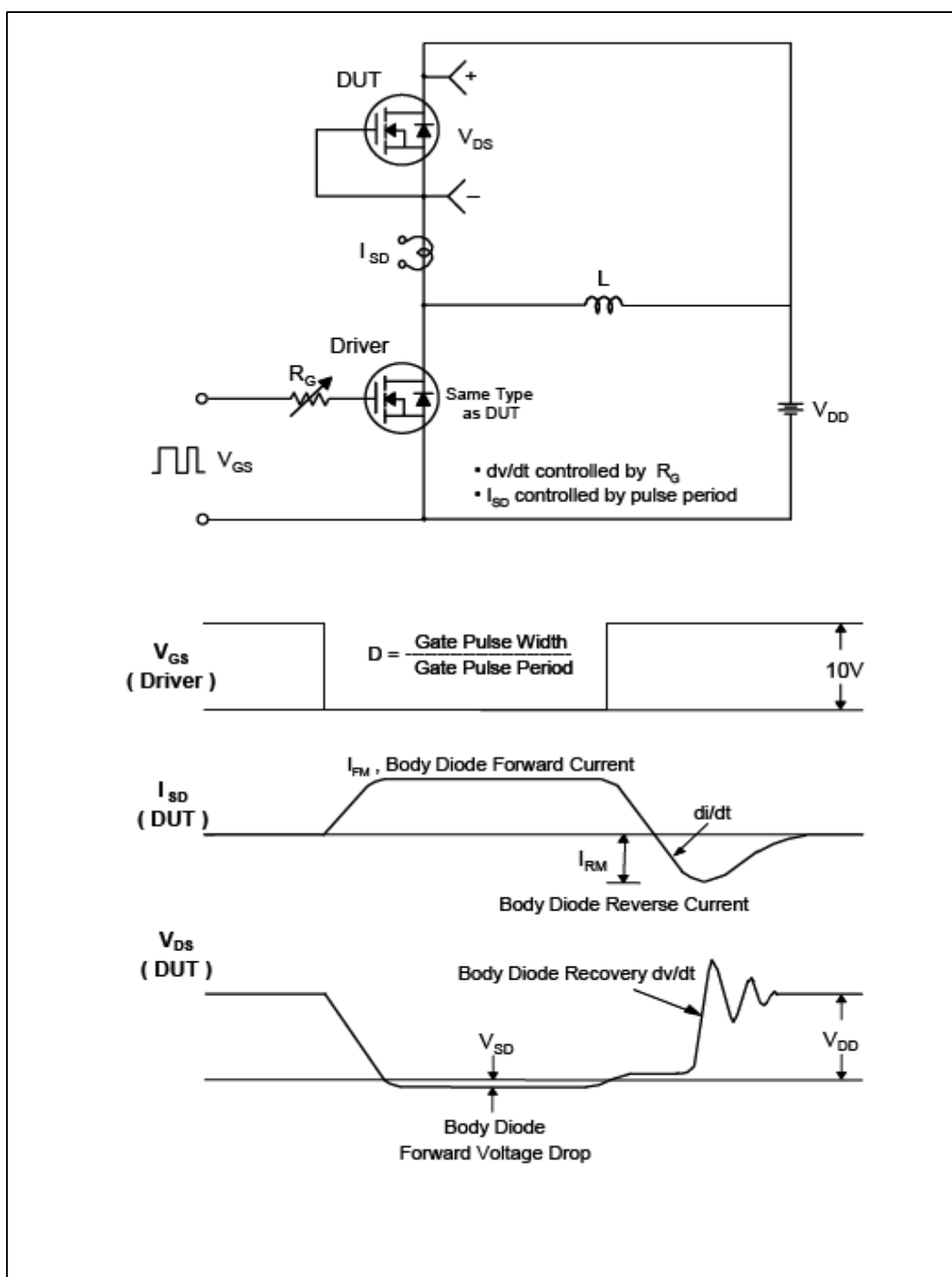


Fig.13 Peak Diode Recovery dv/dt Test Circuit & Waveform

TO-220F Package Dimension

Unit: mm

