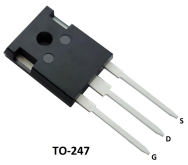
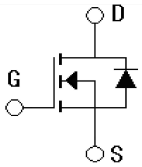
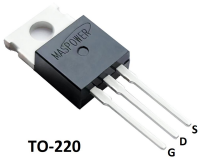
MS20N85ICC0/T0/T1

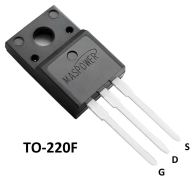
Features

- Very low FOM $R_{DS(on)}$×Qg
- 100% avalanche tested
- Easy to use/drive
- RoHS compliant









Applications

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)
- Low Power Chargers and Adapters

Absolute Ratings (Tc=25℃)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	850	V
Drain Current-continuous	I_D T=25℃	20	A
	T=100℃	10	A
Drain Current-pulse (note 1)	I_{DM}	80	A
Gate-Source Voltage	V_{GSS}	±30	V
Single Pulsed Avalanche Energy (note 2)	E_{AS}	1125	mJ
Repetitive Avalanche Energy(note 2)	E_{AR}	27.8	mJ
Avalanche Current	I_{AR}	4.6	A
MOSFET dv/dt Ruggedness, VDS = 0...480V	dv/dt	50	V/ns
Continuous Diode Forward Current	I_S	20	A
Diode Pulsed Current(note 1)	$I_{S,pulse}$	69	A
Reverse Diode dv/dt(note 3)	dv/dt	15	V/ns
Maximum Diode Commutation Speed(note 3)	di/dt	500	A/μs
Power Dissipation (TO-247/TO-220)	PD	183	W
Power Dissipation (TO-220F)	PD	68	W
Operating and Storage Temperature Range	T_J,T_{STG}	-55~+150	℃

Electrical Characteristics(T_{CASE}=25℃ unless otherwise specified)

Parameter	Symbol	Tests conditions	Min	Typ	Max	Units
Drain-Source Voltage	BV_{DSS}	I_D=250μA,V_{GS}=0V	850	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=800V,V_{GS}=0V，T_C=25℃	-	-	1	μA
		V_{DS}=800V，T_C=150℃	-	-	100	μA
Gate body leakage current	I_{GSS}	V_{DS}=0V,V_{GS}=±30V	-	-	±100	nA
On-Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	2.5	-	4.5	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V,I_D=10A	-	320	380	mΩ
Gate Resistance	R_G	f = 1.0MHz open drain	-	1.5	-	Ω
Dynamic Characteristics						
Input capacitance	C_{iss}	V_{DS}=100V, V_{GS}=0V, f=1.0MHZ	-	2468.4	-	pF
Output capacitance	C_{oss}		-	56.81	-	pF
Reverse transfer capacitance	C_{rss}		-	5.2	-	pF

Electrical Characteristics(T_{CASE}=25℃ unless otherwise specified)

Parameter	Symbol	Tests conditions	Min	Typ	Max	Units
Switching-Characteristics						
Turn-On delay time	$t_{d(on)}$	V_{DD}=400V,I_D=20A, R_G=25Ω	-	68.45	-	ns
Turn-On rise time	t_r		-	76.9	-	ns
Turn-Off delay time	$t_{d(Off)}$		-	180.2	-	ns
Turn-Off rise time	t_f		-	58.35	-	ns
Total Gate Charge	Q_g	V_{DS}=640V,I_D=20A, V_{GS}=10V	-	54.9	-	nC
Gate-Source charge	Q_{gs}		-	10.4	-	nC
Gate-Drain charge	Q_{gd}		-	21.5	-	nC
Drain-Source Diode Characteristics and Maximum Ratings						

Source-Drain Current (Body Diode)	I_{SD}	T_C=25℃	-	-	10	A
Reverse recovery time	t_{rr}	V_R=400,I_F=20A dI_F/dt=100A/μs	-	405.4	-	ns
Reverse recovery charge	Q_{rr}		-	4.633	-	μC
Peak Reverse Recovery Current	I_{rrm}		-	22.83	-	A

Thermal Characteristic

Parameter	Symbol	Value		Unit
		TO-247/ TO-220	TO-220F	
Thermal Resistance,junction to Case	R_{th}(j-C)	0.68	1.84	℃/W
Thermal Resistance,junction to Ambient	R_{th}(j-A)	62.5	62.5	℃/W

Notes:

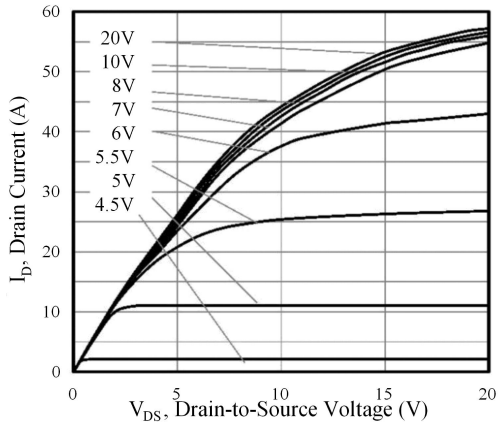
1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. I_D = 10A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C
3. Identical low side and high side switch with identical R_G

Order information

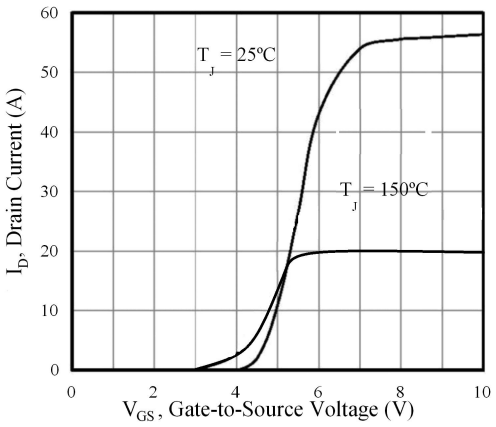
Order codes	Package	Packaging
MS20N85ICC0	TO-247	Tube
MS20N85ICT0	TO-220	Tube
MS20N85ICT1	TO-220F	Tube

Typical Characteristics (TJ = 25° C, unless otherwise noted)

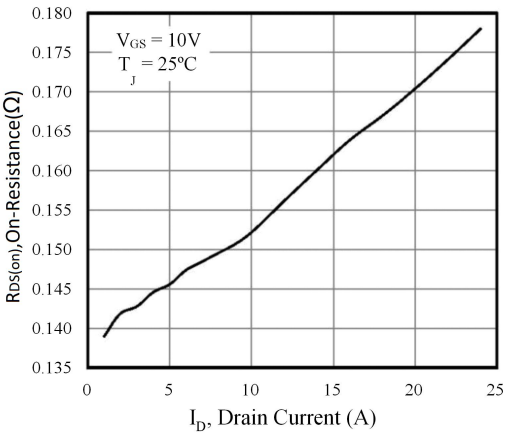
Output Characteristics



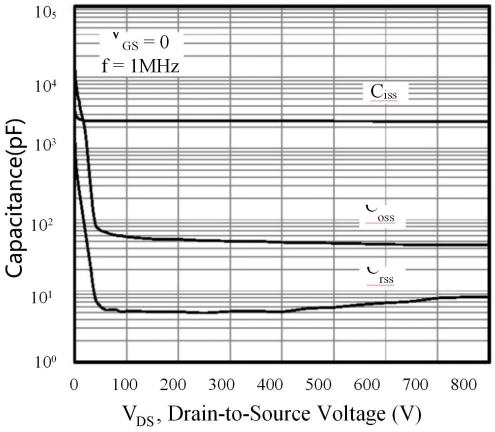
Transfer Characteristics



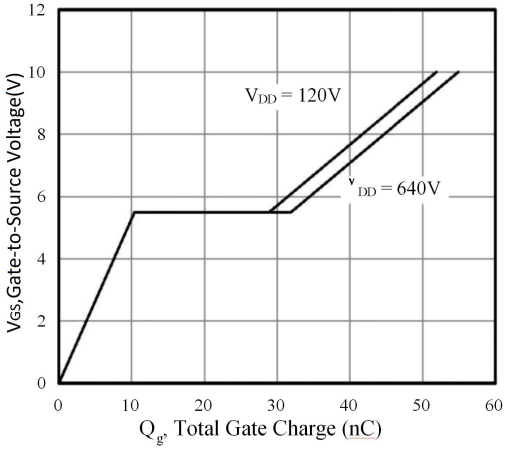
On-Resistance vs. Drain Current



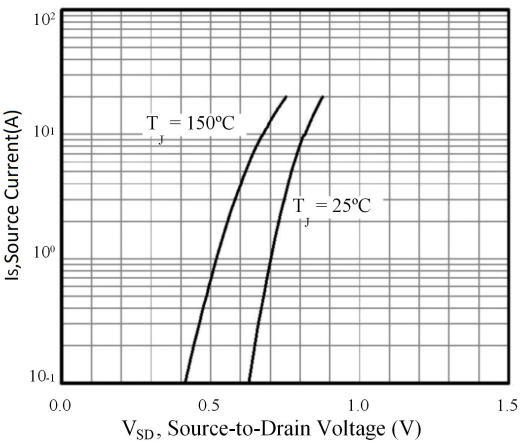
Capacitance



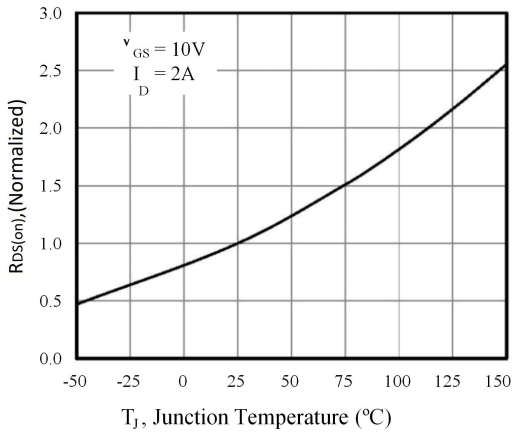
Gate Charge



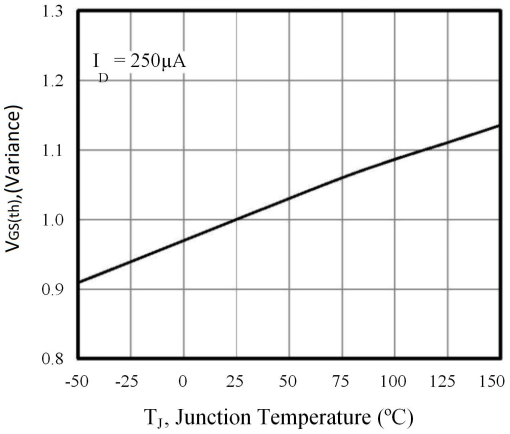
Body Diode Forward Voltage



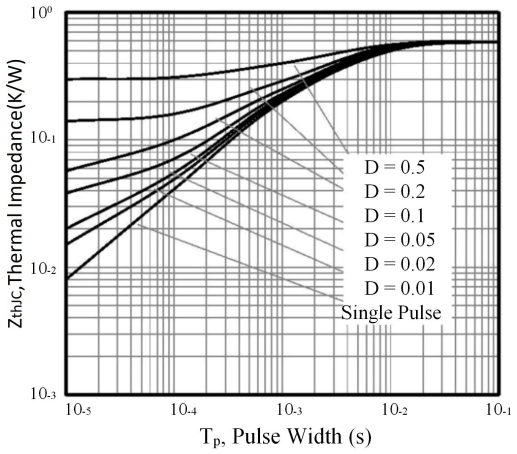
On-Resistance vs. Temperature



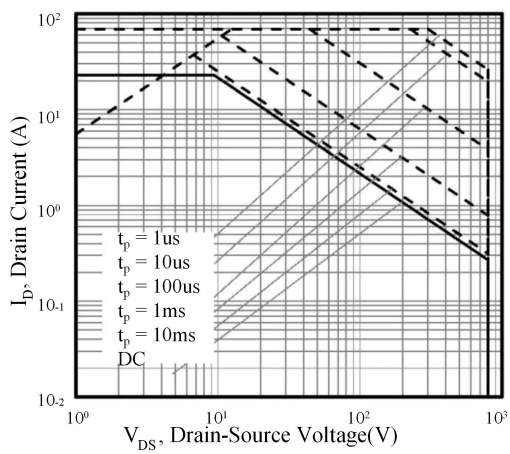
Breakdown Voltage vs. Junction Temperature



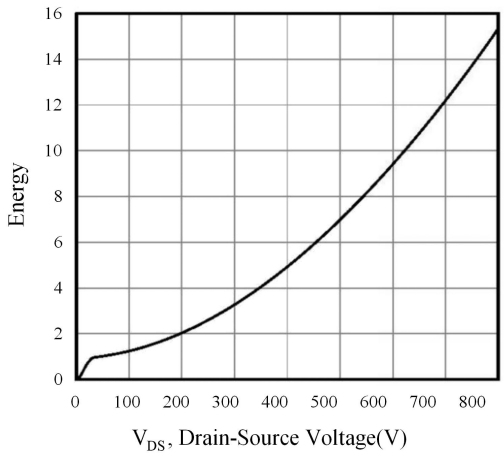
Transient Thermal Impedance



Safe Operation Area

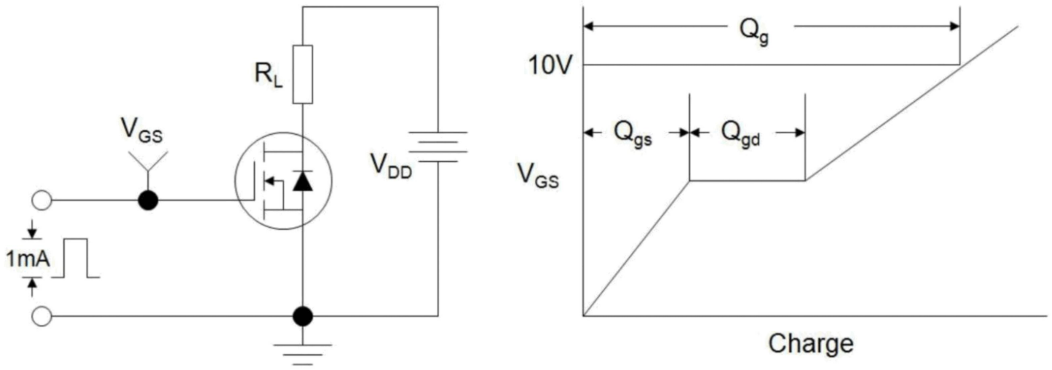


Typ. Coss Stored Energy

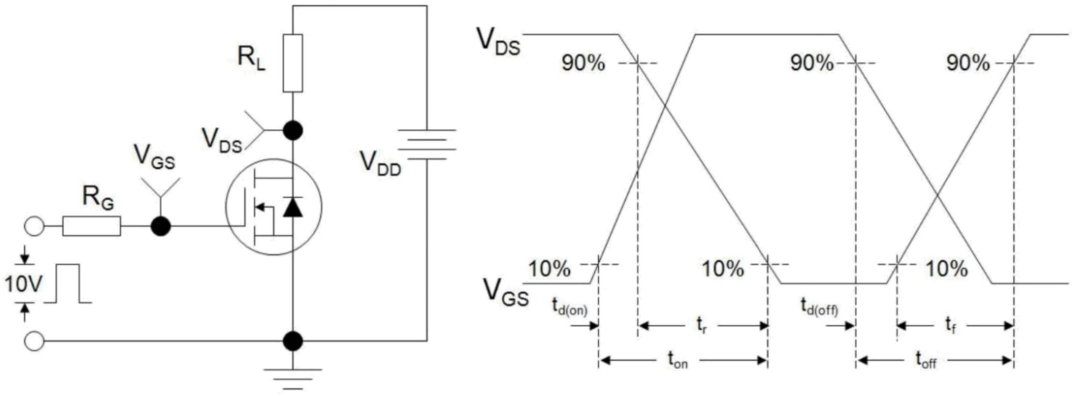


Test Circuit

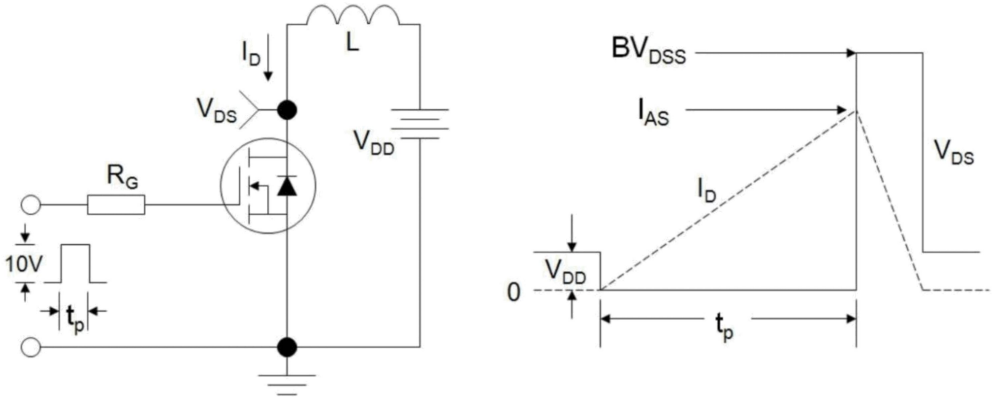
Gate Charge Test Circuit and Waveform



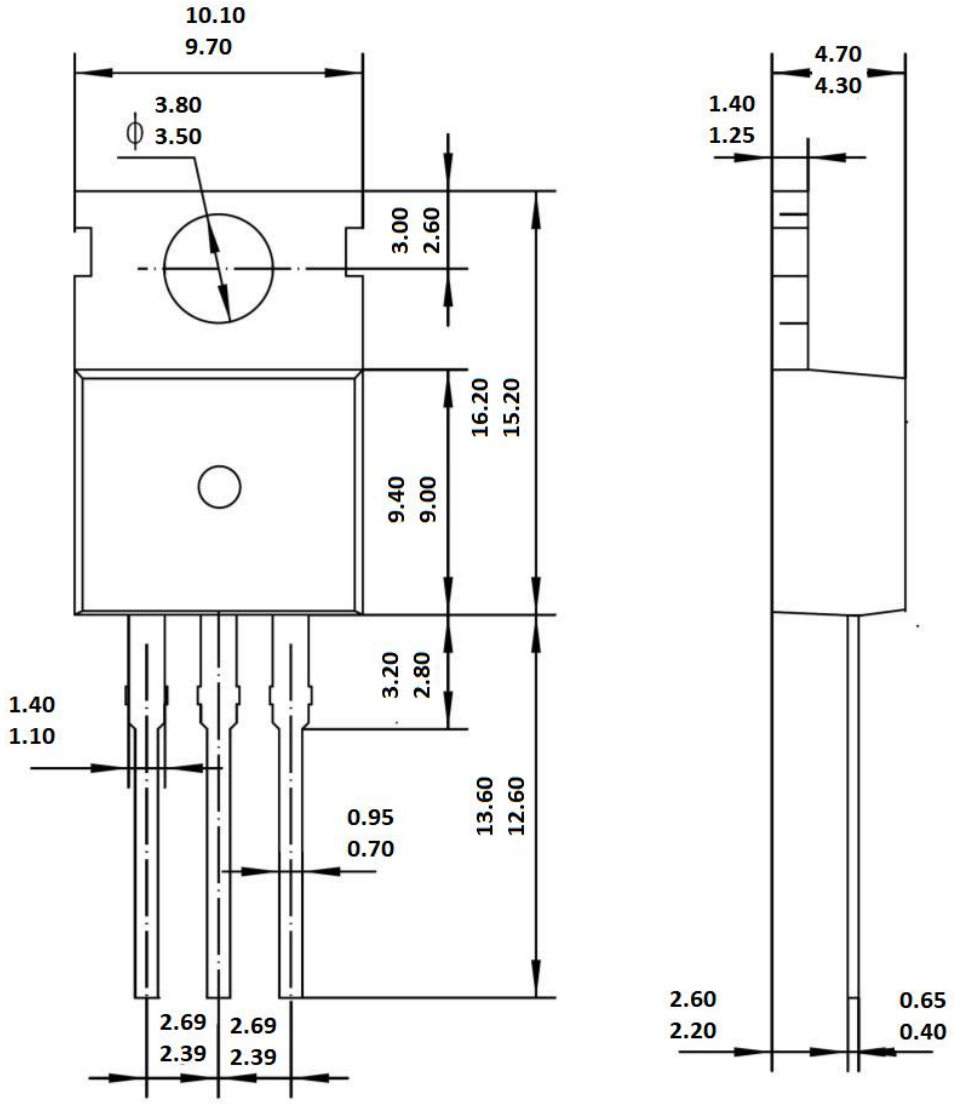
Resistive Switching Test Circuit and Waveform

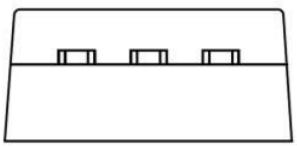


Unclamped Inductive Switching Test Circuit and Waveform



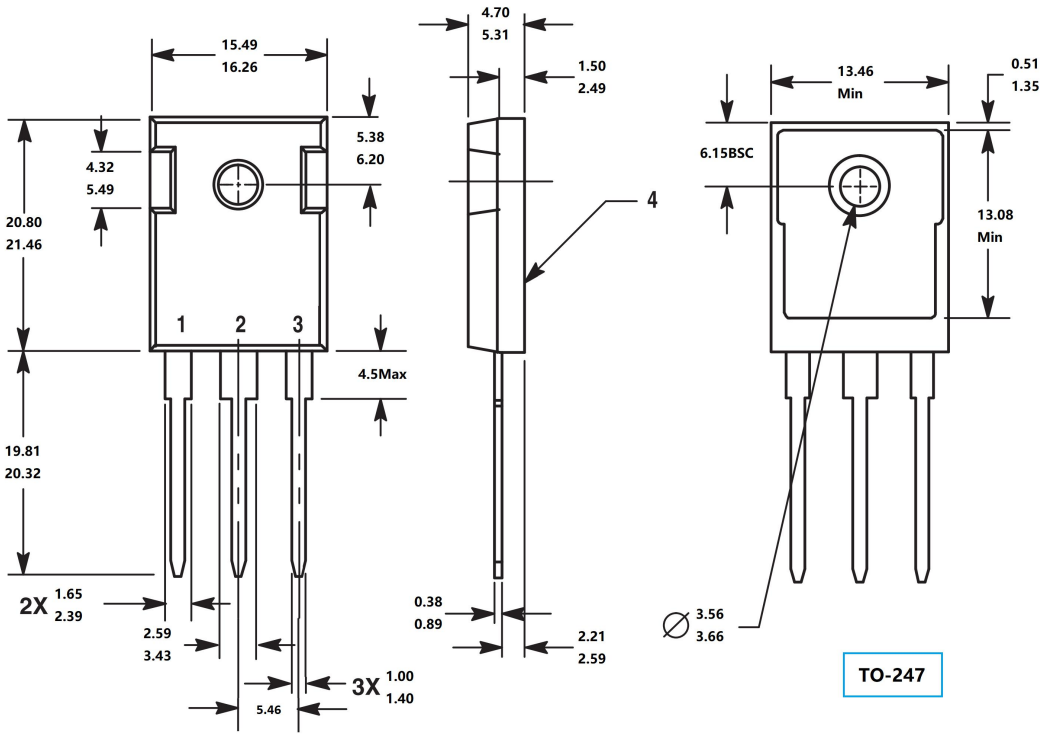
Package Mechanical DATA

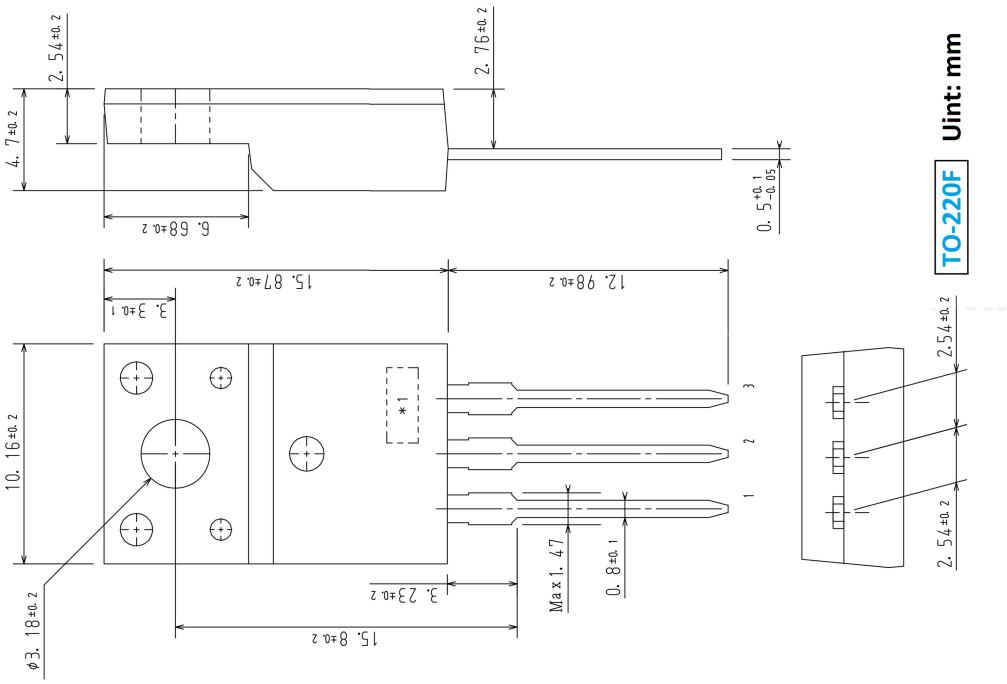




TO-220

Unit: mm


15.49
16.26
4.70
5.31
1.50
2.49
13.46
Min
0.51
1.35
5.38
6.20
4.32
5.49
6.15BSC
20.80
21.46
4
13.08
Min
1
2
3
4.5Max
19.81
20.32
2X 1.65
2.39
2.59
3.43
3X 1.00
1.40
5.46
0.38
0.89
2.21
2.59
3.56
3.66
TO-247


TO-220F
Uint: mm
2.54±0.2
2.76±0.2
4.7±0.2
6.68±0.2
0.5+0.1 -0.05
15.87±0.2
12.98±0.2
3.3±0.1
10.16±0.2
*1
3.23±0.2
Max1.47
0.8±0.1
15.8±0.2
ø3.18±0.2
2.54±0.2
2.54±0.2