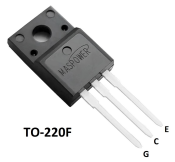
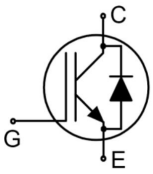
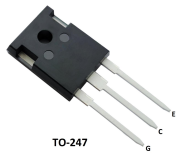
Features

- Low gate charge
- Trench FS Technology
- Fast switching speed
- Low switching losses

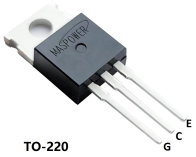






Applications

- PFC
- UPS
- Inverter
- Welding Machine



Absolute Maximum Ratings

Parameter		Symbol	Value	Unit
Collector-emitter voltage		V_{CES}	650	V
Gate-emitter voltage		V_{GES}	±30	
Collector current*	T_C=25°C	I_C	60	A
	T_C=100°C		30	
Pulsed collector current, pulse time limited by Tjmax(note1)		I_{CM}	120	
Diode forward current	T_C=25°C	I_F	60	
	T_C=100°C		30	
Diode pulsed current, Pulse time limited by Tjmax		I_{FM}	120	
Power dissipation(TO-220F)		P_D	35	W
Power dissipation(TO-247/TO-220)		P_D	230	W
Operating Junction and storage temperature rang(note2)		T_J	-55 to175	°C
		T_{stg}	-55 to175	

Electrical Characteristics (Tc =25°C unless otherwise specified)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
Collector-emitter breakdown voltage	BV_{CES}	I_C = 500uA, V_{GE} = 0V	650	-	-	V
Gate-emitter threshold voltage	$V_{GE(th)}$	V_{CE} = V_{GE}, I_C = 250uA	3.5	4.5	5.5	
Zero gate voltage collector current	I_{CES}	V_{CE} = 650V, V_{GE} = 0V	-		50	uA
Gate-emitter leakage current	I_{GES}	V_{GE} = 20V, V_{CE} = 0V	-	-	±200	nA
Collector-emitter saturation voltage	$V_{CE(sat)}$	I_C = 30A V_{GE} = 15V T_C = 25°C	-	1.7	-	V
Dynamic and Switching Characteristics						
Total gate charge	Q_g	V_{CE} = 520V, I_C = 30A,	-	62	-	nC

Gate emitter charge	Qge	V_{GE} = 15V	-	9.5	-	nC
Gate Collector Charge	Qgc		-	33	-	nC
Input capacitance	C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz	-	955	-	pF
Reverse transfer capacitance	C_{res}		-	107	-	
Output capacitance	C_{oes}		-	33	-	
Turn-on delay time	$t_{d(on)}$	V_{GE} = 15V, V_{CC} = 400V, I_C = 30A, R_G = 10Ω, Inductive Load, T_C = 25°C	-	11	-	nS
Rise time	t_r		-	42	-	
Turn-off delay time	$t_{d(off)}$		-	89	-	
Fall time	tf		-	73	-	
Turn-on switching energy	E_{on}		-	0.53	-	mJ
Turn-off switching energy	E_{off}		-	0.55	-	
Total switching energy	E_{ts}		-	1.0	-	
Turn-on delay time	$t_{d(on)}$	V_{GE} = 15V, V_{CC} = 400V, I_C = 30A, R_G = 10Ω, Inductive Load, T_C = 150°C	-	10	-	nS
Rise time	tr		-	44	-	
Turn-off delay time	$t_{d(off)}$		-	114	-	
Fall time	t_f		-	130	-	
Turn-on switching energy	E_{on}		-	0.52	-	mJ
Turn-off switching energy	E_{off}		-	0.79	-	
Total switching energy	E_{ts}		-	1.30	-	
Diode Characteristics (Tc =25°C unless otherwise specified)						
Forward voltage	V_F	I_F=30A,T_C=25℃	-	1.4	-	V
Reverse recovery time	t_{rr}	I_F=30A,di/dt=200A/μS T_C=25℃	-	50	-	nS
Reverse recovery current	I_{rr}		-	2.5	-	A
Reverse recovery charge	Q_{rr}		-	0.31	-	uC

Thermal Characteristics

Parameter	Symbol	Max.		Unit
		TO-220F	TO-220 TO-247	
Thermal resistance junction-to-case for IGBT	$R_{\theta JC}$	3.57	0.65	°C/W
Thermal resistance junction-to-case for Diode	$R_{\theta JC}$	7.7	40	
Thermal resistance junction-to-ambient	$R_{\theta JA}$	62.5		

*Collector current limited by maximum junction temperature.

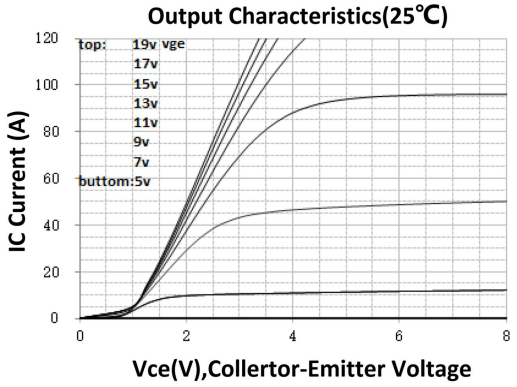
1：Pulse width limited by maximum junction temperature.

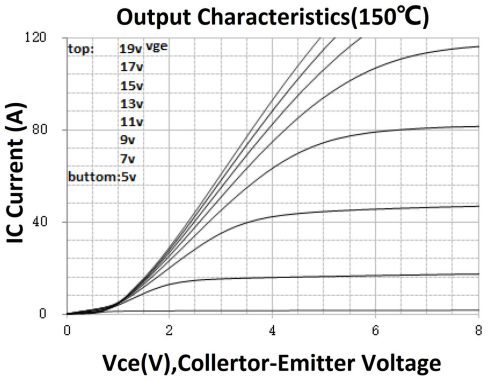
2：Under overload condition, it is allowed to operate at the maximum junction temperature Tvjop=175 ℃, and the maximum duty ratio is less than 20% (lasting for 60 s at most)

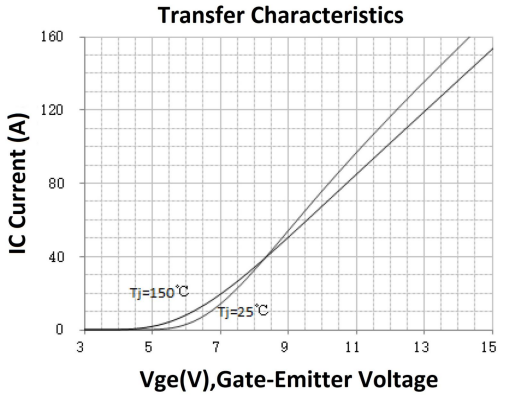
Order Message

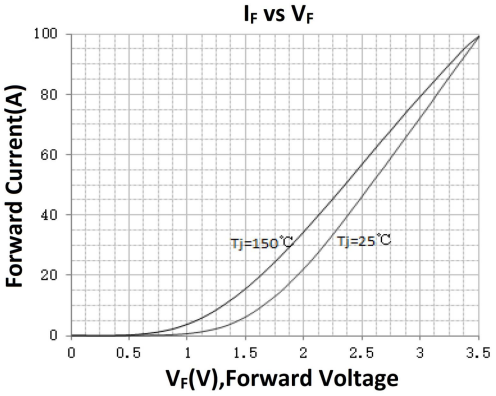
Order codes	Package	Packaging
MSG30T65HHT1	TO-220F	Tube
MSG30T65HHC0	TO-247	Tube
MSG30T65HHT0	TO-220	Tube

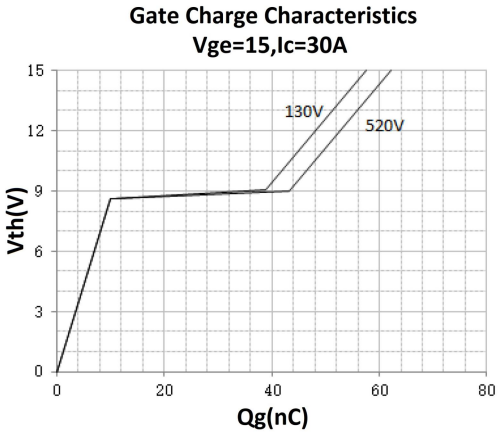
Typical Performance Characteristic

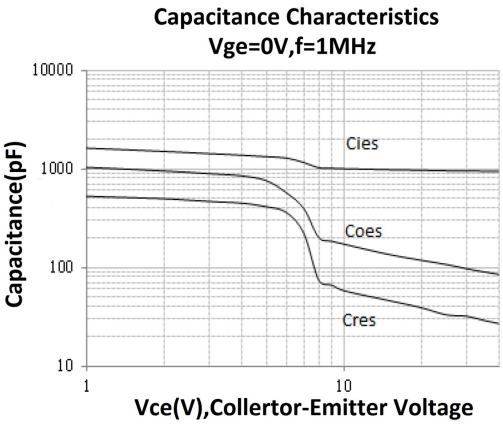




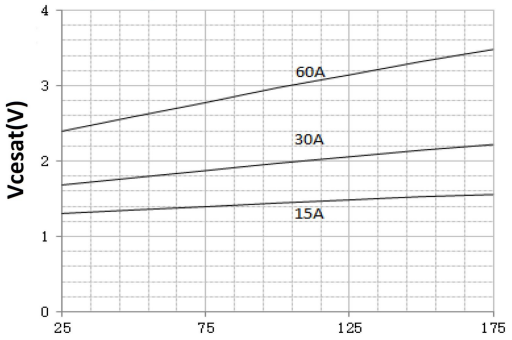




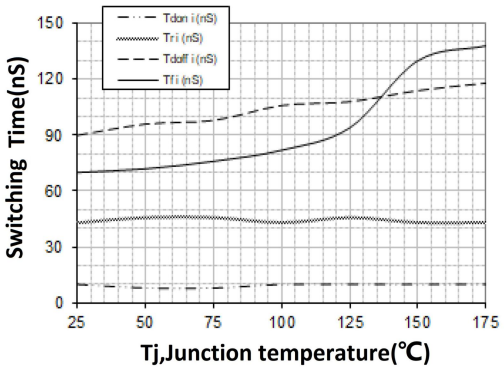




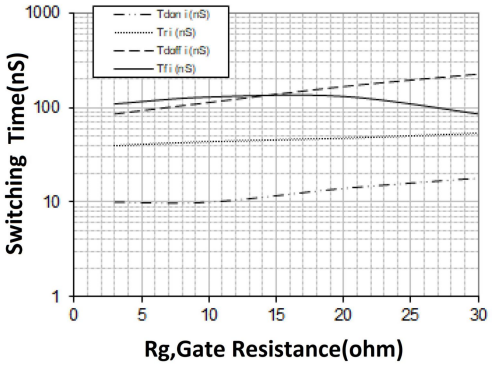
Vcesat vs. Tj
Vge=15V,IC=15A,30A,60A



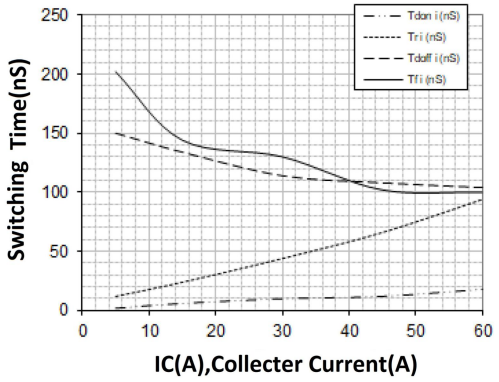
Switching Time vs. Tj
Vge=15V,Vce=400V,Ic=30A,Rg=10ohm



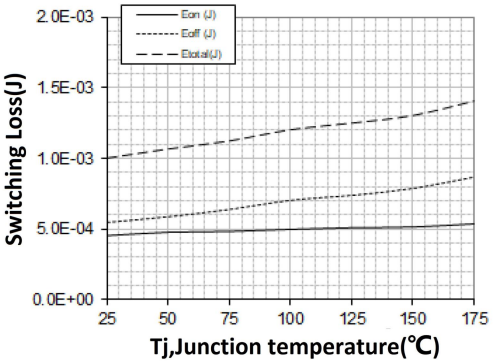
Switching Loss vs. Rg(150℃)
Vge=15V,Vce=400V,Ic=30A



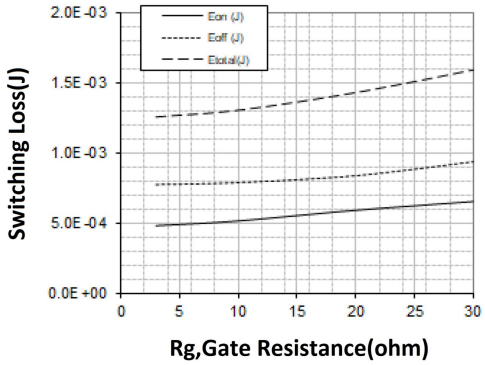
Switching Time vs. Ic(150℃)
Vge=15V,Vce=400V,Rg=10ohm

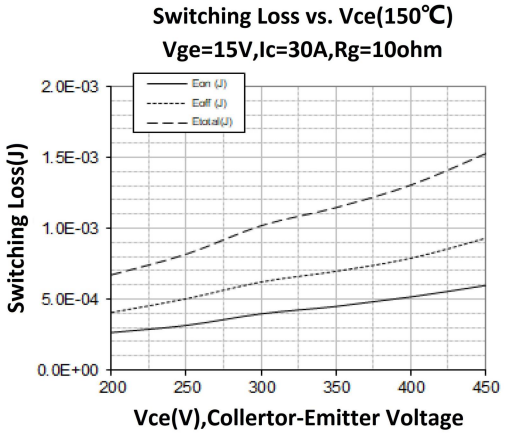


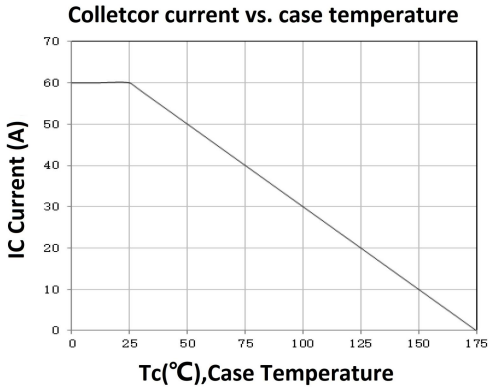
Switching Loss vs. Tj
Vge=15V,Vce=400V,Ic=30A,Rg=10ohm

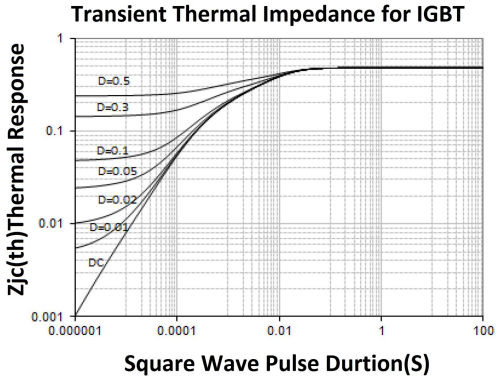


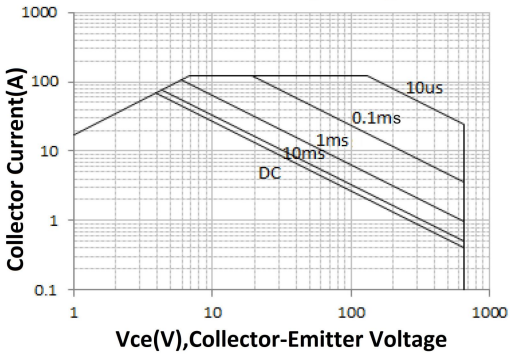
Switching Loss vs. Rg(150℃)
Vge=15V,Vce=400V,Ic=30A



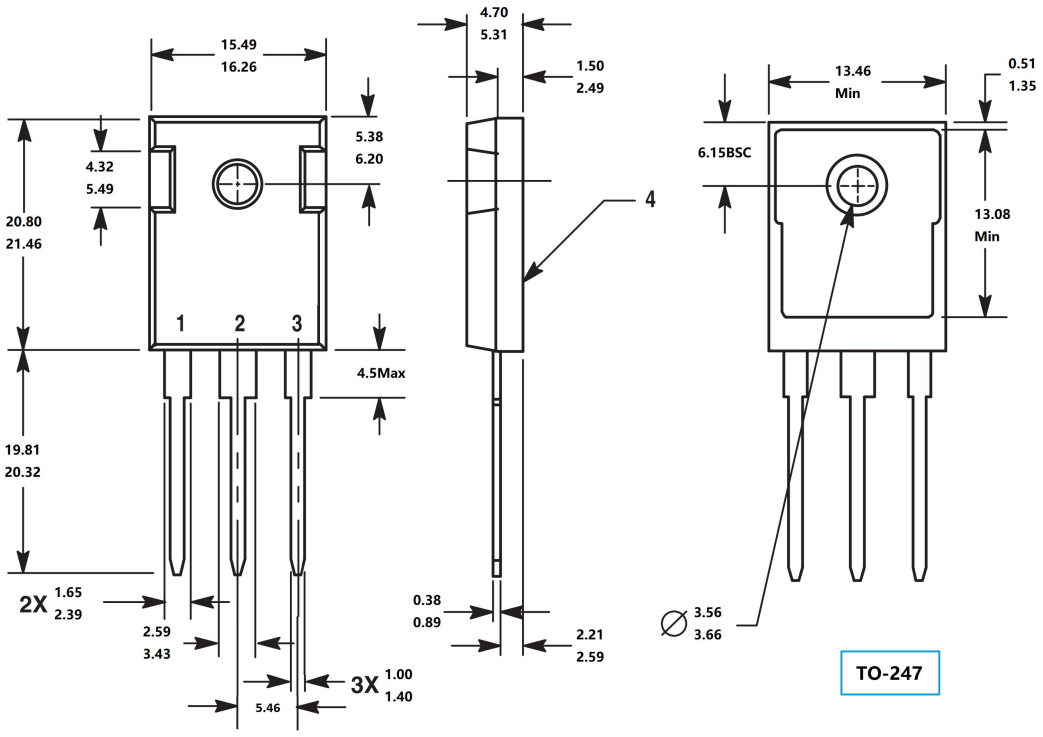


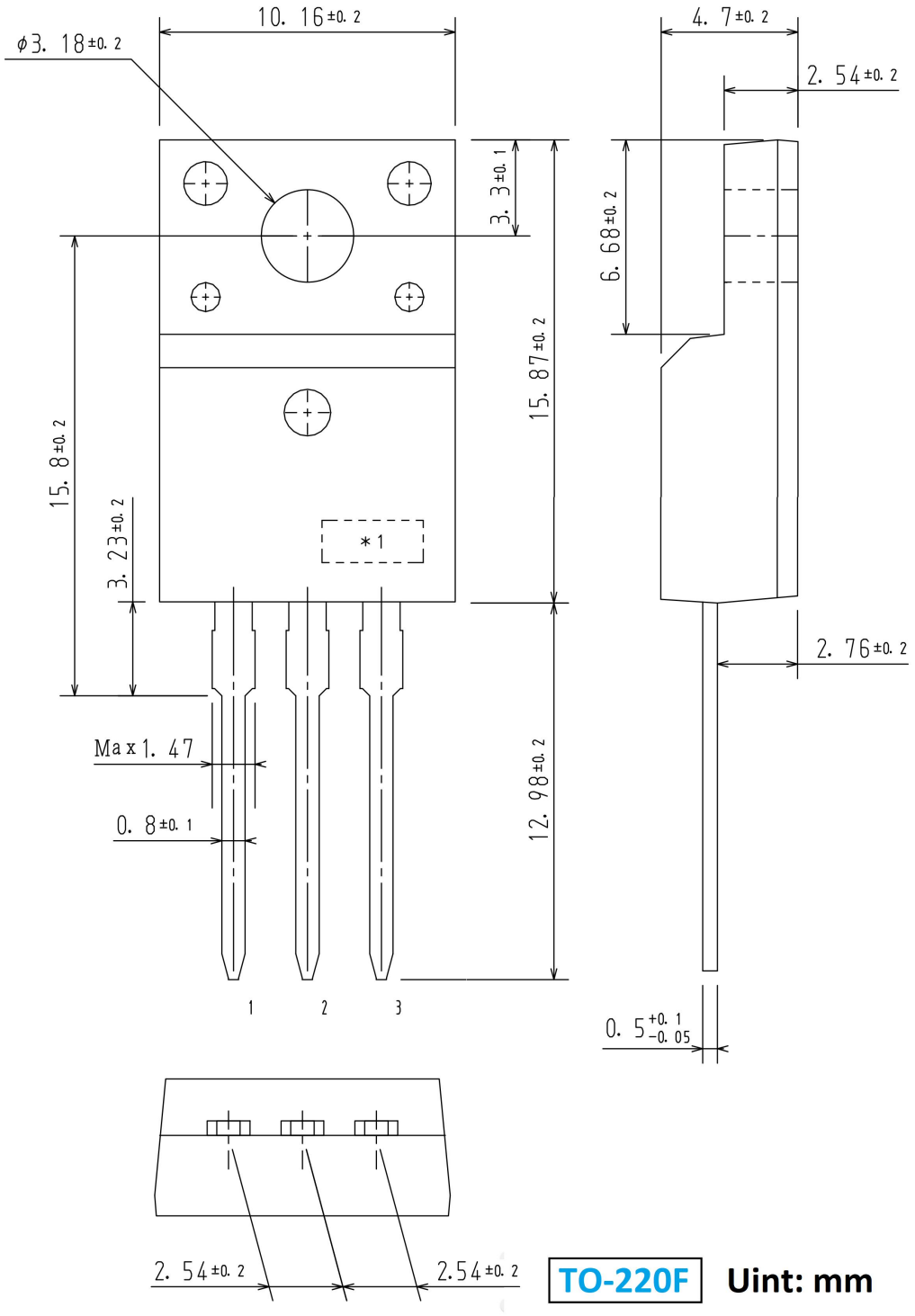




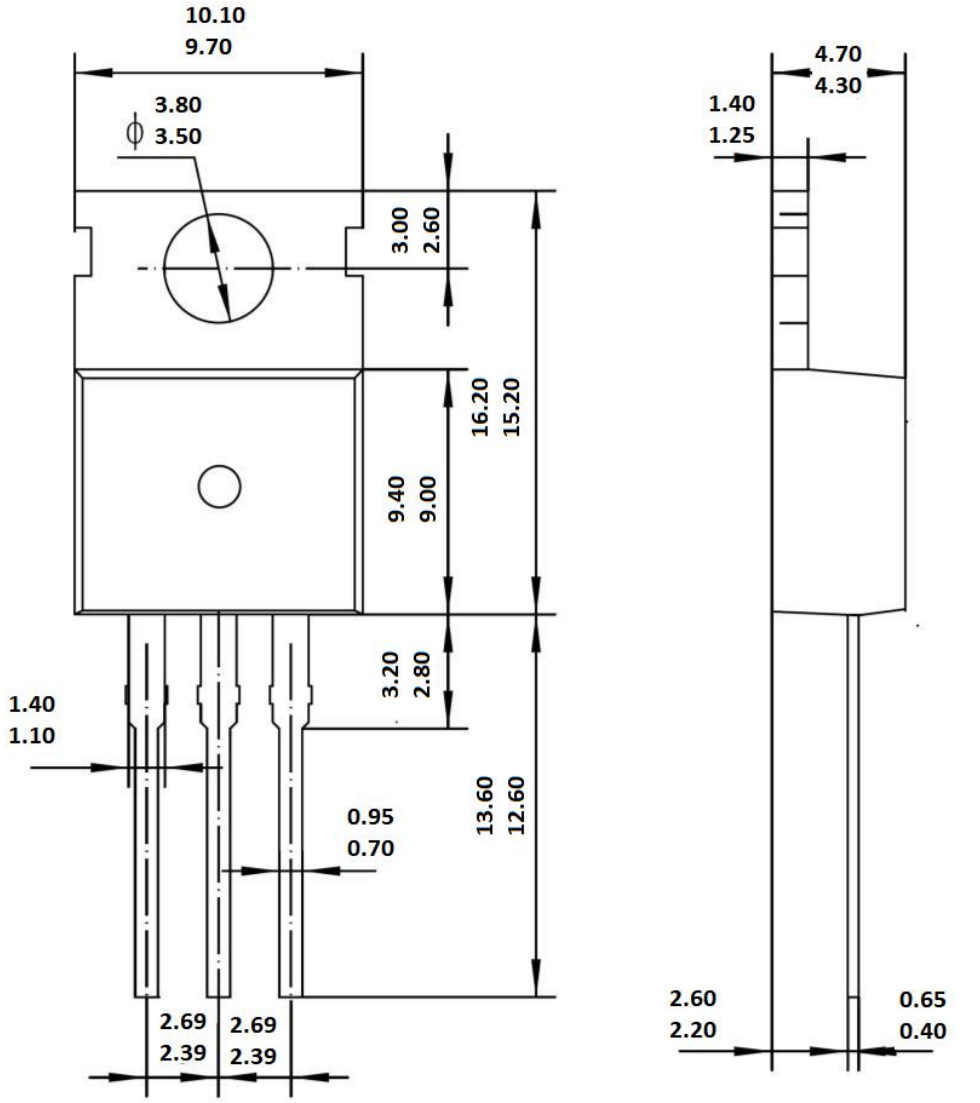


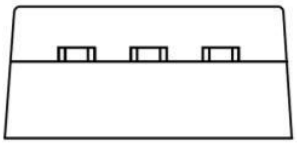
Package outline dimension





TO-220F **Uint: mm**





TO-220

Unit: mm