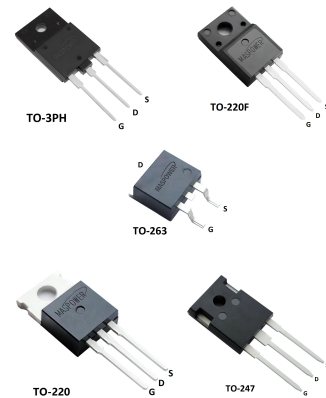
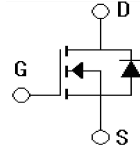


Features

- $V_{DS}=1500V, I_D=4A$
 $R_{DS(on)} < 7\Omega @ V_{GS}=10V$
- 100% avalanche tested
- Intrinsic capacitances and Q_g minimized
- High speed switching



Applications

- Switching applications

Absolute Ratings ($T_c=25^\circ C$)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DSS}	1500	V
Gate-Source Voltage	V_{GSS}	± 30	V
Drain Current-continuous	I_D	4	A
Drain Current-pulse*	I_{DM}	16	A
Single Pulsed Avalanche Energy	E_{AS}	460	mJ
Maximum Power Dissipation (TO-3PH)	PD	75	W
Maximum Power Dissipation (TO-220F)	PD	30	W
Maximum Power Dissipation (TO-263)	PD	96	W
Maximum Power Dissipation (TO-247)	PD	96	W
Maximum Power Dissipation (TO-220)	PD	96	W
Operating and Storage Temperature Range	T_J, T_{STG}	$-55 \sim +150$	$^\circ C$

*Drain current limited by maximum junction temperature

Electrical Characteristics ($T_{CASE}=25^\circ C$ unless otherwise specified)

Parameter	Symbol	Tests conditions	Min	Typ	Max	Units
Drain-Source Voltage	BV_{DSS}	$I_D=250\mu A, V_{GS}=0V$	1500	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=V_{DSS}, V_{GS}=0V$	-	-	10	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 30V, V_{DS}=0V$	-	-	± 100	nA

On-Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	3.5	-	5	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=1A$	-	5.5	7	Ω
Forward Transconductance	g_{fs}	$V_{DS}=30V, I_D=3A$	-	5.8	-	S
Dynamic Characteristics						
Input capacitance	C_{iss}	$V_{DS}=25V,$ $V_{GS}=0V,$ $f=1.0MHz$	-	824	-	pF
Output capacitance	C_{oss}		-	127	-	pF
Reverse transfer capacitance	C_{rss}		-	29	-	pF

Electrical Characteristics($T_{CASE}=25^{\circ}C$ unless otherwise specified)

Parameter	Symbol	Tests conditions	Min	Typ	Max	Units
Switching-Characteristics						
Turn-On delay time	t _{d(on)}	V _{DS} =750V, I _D =3A, V _{GS} =10V R _G =25Ω	-	31	-	ns
Turn-On rise time	t _r		-	56	-	ns
Turn-Off delay time	t _{d(Off)}		-	105	-	ns
Turn-Off rise time	t _f		-	115	-	ns
Total Gate Charge	Q _g	V _{DS} =750V,I _D =3A, V _{GS} =10V R _G =25Ω	-	37	-	nC
Gate-Source charge	Q _{gs}		-	6	-	nC
Gate-Drain charge	Q _{gd}		-	22	-	nC
Drain-Source Diode Characteristics and Maximum Ratings						
Maximum Continuous Drain-Source Diode Forward Current	V _{SD}	V _{GS} =0V,I _S =1A	-	-	1.4	V
Diode Forward Current	I _S	TC=25°C	-	-	4	A
Reverse recovery time	T _{rr}	I _S =3A,	-	376	-	nS
Reverse recovery charge	Q _{rr}	dl/dT=100A/μS	-	2.1	-	μC

Thermal Characteristic

Parameter	Symbol	TO-3PH	TO-263	TO-220F	TO-220 TO-247	Unit
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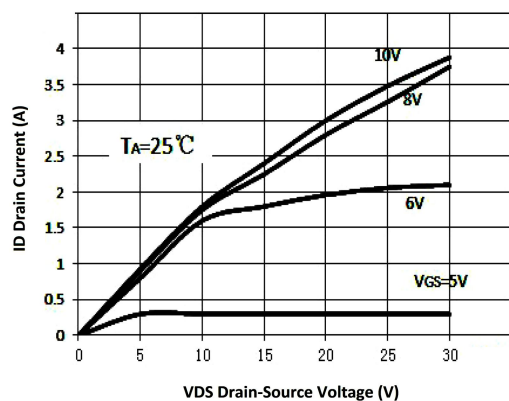
Thermal Resistance, junction to Case	$R_{th(j-C)}$	1.7	0.371	4.2	0.371	°C/W
Thermal Resistance, junction to Ambient	$R_{th(j-A)}$	50	35	58	50	°C/W

Order Message

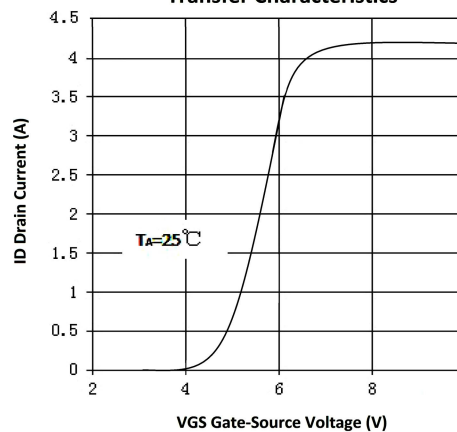
Marking	Package
MS4N1350	TO-3PH
MS4N1350S	TO-220F
MS4N1350E	TO-263
MS4N1350W	TO-247
MS4N1350T	TO-220

Electrical Characteristics

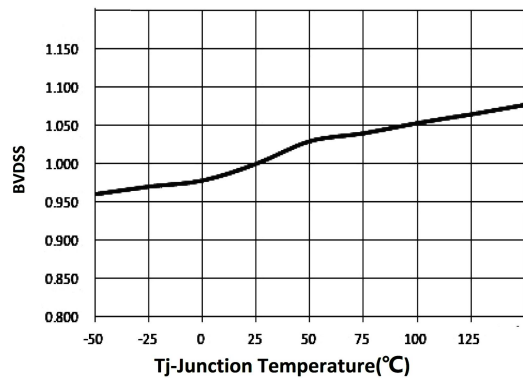
Out Characteristics



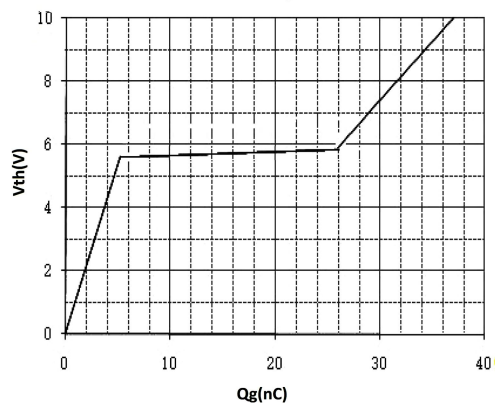
Transfer Characteristics



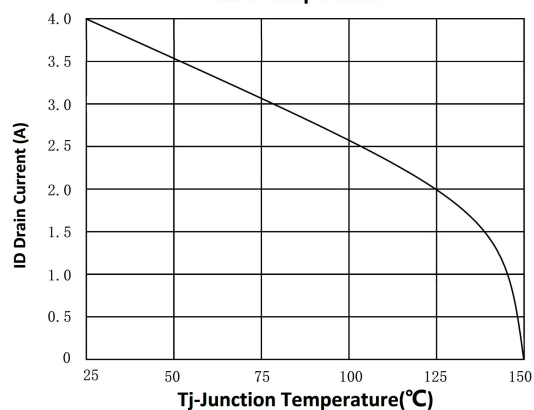
Normalized BV_{DSS} vs. Temperature



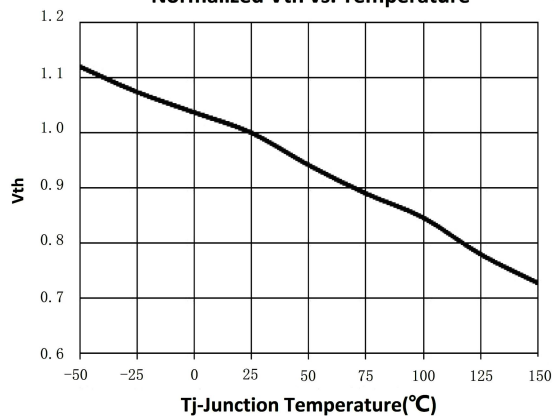
Gate Charge vs. V_{GS}



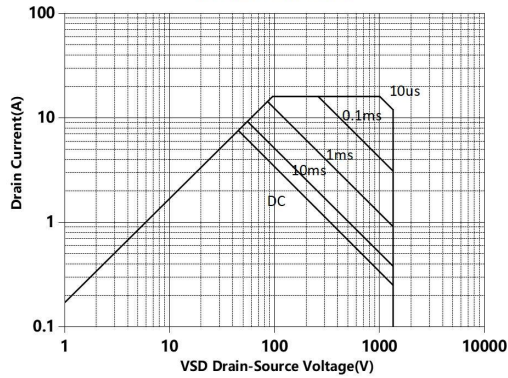
Maximum Drain Current vs. Case Temperature



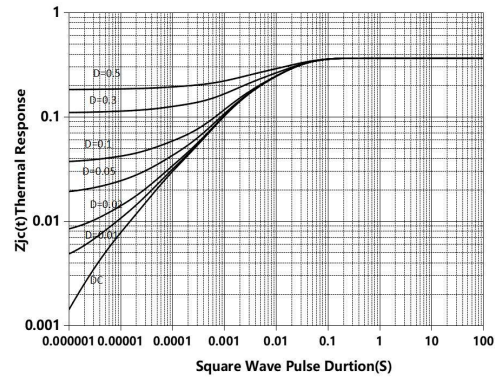
Normalized Vth vs. Temperature



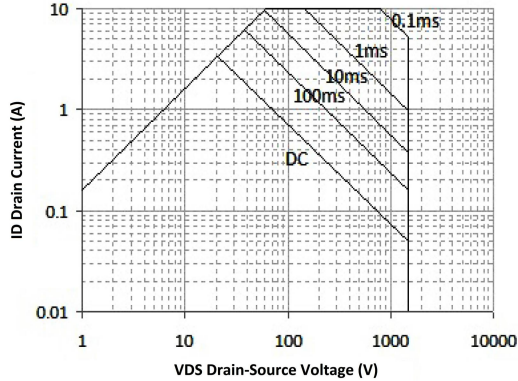
Maximum Safe Operating Area for
TO-263/TO-247/TO-220



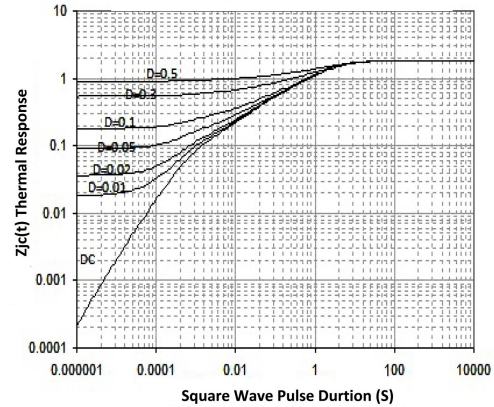
Thermal Impedance for
TO-263/TO-247/TO-220



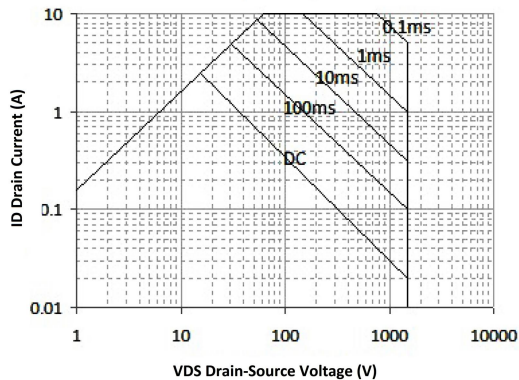
Maximum Safe Operating Area for
TO-3PH



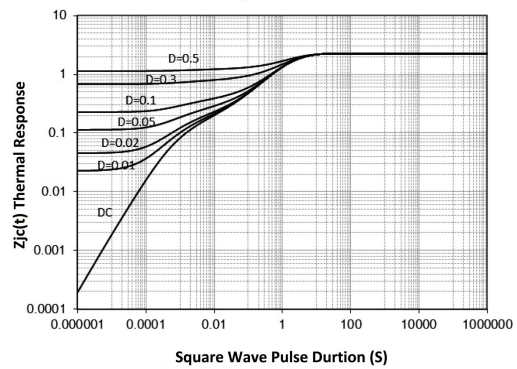
Thermal Impedance for TO-3PH

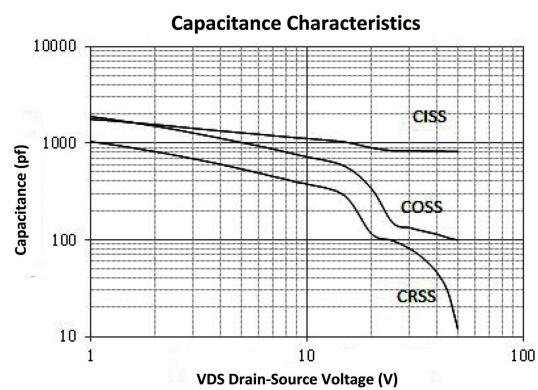
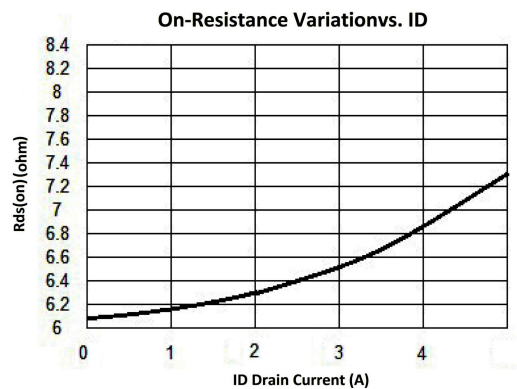
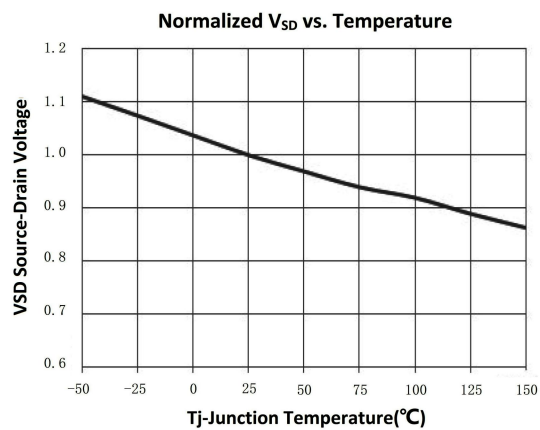


Maximum Safe Operating Area for TO-220F

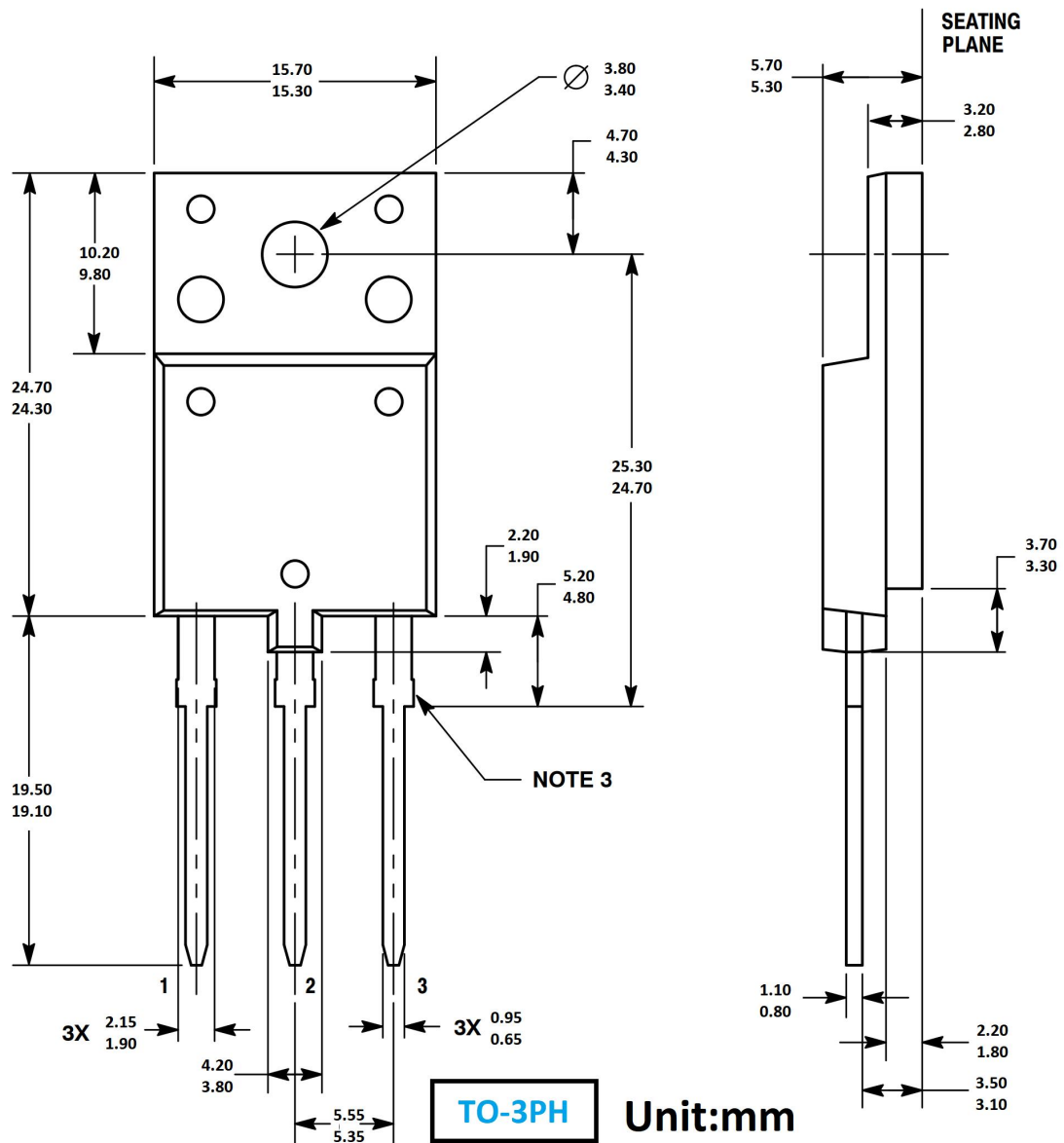


Thermal Impedance for TO-220F

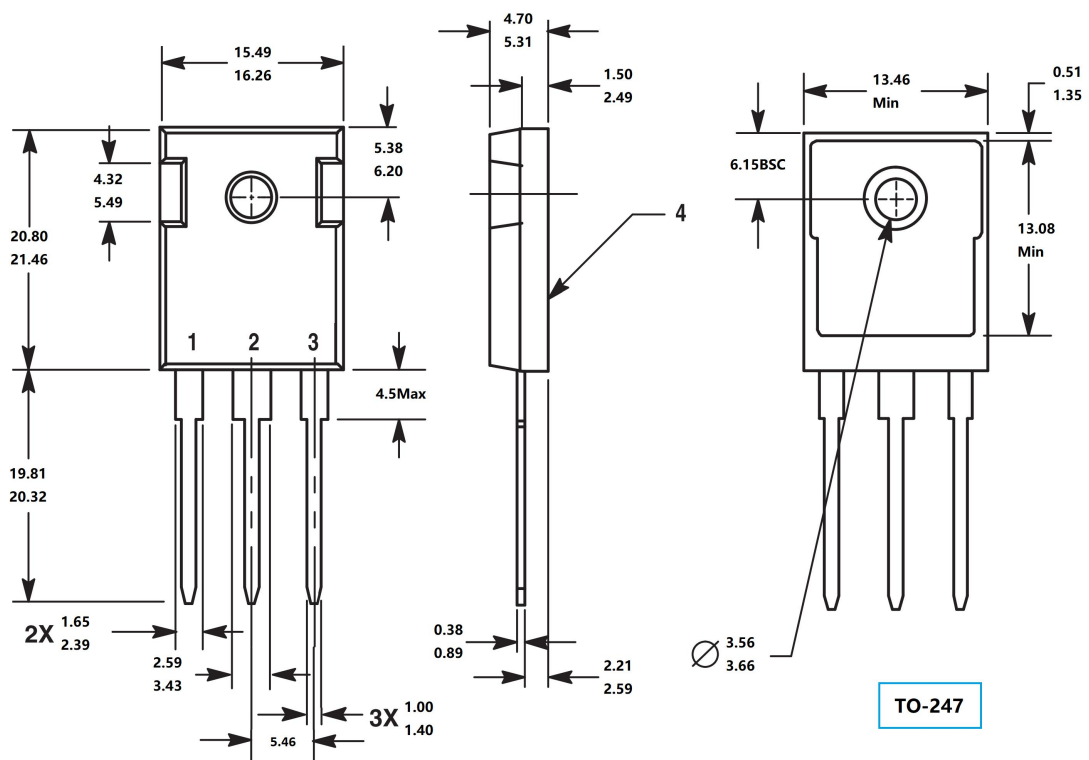
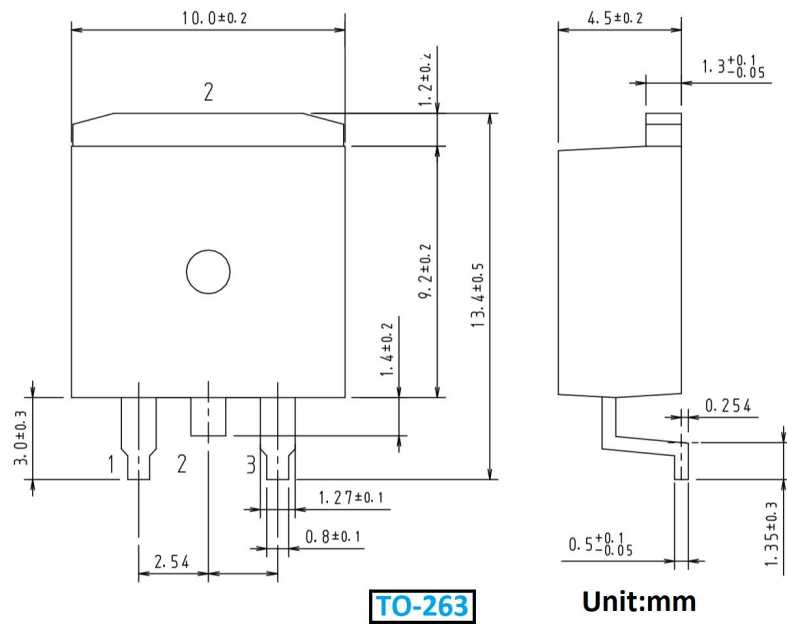


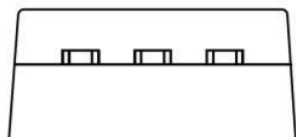
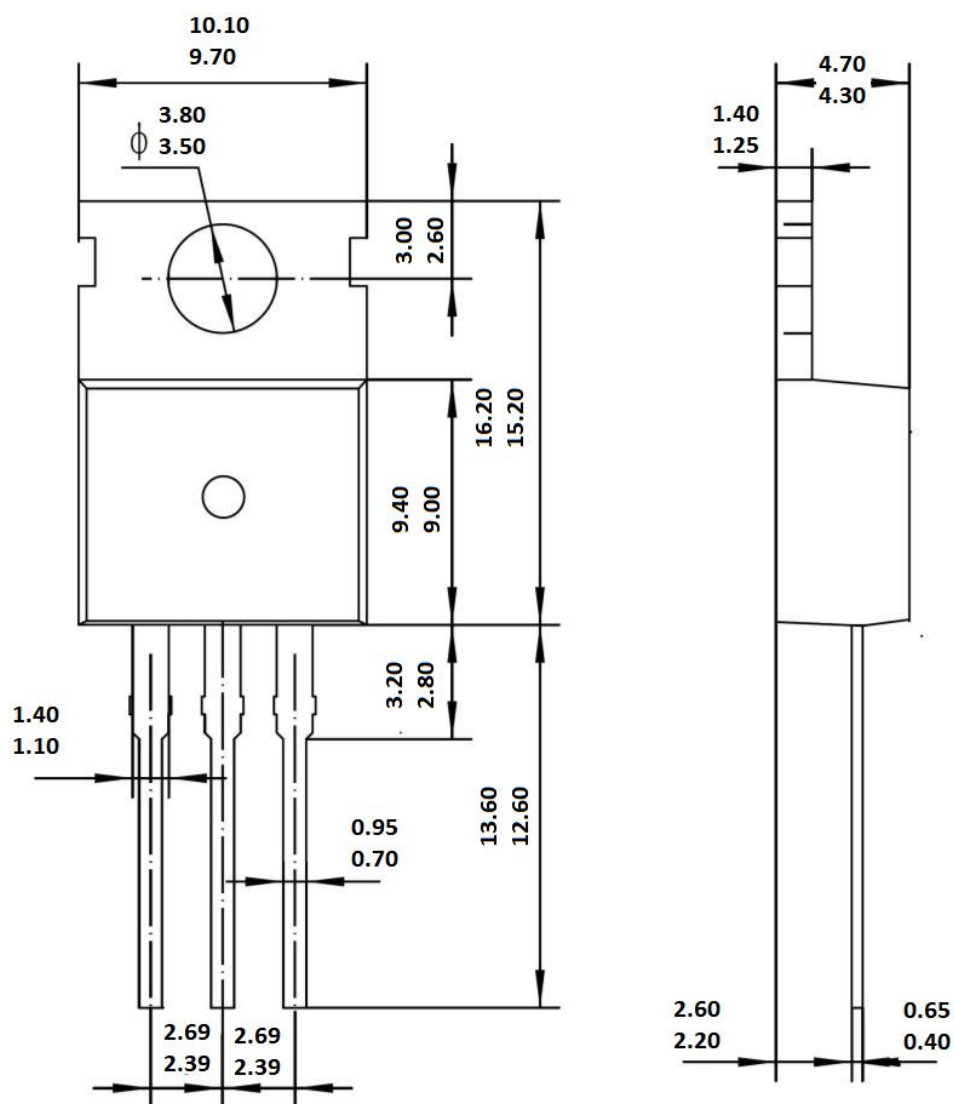


Package Mechanical DATA









TO-220

Unit: mm