

# KSB13005A/KSG13005A/KSU13005A KSD13005A/KSH13005A/KSH13005AF

NPN Silicon Power Transistor,  $V_{CBO}=700V$ ,  $V_{CEO}=400V$ ,  $I_C=4A$

## General Description

- High voltage, high speed power switching
- Suitable for switching regulator, inverters motor controls

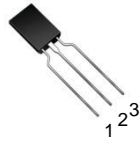
## Features

- $V_{CBO} = 700V$
- $V_{CEO} = 400V$
- $V_{BEO} = 9V$
- $I_C = 4A$

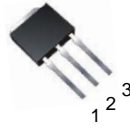
TO-92



TO-92L



TO-251



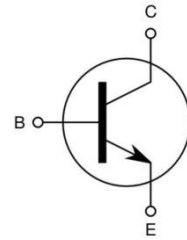
TO-252



TO-220



TO-220F



## Ordering Information

Ordering number	Package	Pin Assignment			Packing
		1	2	3	
KSB13005A	TO-92	B	C	E	Ammo
KSB13005AR	TO-92	E	C	B	Ammo
KSG13005AR	TO-92L	E	C	B	Ammo
KSU13005A	TO-251	B	C	E	Tube
KSD13005A	TO-252	B	C	E	Reel
KSH13005A	TO-220	B	C	E	Tube
KSH13005AF	TO-220F	B	C	E	Tube

# KSB13005A/KSG13005A/KSU13005A KSD13005A/KSH13005A/KSH13005AF

NPN Silicon Power Transistor,  $V_{CBO}=700V$ ,  $V_{CEO}=400V$ ,  $I_C=4A$

## Absolute Maximum Ratings TC=25°C unless otherwise noted

CHARACTERISTICS	SYMBOL	RATING					UNIT
		TO-92	TO-92L	TO-251(2)	TO-220	TO-220F	
Collector-Base Voltage	$V_{CBO}$	700					V
Collector-Emitter Voltage	$V_{CEO}$	400					V
Emitter-Base Voltage	$V_{EBO}$	9					V
Collector Current(DC)	$I_C$	4					A
Collector Current(Pulse)	$I_{CP}$	8					A
Base Current	$I_B$	2					A
Collector Dissipation(TC=25°C)	$P_C$	2.8	3.8	40	75	30	W
Junction Temperature	$T_J$	150					°C
Storage Temperature	$T_{STG}$	-65~150					°C

## Electrical Characteristics TC=25°C unless otherwise noted

CHARACTERISTICS	SYMBOL	Test Condition	Min	Typ.	Max	Unit
Collector-Base Breakdown Voltage	$V_{CBO}$	$I_C=500\mu A, I_E=0$	700			V
Collector-Emitter Breakdown Voltage	$V_{CEO}$	$I_C=10mA, I_B=0$	400			V
Emitter Cut-off Current	$I_{EBO}$	$V_{EB}=9V, I_C=0$			1	mA
*DC Current Gain	$h_{FE1}$ $h_{FE2}$	$V_{CE}=5V, I_C=1A$ $V_{CE}=5V, I_C=2A$	20 8		40 40	
*Collector-Emitter Saturation Voltage	$V_{CE}(sat)$	$I_C=1A, I_B=0.2A$ $I_C=2A, I_B=0.5A$ $I_C=4A, I_B=1A$			0.5 0.8 1	V V V
*Base-Emitter Saturation Voltage	$V_{BE}(sat)$	$I_C=1A, I_B=0.2A$ $I_C=2A, I_B=0.5A$			1.2 1.6	V V
Output Capacitance	$C_{ob}$	$V_{CB}=10V, f=0.1MHz$		65		pF
Current Gain Bandwidth Product	$f_T$	$V_{CE}=10V, I_C=0.5A$	4			MHz
Turn on Time	$t_{on}$	$V_{CC}=125V, I_C=2A$ $I_{B1}=0.4A, I_{B2}=-0.4A$ $R_L=62.5\Omega$			0.8	$\mu s$
Storage Time	$t_{stg}$				4.0	$\mu s$
Fall Time	$t_F$				0.9	$\mu s$

\* Pulse Test: Pulse Width $\leq 300\mu s$ , Duty Cycles $\leq 2\%$

# Typical Characteristics

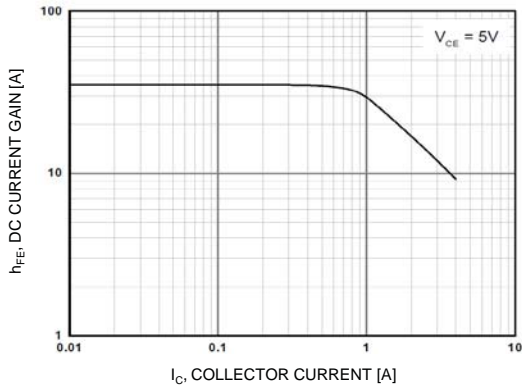


Figure 1. DC Current Gain

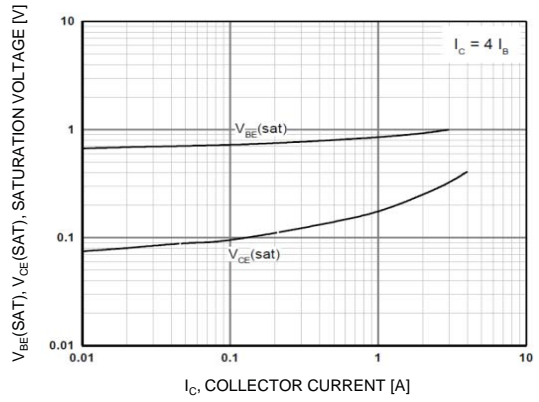


Figure 2. Base-Emitter Saturation Voltage  
Collector-Emitter Saturation Voltage

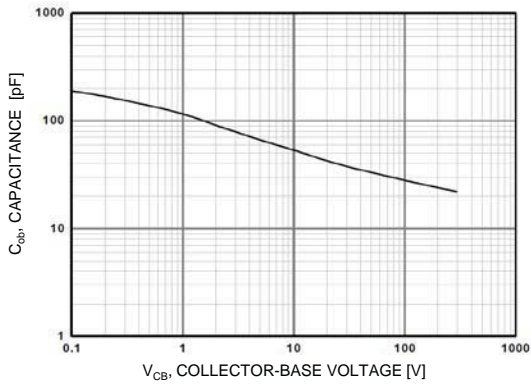


Figure 3. Collector Output Capacitance

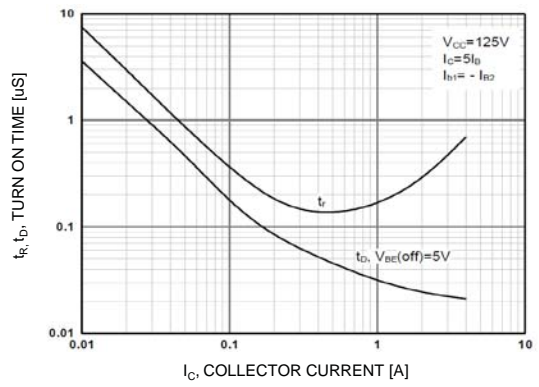


Figure 4. Turn On Time

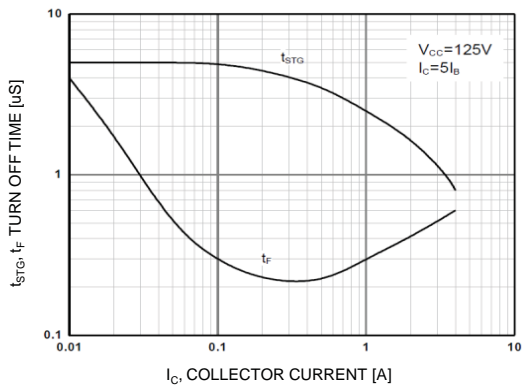


Figure 5. Turn Off Time

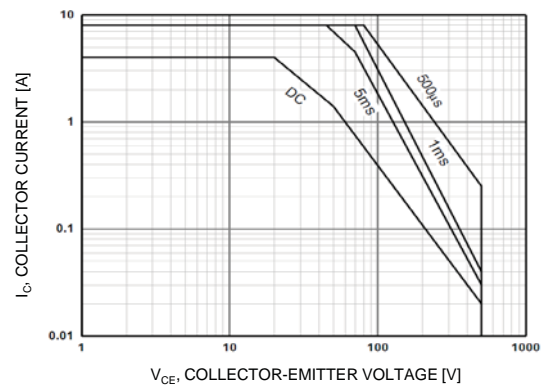


Figure 6. Safe Operating Area

# Typical Characteristics

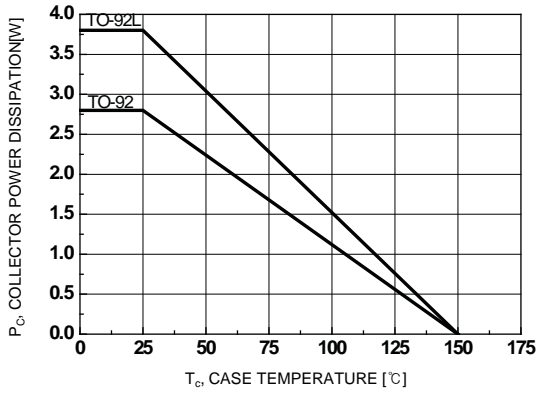


Figure 7. Power Derating

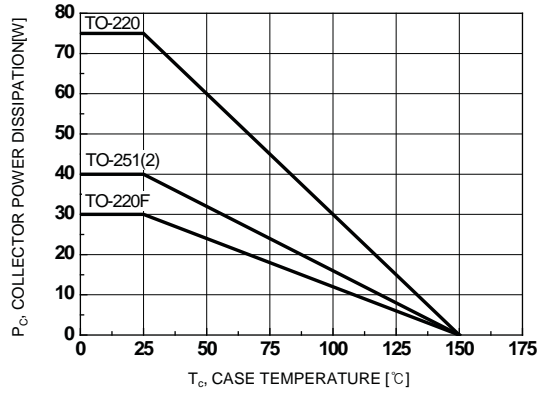
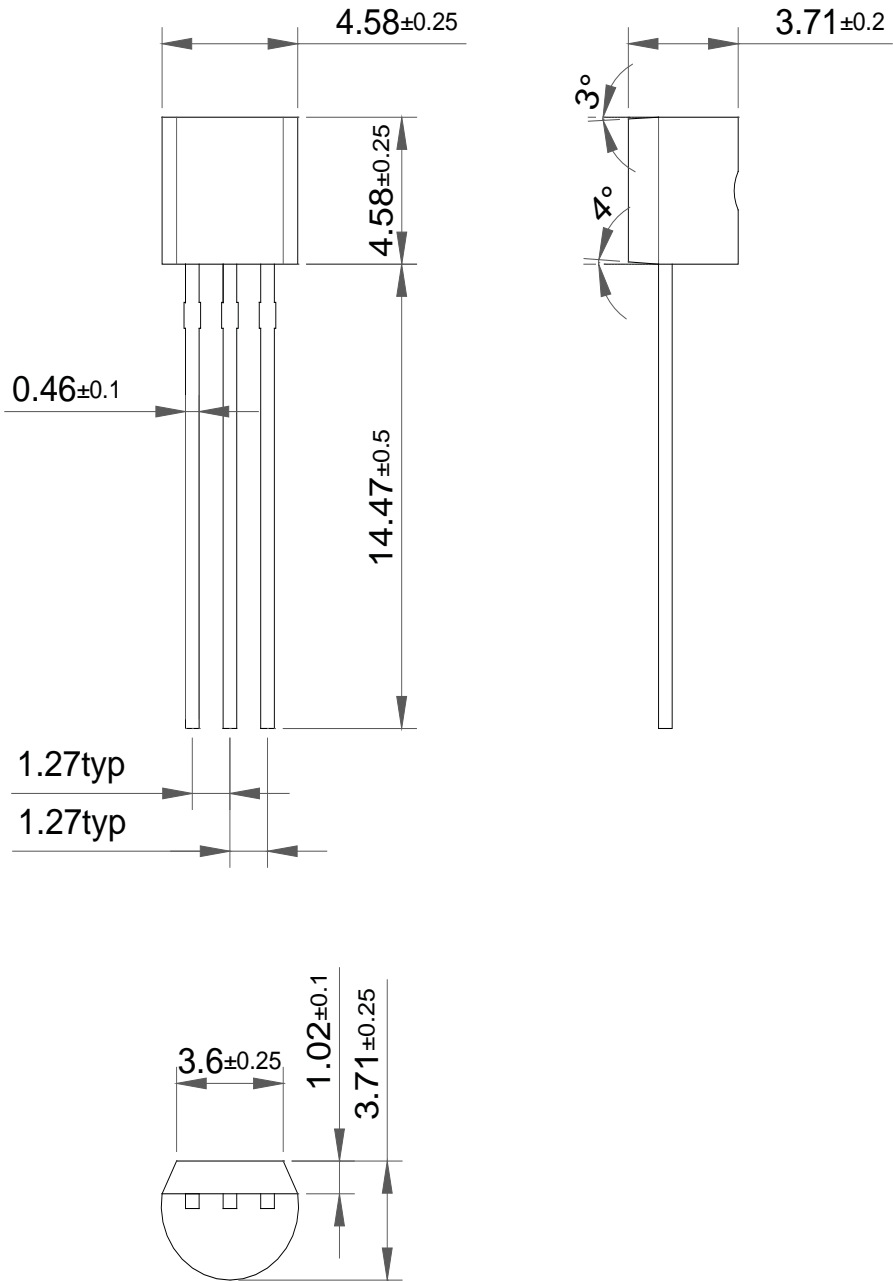


Figure 8. Power Derating

Package Dimension

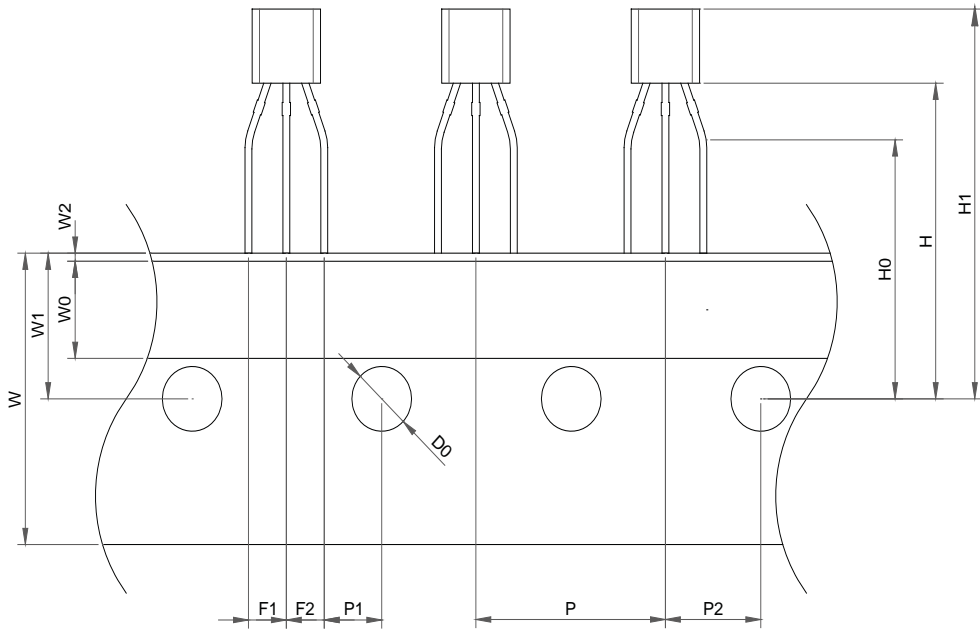
TO-92



Dimensions in Millimeters

**Package Dimension**

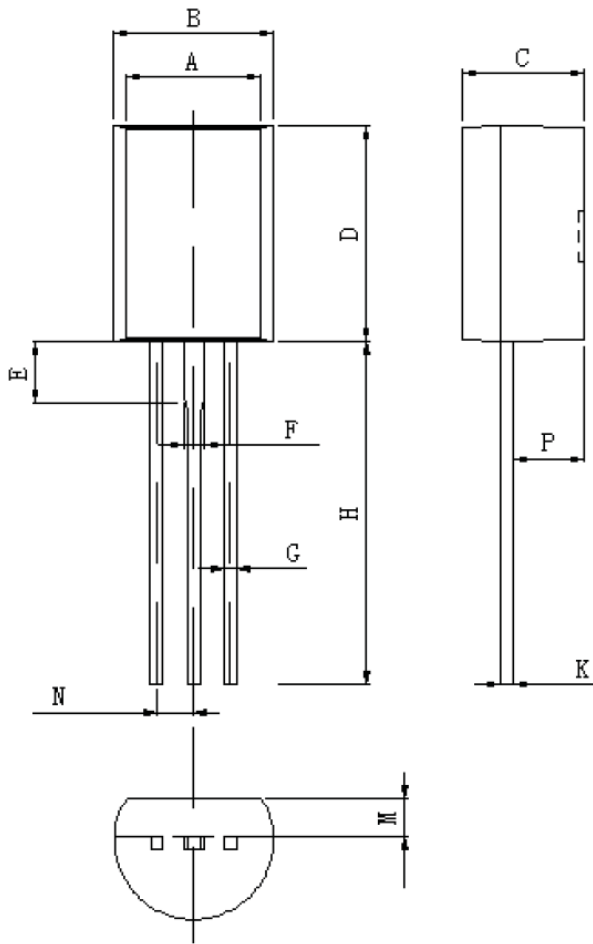
**TO-92 TAPING**



Item	Symbol	Dimension [mm]	
		Reference	Tolerance
Component pitch	P	12.7	±0.5
Side lead to center of feed hole	P1	3.85	±0.5
Center lead to center of feed hole	P2	6.35	±0.5
Lead pitch	F1,F2	2.5	+0.2/-0.1
Carrier Tape width	W	18.0	+1.0/-0.5
Adhesive tape width	W0	6.0	±0.5
Tape feed hole location	W1	9.0	±0.5
Adhesive tape position	W2	1.0 MAX	
Center of feed hole to bottom of component	H	19.5	±1
Center of feed hole to lead form	H0	16.0	±0.5
Component height	H1	27.0 max	
Tape feed hole diameter	D0	4.0	±0.2

Package Dimension

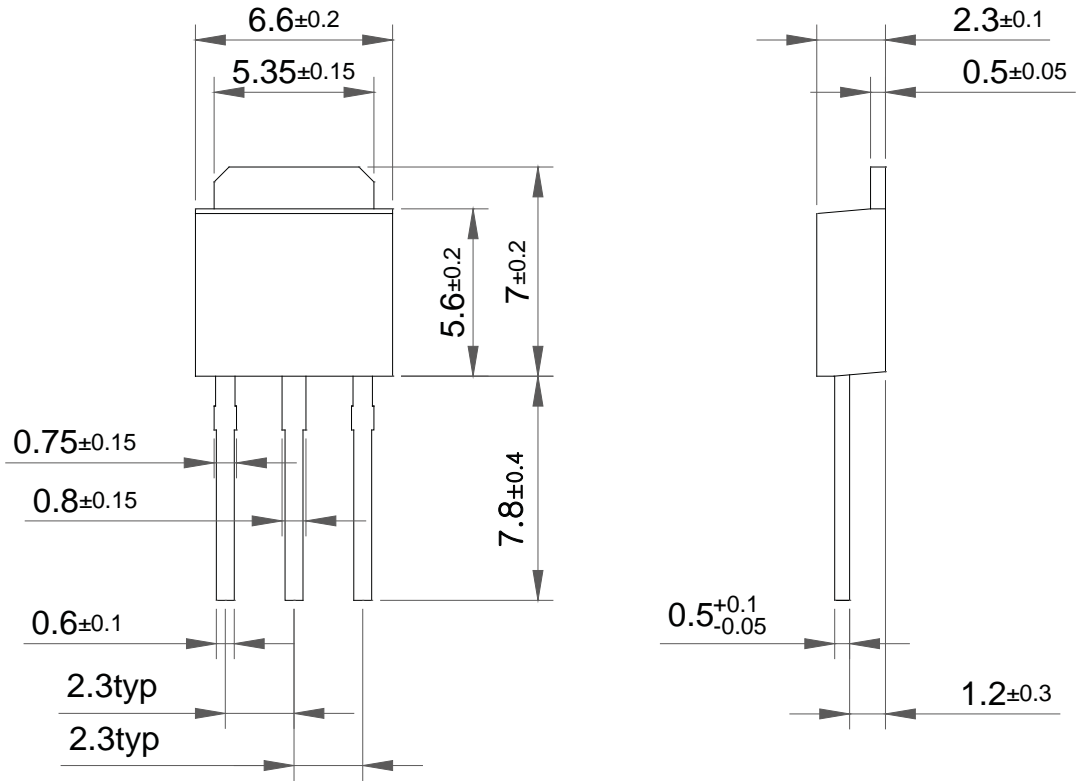
TO-92L



DIM	MILLIMETERS
A	5.8 <sub>-0.2</sub>
B	6.3 <sub>+0.2</sub>
C	4.8 <sub>+0.2</sub>
D	8.6 <sub>+0.2</sub>
E	3.0 <sub>+0.2</sub>
F	1.0 <sub>+0.2</sub>
G	0.5 <sub>+0.1</sub>
H	13.0 <sub>+0.2</sub>
K	0.5 <sub>+0.1</sub>
M	1.5 <sub>+0.2</sub>
N	1.4 <sub>+0.2</sub>
P	2.9 <sub>+0.3</sub>

Package Dimension

TO-251

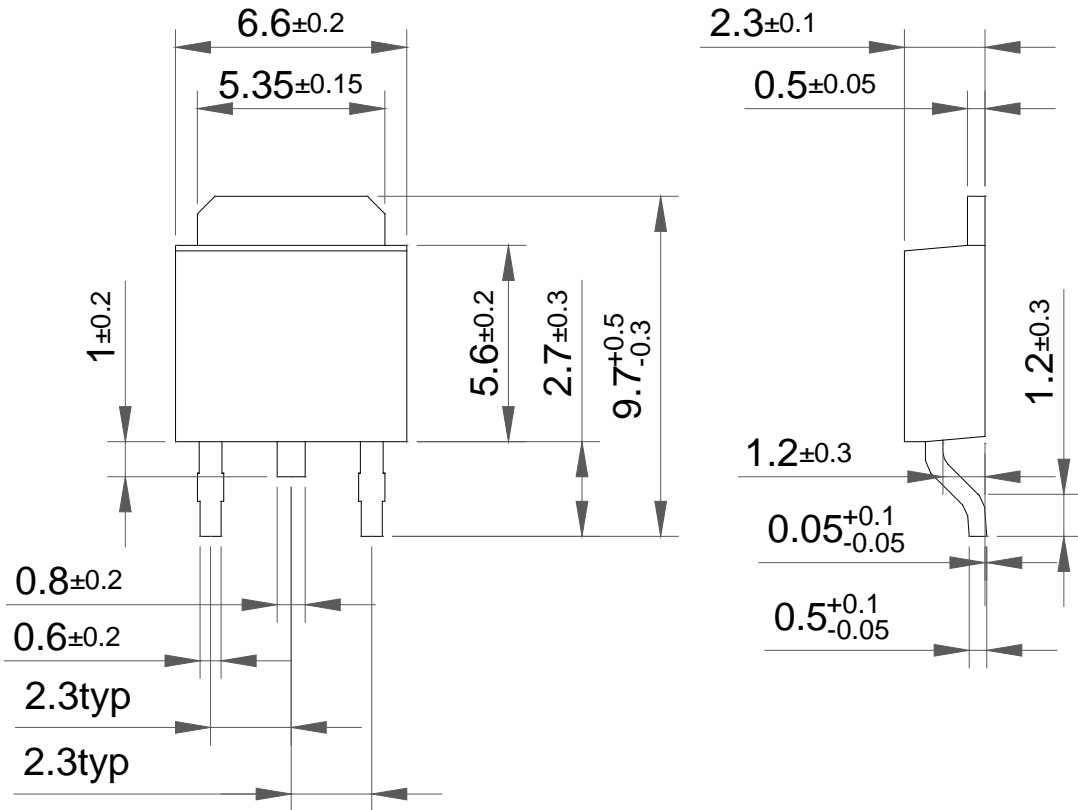


Dimensions in Millimeters



Package Dimension

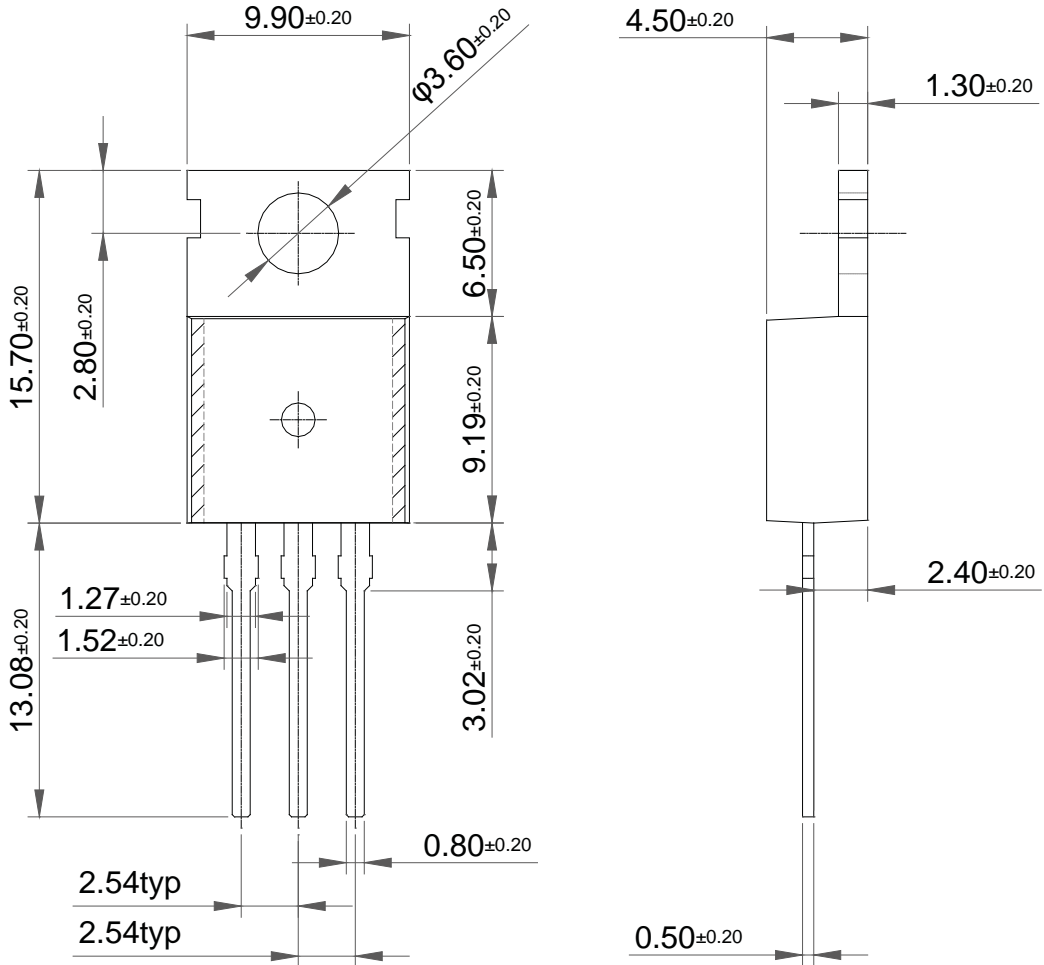
TO-252



Dimensions in Millimeters

Package Dimension

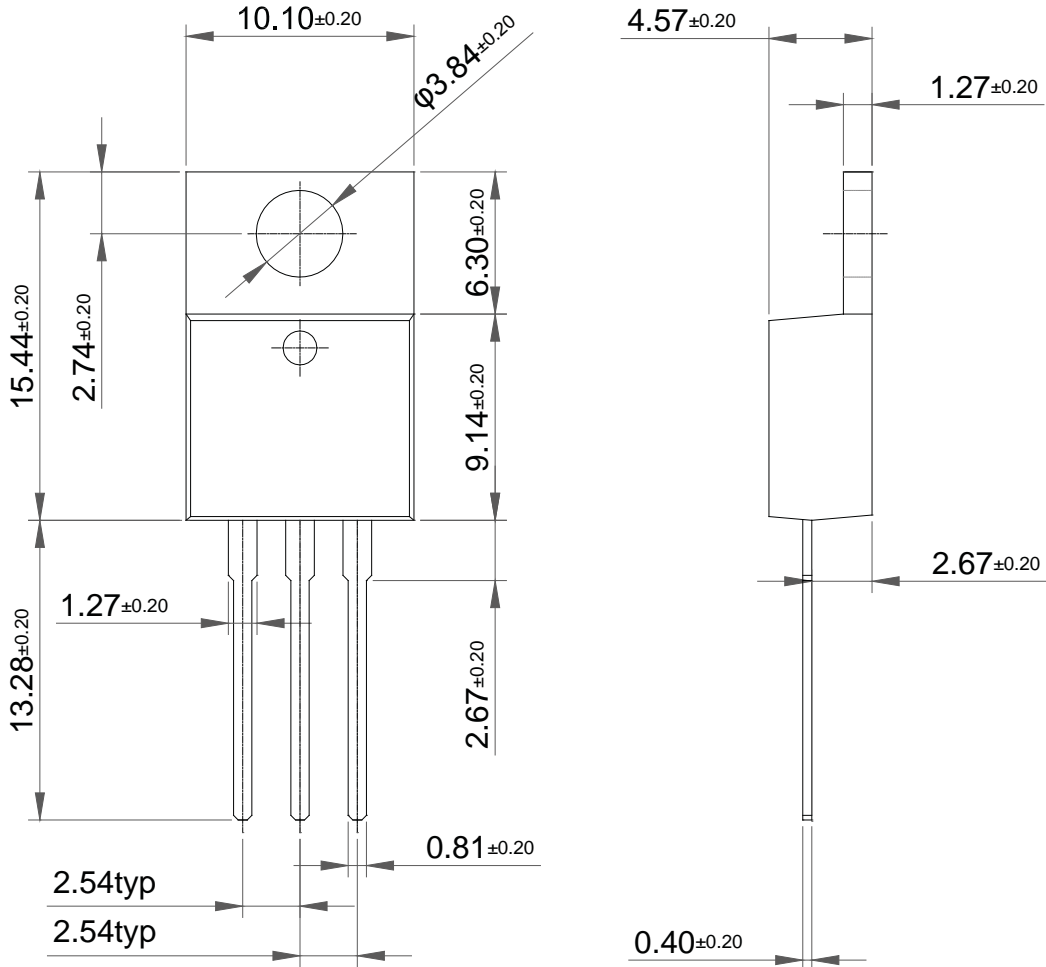
TO-220 (A)



Dimensions in Millimeters

Package Dimension

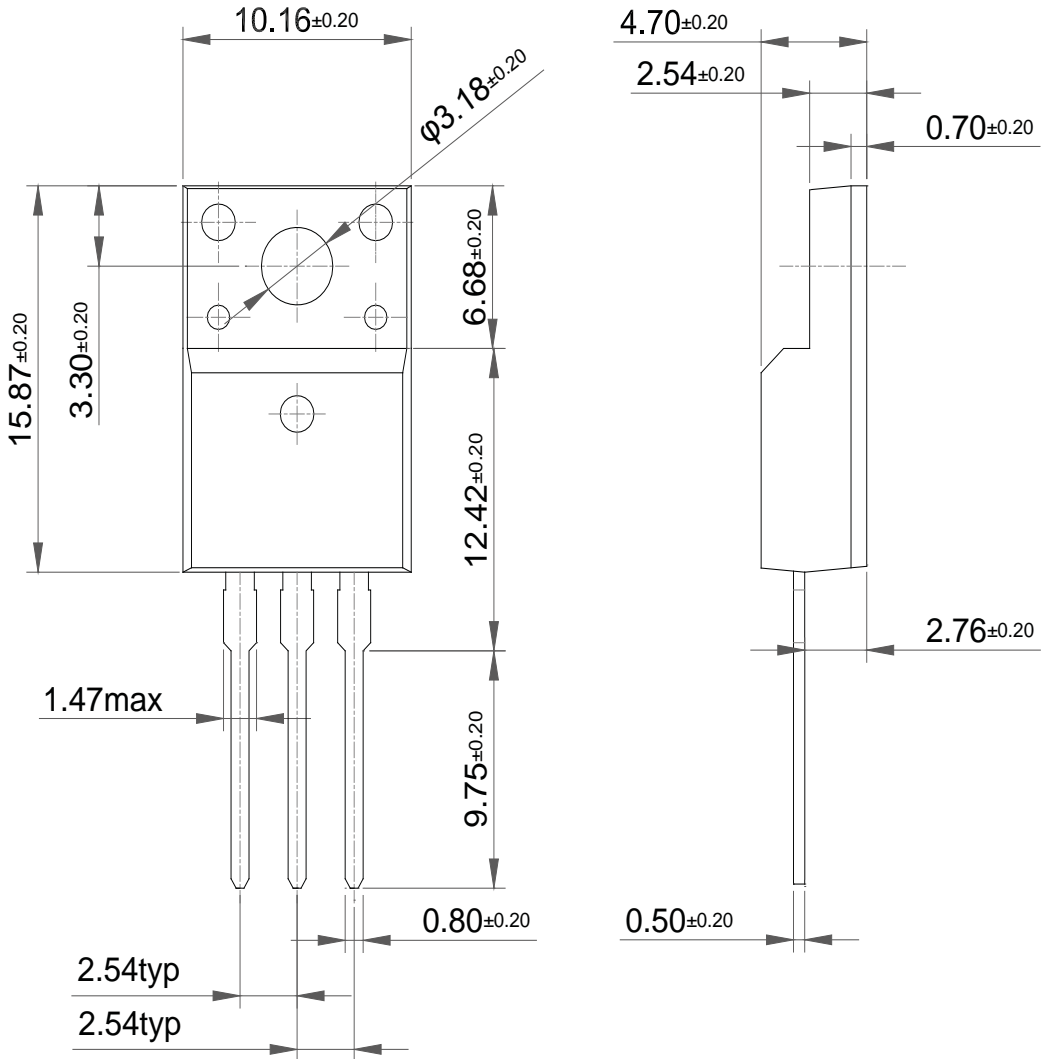
TO-220 (B)



Dimensions in Millimeters

# Package Dimension

## TO-220F



Dimensions in Millimeters