

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

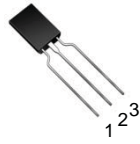
Features

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

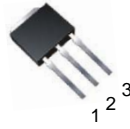
TO-92



TO-92L



TO-251



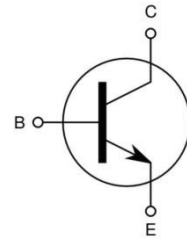
TO-252



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	μs
Storage Time	t_{stg}				4.0	μs
Fall Time	t_F				0.9	μs

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

Typical Characteristics

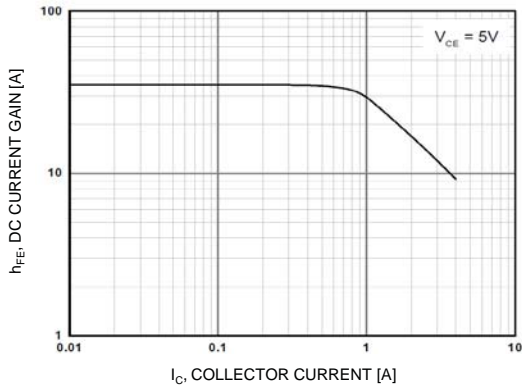


Figure 1. DC Current Gain

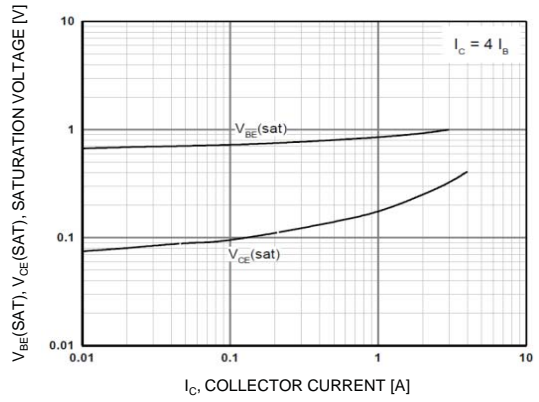


Figure 2. Base-Emitter Saturation Voltage
Collector-Emitter Saturation Voltage

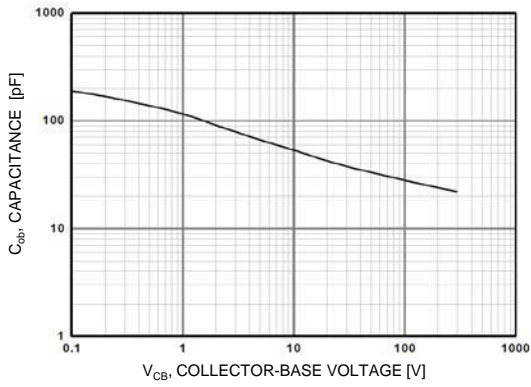


Figure 3. Collector Output Capacitance

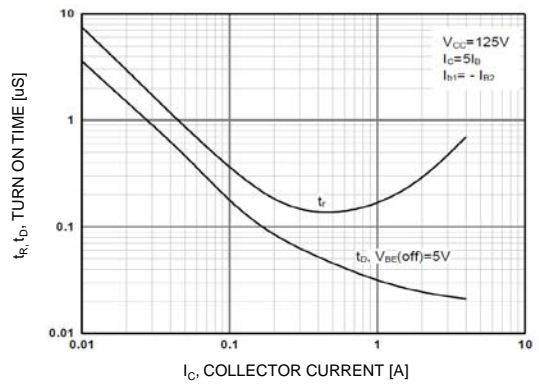


Figure 4. Turn On Time

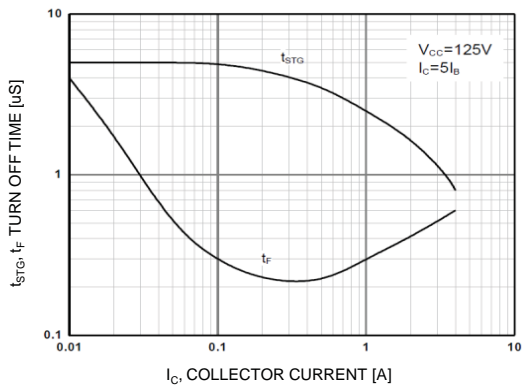


Figure 5. Turn Off Time

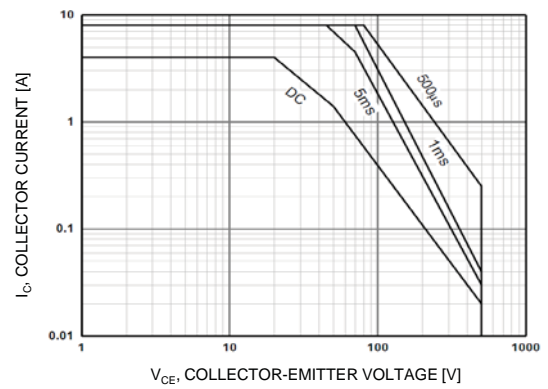


Figure 6. Safe Operating Area

Typical Characteristics

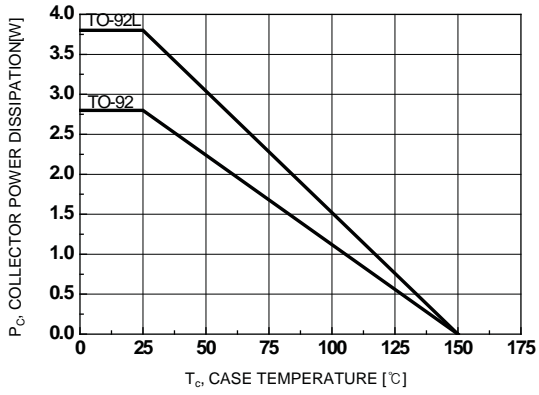


Figure 7. Power Derating

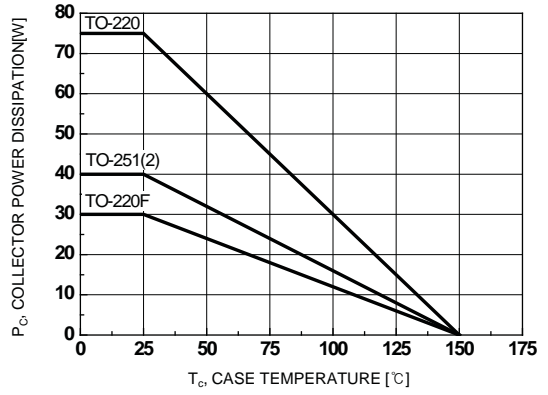
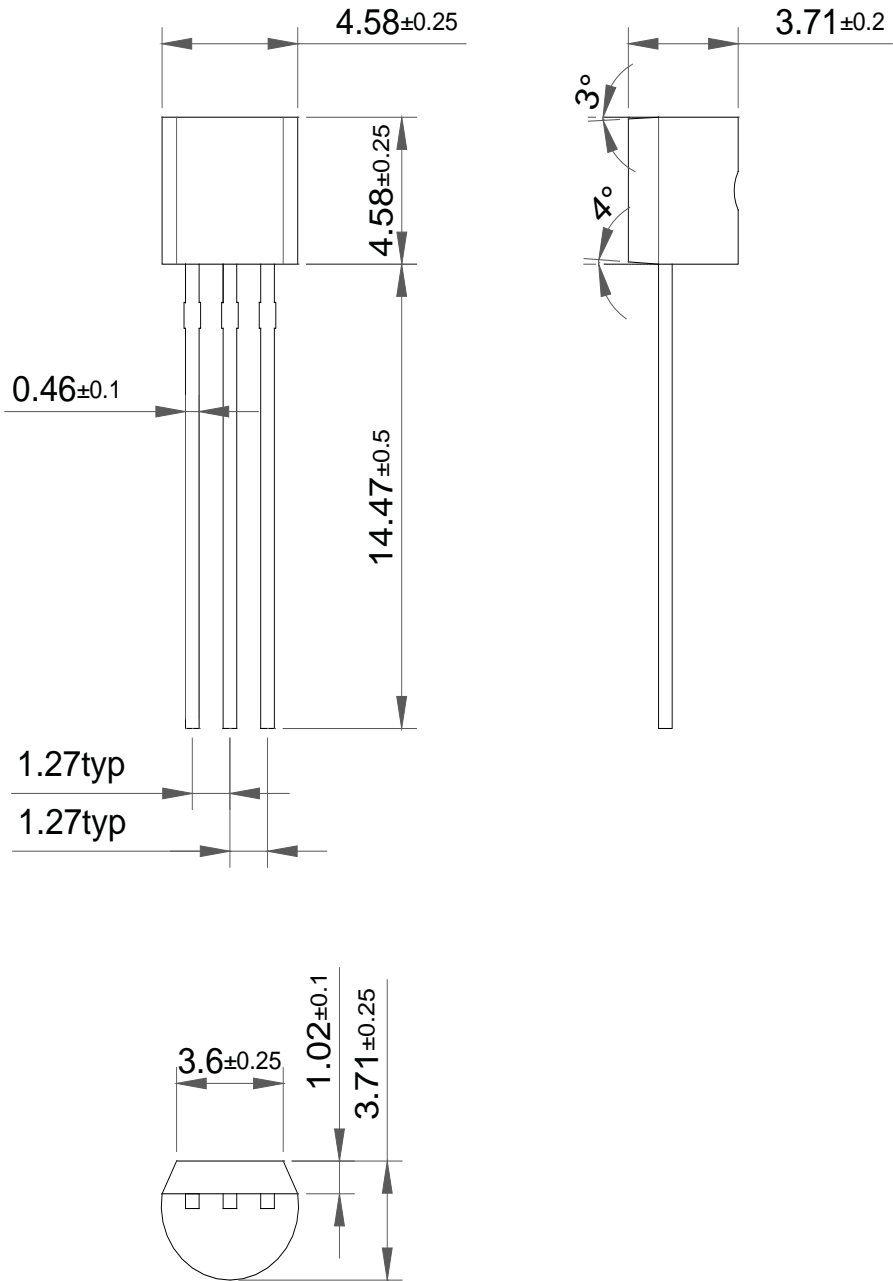


Figure 8. Power Derating

Package Dimension

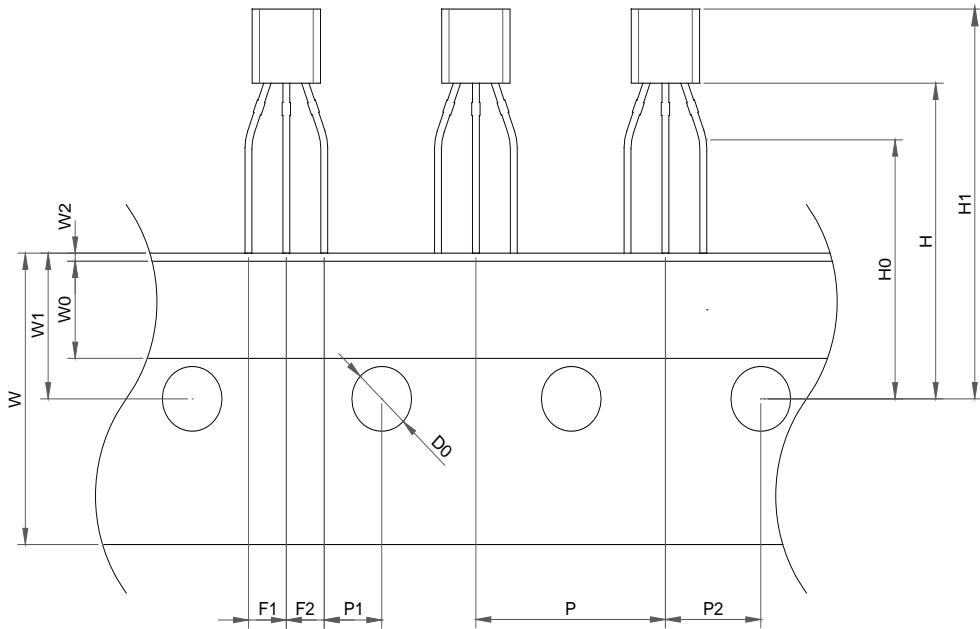
TO-92



Dimensions in Millimeters

Package Dimension

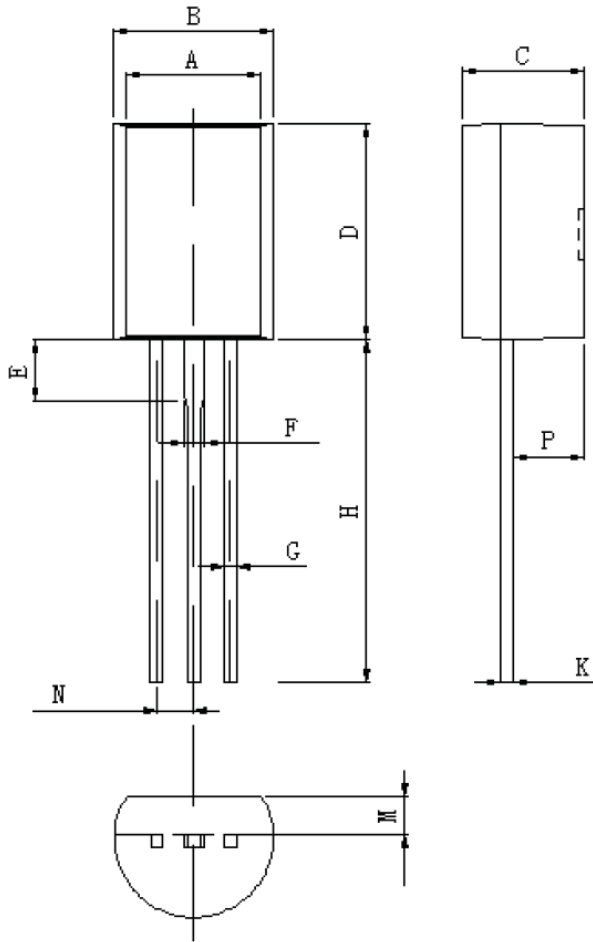
TO-92 TAPING



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

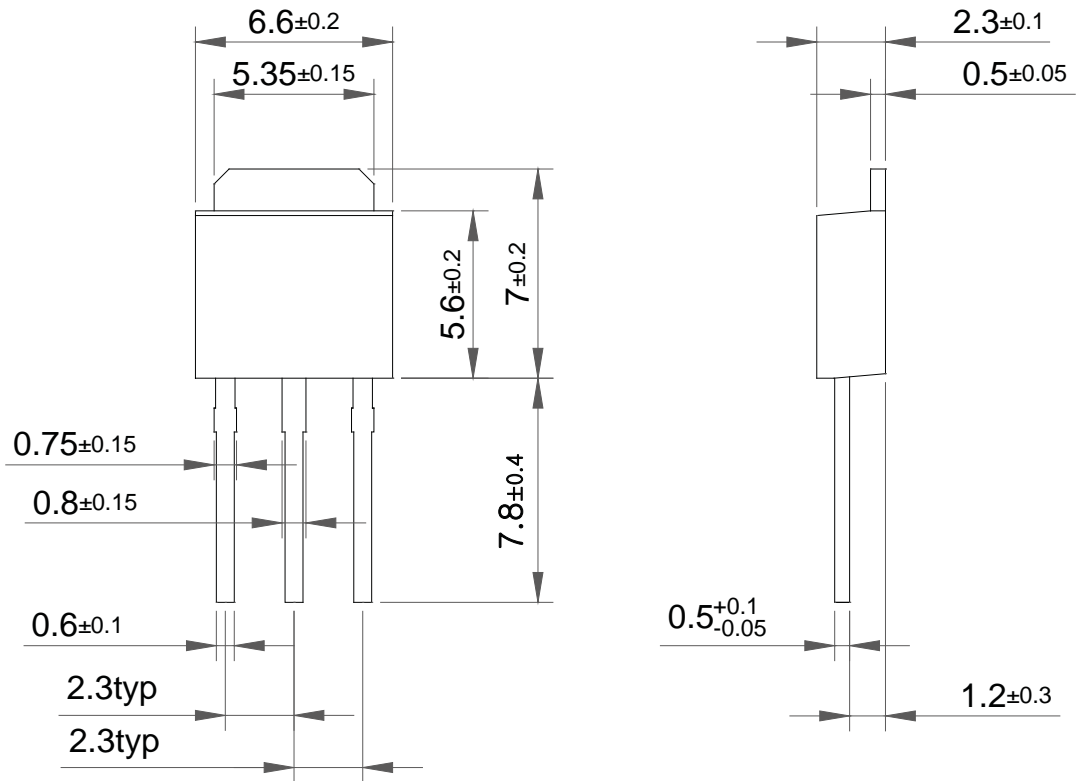
TO-92L



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

Package Dimension

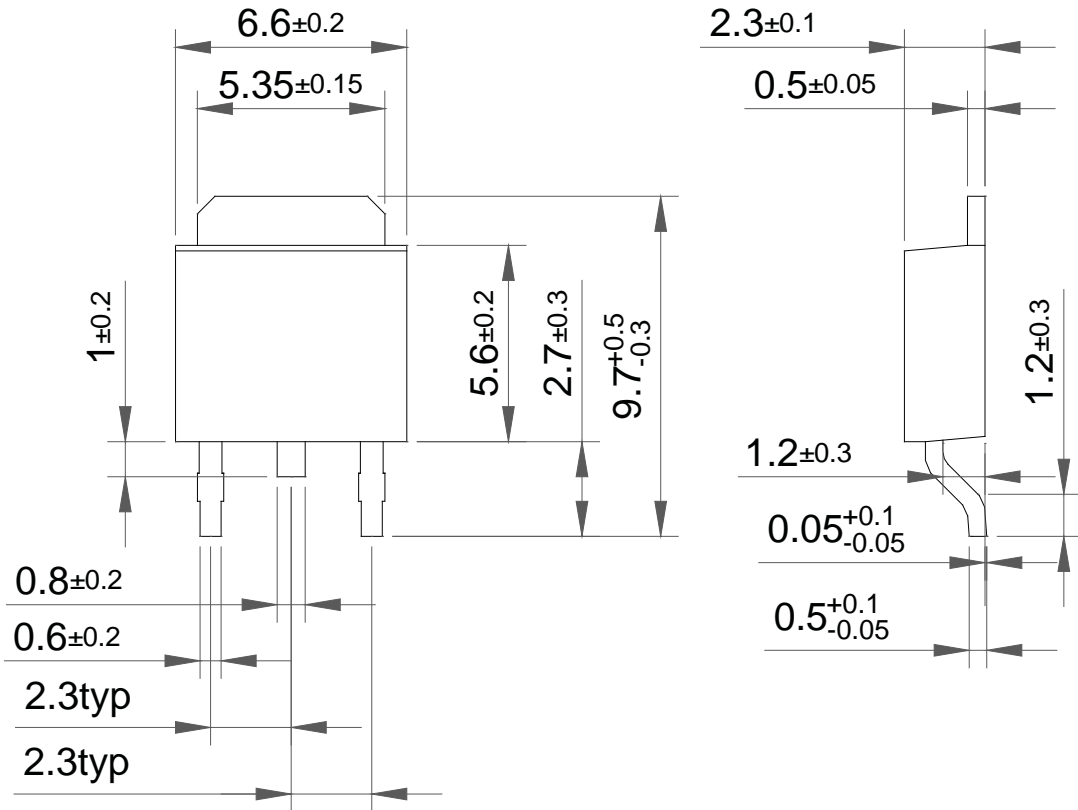
TO-251



Dimensions in Millimeters

Package Dimension

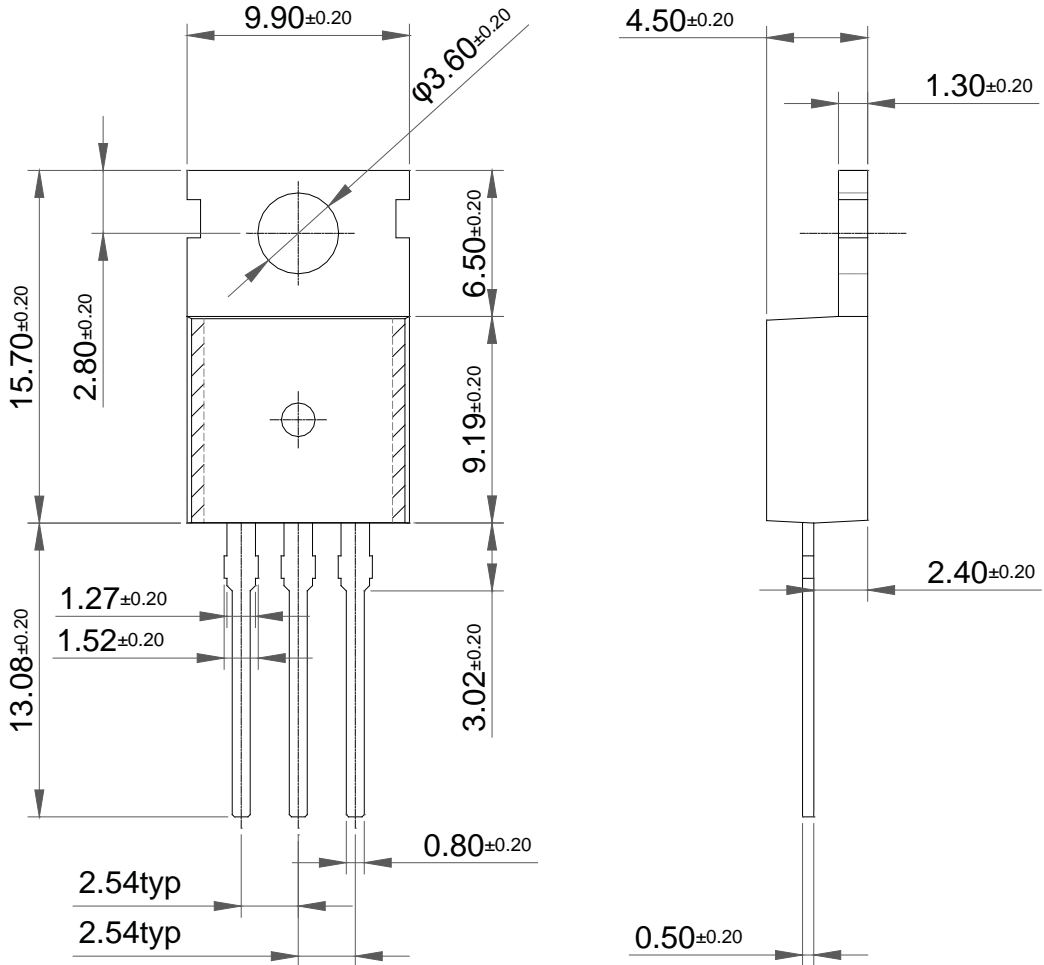
TO-252



Dimensions in Millimeters

Package Dimension

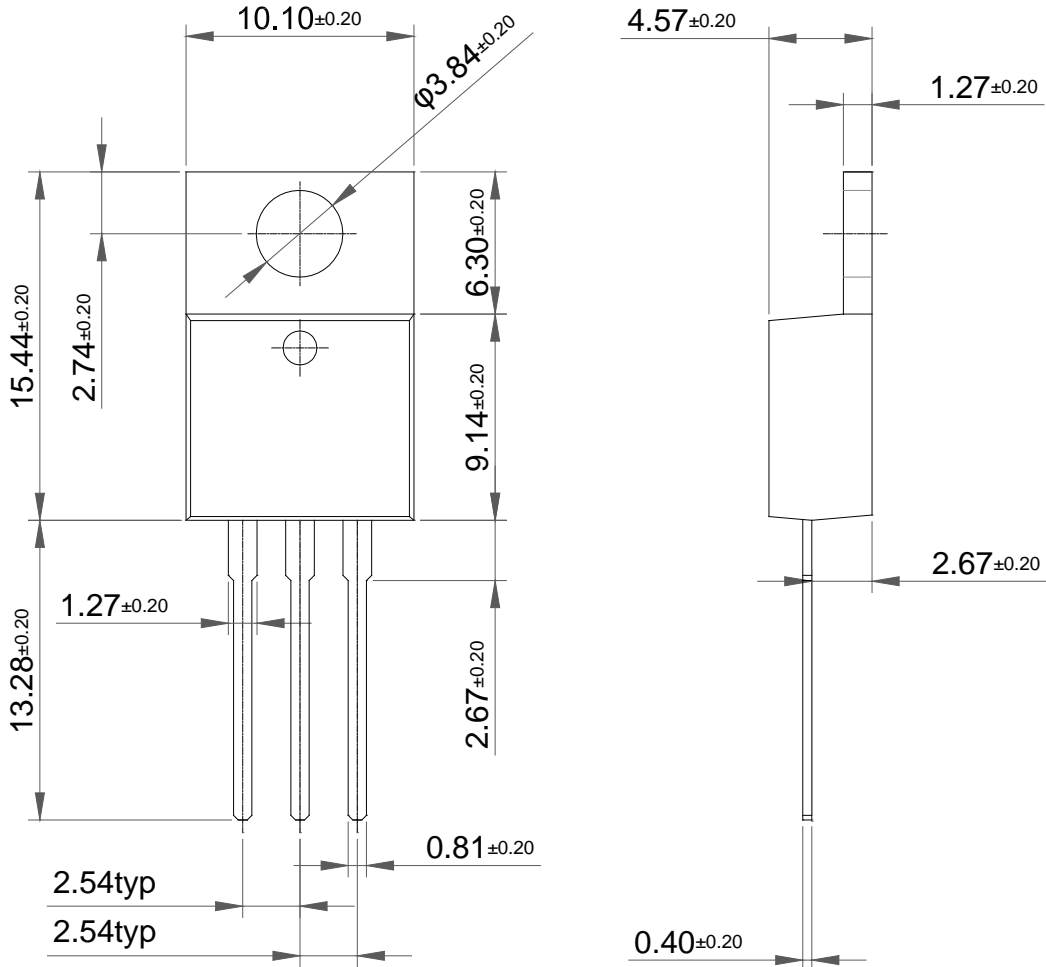
TO-220 (A)



Dimensions in Millimeters

Package Dimension

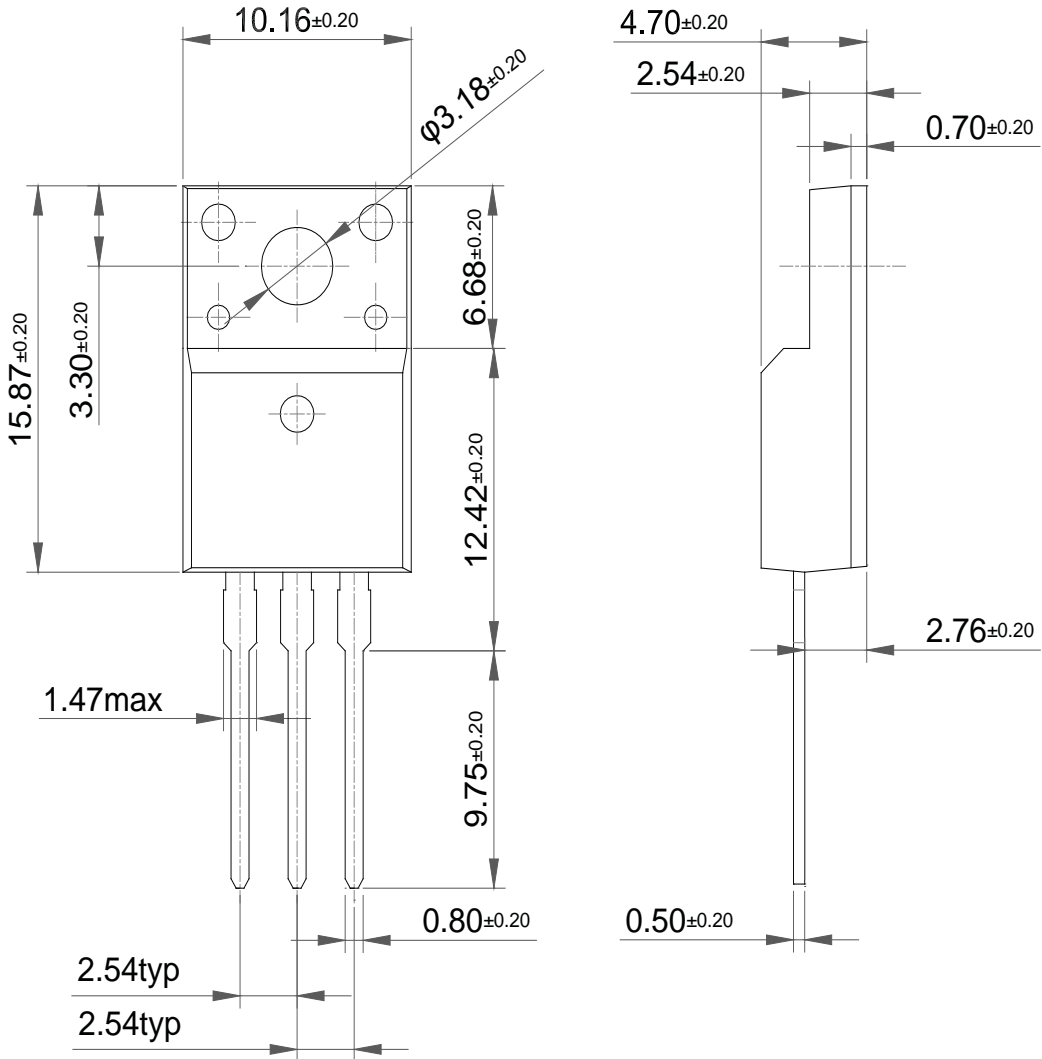
TO-220 (B)



Dimensions in Millimeters

Package Dimension

TO-220F



Dimensions in Millimeters