

KSH13009A

KSH13009AF / KSH13009AL

NPN Silicon Power Transistor, VCBO= 700V, VCEO= 400V, IC= 12A

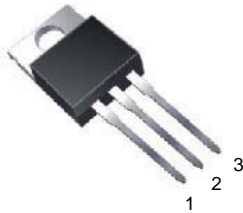
General Description

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

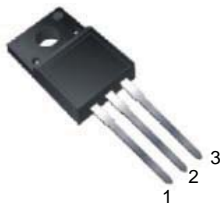
Features

- VCBO = 700V
- VCEO = 400V
- VBEO = 9V
- IC = 12A

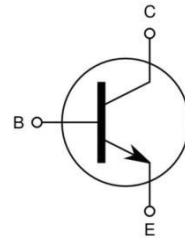
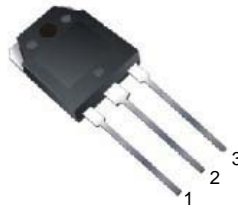
TO-220



TO-220F



TO-3P



Ordering Information

Ordering number	Package	Pin Assignment			Packing
		1	2	3	
KSH13009A	TO-220	B	C	E	Tube
KSH13009AF	TO-220F	B	C	E	Tube
KSH13009AL	TO-3P	B	C	E	Tube

h_{FE} Classification

Classification	R	O	Y
h _{FE}	8 ~ 17	15 ~ 28	26 ~ 39

* Test Condition : V_{CE}=5V, I_C=5A

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Absolute Maximum Ratings TC=25°C unless otherwise noted

CHARACTERISTICS	SYMBOL	RATING			UNIT
		TO-220	TO-220F	TO-3P	
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	12			A
Collector Current(Pulse)	I_{CP}	24			A
Base Current	I_B	6			A
Collector Dissipation(Tc=25°C)	P_C	100	50	130	W
Junction Temperature	T_J	150			°C
Storage Temperature	T_{STG}	-65~150			°C

Electrical Characteristics ⁽¹⁾ 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}	$V_{CE}=5V, I_C=5A$	8		40	
	h_{FE2}	$V_{CE}=5V, I_C=8A$	6		30	
Collector-Emitter Saturation Voltage	$V_{CE}(sat)$	$I_C=5A, I_B=1A$			1	V
		$I_C=8A, I_B=1.6A$			1.5	V
		$I_C=12A, I_B=3A$			3	V
Base-Emitter Saturation Voltage	$V_{BE}(sat)$	$I_C=5A, I_B=1A$			1.4	V
		$I_C=8A, I_B=1.6A$			1.6	V
Output Capacitance	C_{ob}	$V_{CB}=10V, f=0.1MHz$		180		pF
Current Gain Bandwidth Product	f_T	$V_{CE}=10V, I_C=0.5A$	4			MHz
Turn on Time	t_{on}	$V_{CC}=125V, I_C=8A$ $I_{B1}=1.6A, I_{B2}=-1.6A$ $R_L=15.6\Omega$ (Note 2)			1.1	μs
Storage Time	t_{stg}				3.0	μs
Fall Time	t_F				0.7	μs

Notes ;

- Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$
- Final Test Condition : UI9600, Vcc=5V, Ic=0.5A (t_{stg} Class = A : 4.0~4.5, B : 4.5~5.0, C : 5.0~5.5)

Typical Characteristics

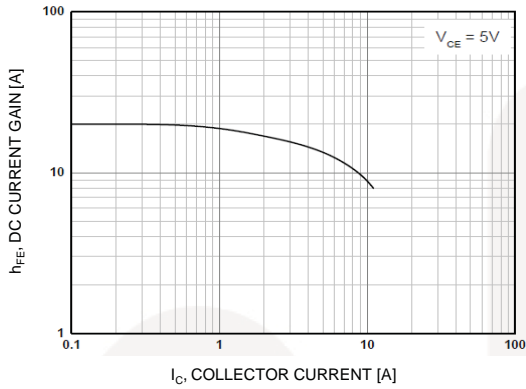


Figure 1. DC Current Gain

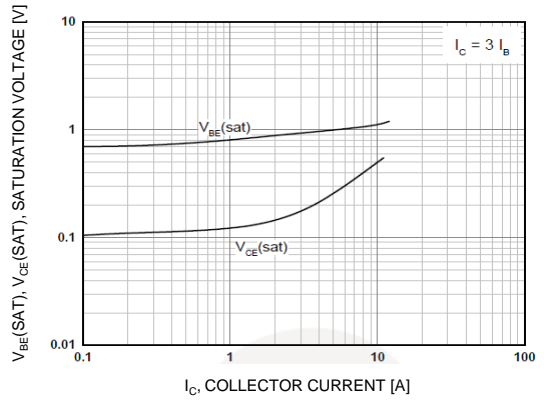


Figure 2. Base-Emitter Saturation Voltage
Collector-Emitter Saturation Voltage

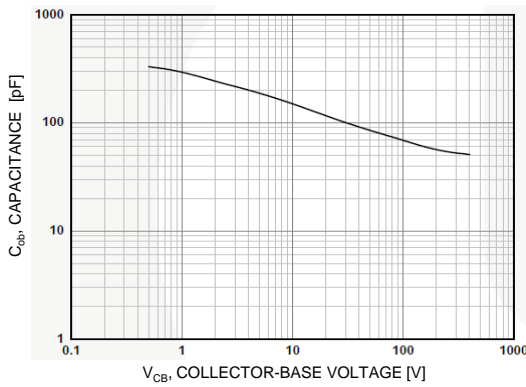


Figure 3. Collector Output Capacitance

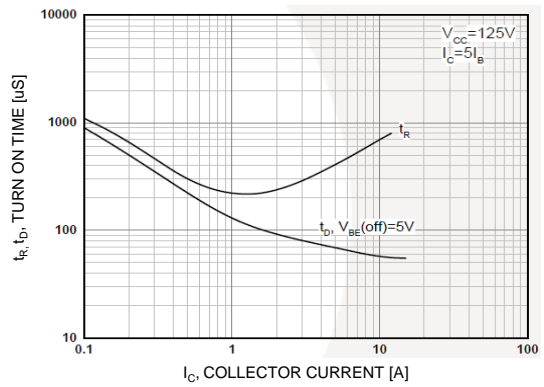


Figure 4. Turn On Time

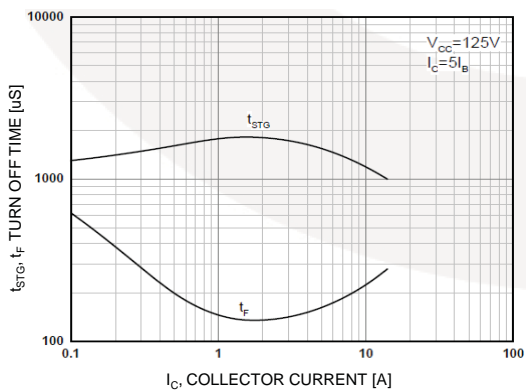


Figure 5. Turn Off Time

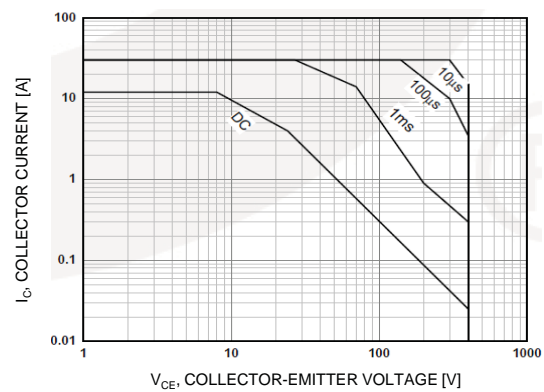


Figure 6. Safe Operating Area

Typical Characteristics

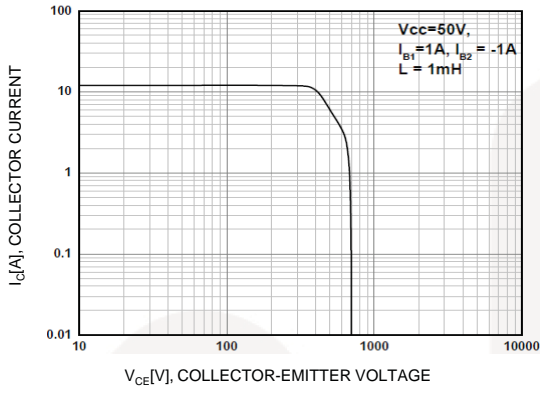


Figure 7. Reverse Biased Safe Operating Area

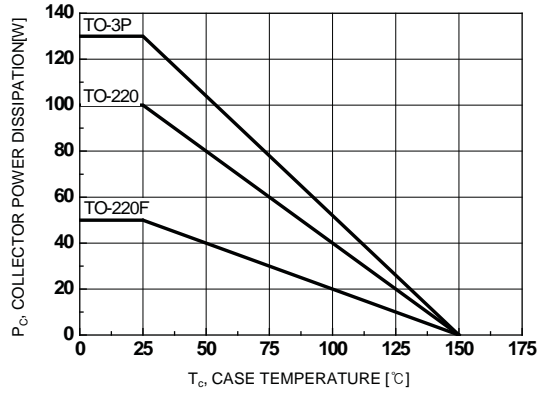
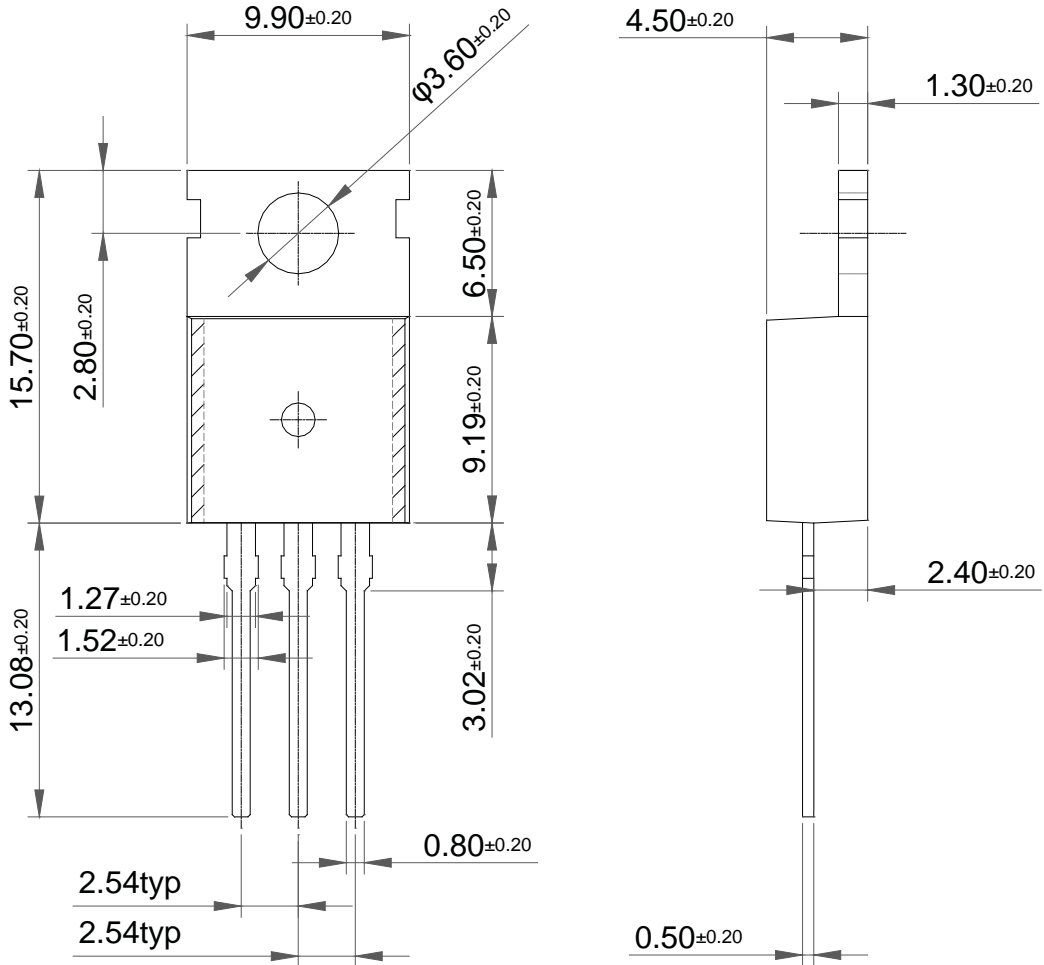


Figure 8. Power Derating

Package Dimension

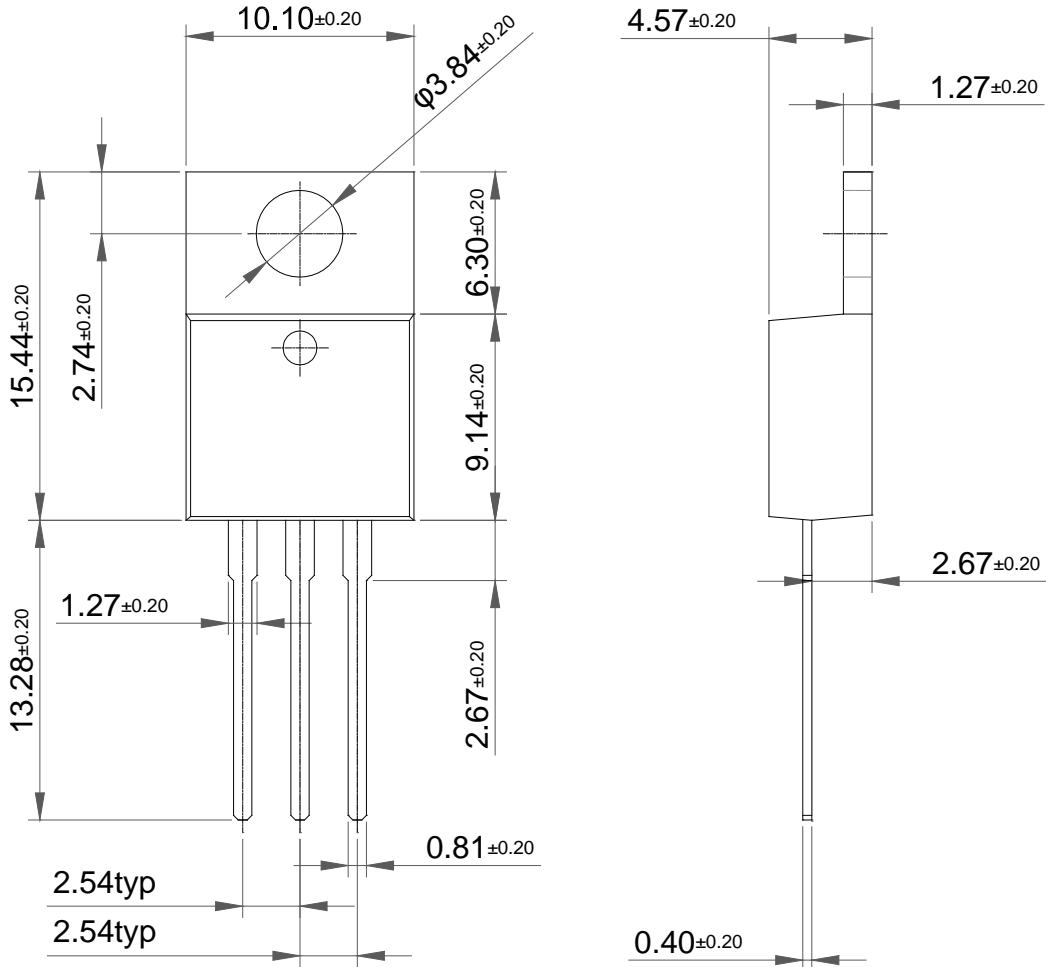
TO-220 (A)



Dimensions in Millimeters

Package Dimension

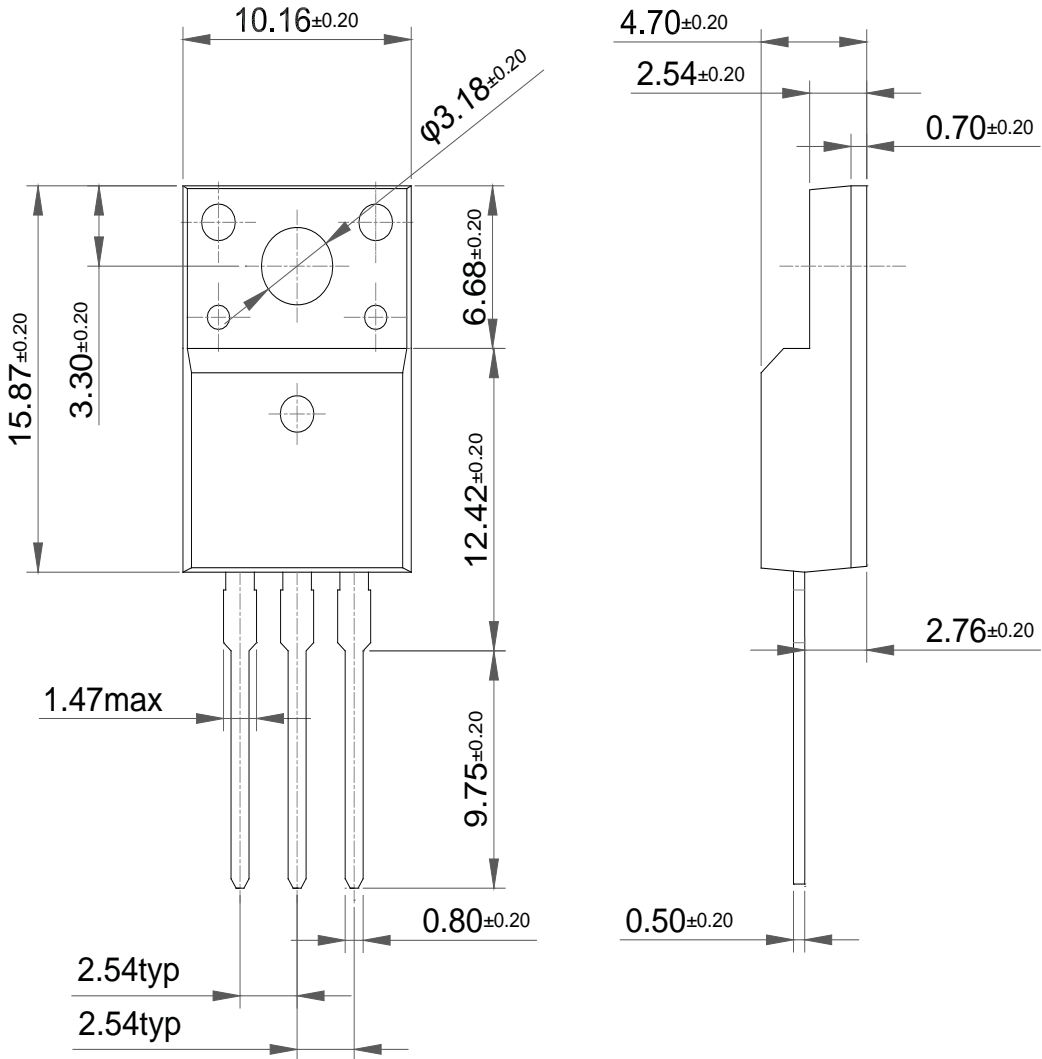
TO-220 (B)



Dimensions in Millimeters

Package Dimension

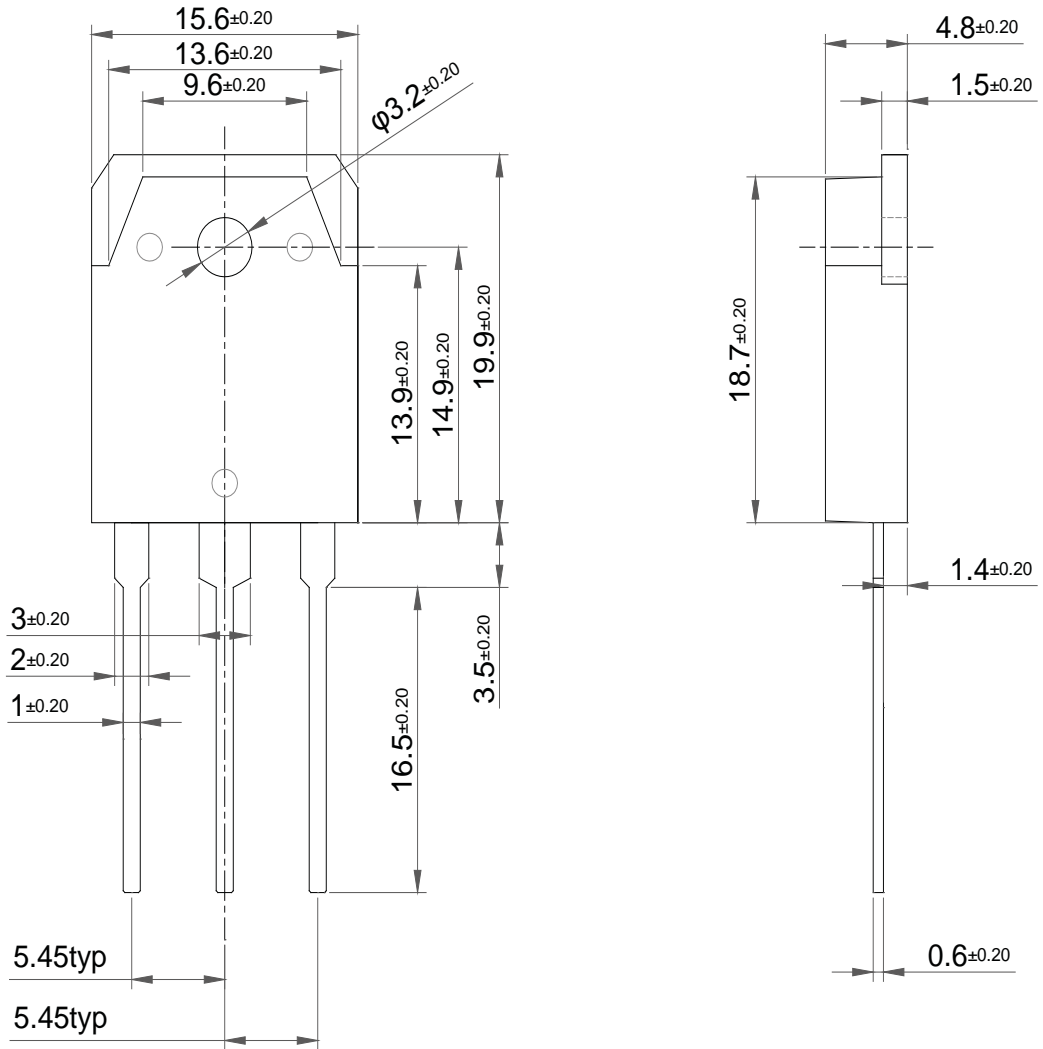
TO-220F



Dimensions in Millimeters

Package Dimension

TO-3P



Dimensions in Millimeters