

# KSH13009

**SemiHow**  
Know-How for Semiconductor

# KSH13009

## Switch Mode series NPN silicon Power Transistor


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

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

12 Amperes  
NPN Silicon Power Transistor  
100 Watts

CHARACTERISTICS	SYMBOL	RATING	UNIT
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	W
Junction Temperature	$T_J$	150	°C
Storage Temperature	$T_{STG}$	-65~150	°C

TO-220  
1. Base  
2. Collector  
3. Emitter



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

CHARACTERISTICS	SYMBOL	Test Condition	Min	Typ.	Max	Unit
Collector-Emitter Sustaining Voltage	$V_{CEO(sus)}$	$I_C=10mA, I_B=0$	400			V
Emitter Cut-off Current	$I_{EBO}$	$V_{EB}=9V, I_C=0$			1	mA
*DC Current Gain	$h_{FE1}$ $h_{FE2}$	$V_{CE}=5V, I_C=5A$ $V_{CE}=5V, I_C=8A$	8 6		40 30	
*Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=5A, I_B=1A$ $I_C=8A, I_B=1.6A$ $I_C=12A, I_B=3A$			1 1.5 3	V V V
*Base-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C=5A, I_B=1A$ $I_C=8A, I_B=1.6A$			1.2 1.6	V 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	$t_{on}$	$V_{CC}=125V, I_C=8A$ $I_{B1}=1.6A, I_{B2}=-1.6A$ $R_L=15.6\Omega$			1.1	$\mu s$
Storage Time	$T_{stg}$				3	$\mu s$
Fall Time	$t_F$				0.7	$\mu s$

\* Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%

Note.

Package Mark information.

<b>hFE1 Classification</b>	R	8 ~ 17	<b>S</b> <b>YWW Z</b> <b>KSH13009</b>	S	SemiHow Symbol
	O	15~28		YWW	Y; year code, WW; week code
	Y	26 ~ 39		Z	hFE1 Classification
	Y1(26~33), Y2(31~39)				

## Typical Characteristics

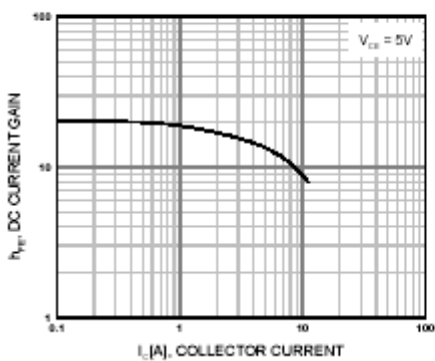


Figure 1. DC current Gain

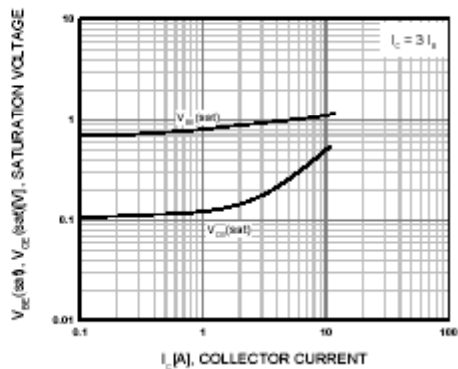


Figure 2. Base-Emitter Saturation Voltage  
Collector-Emitter Saturation Voltage

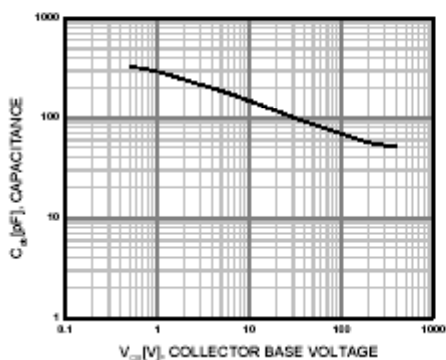


Figure 3. Collector Output Capacitance

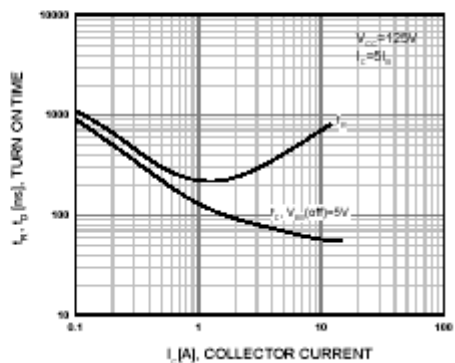


Figure 4. Turn On Time

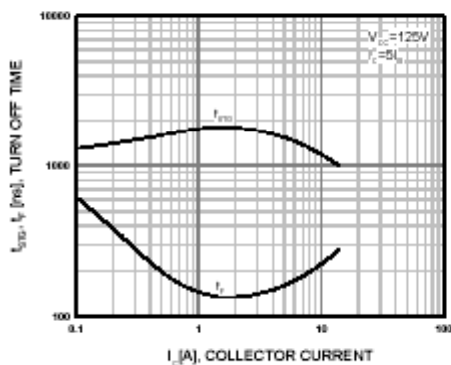


Figure 5. Turn Off Time

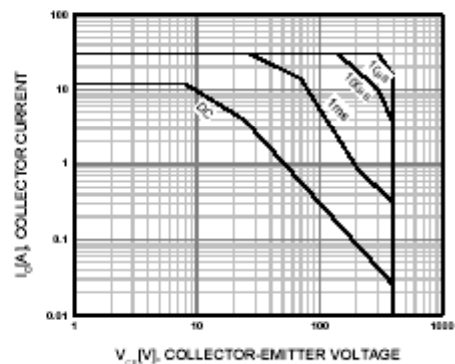


Figure 6. Forward Bias Safe Operating Area

Typical Characteristics (Continued)

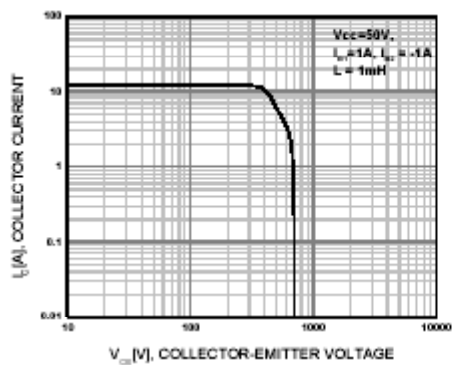


Figure 7. Reverse Bias Safe Operating Area

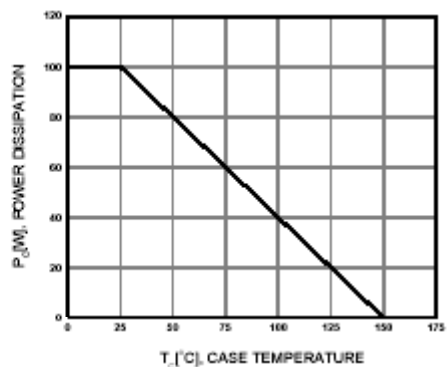
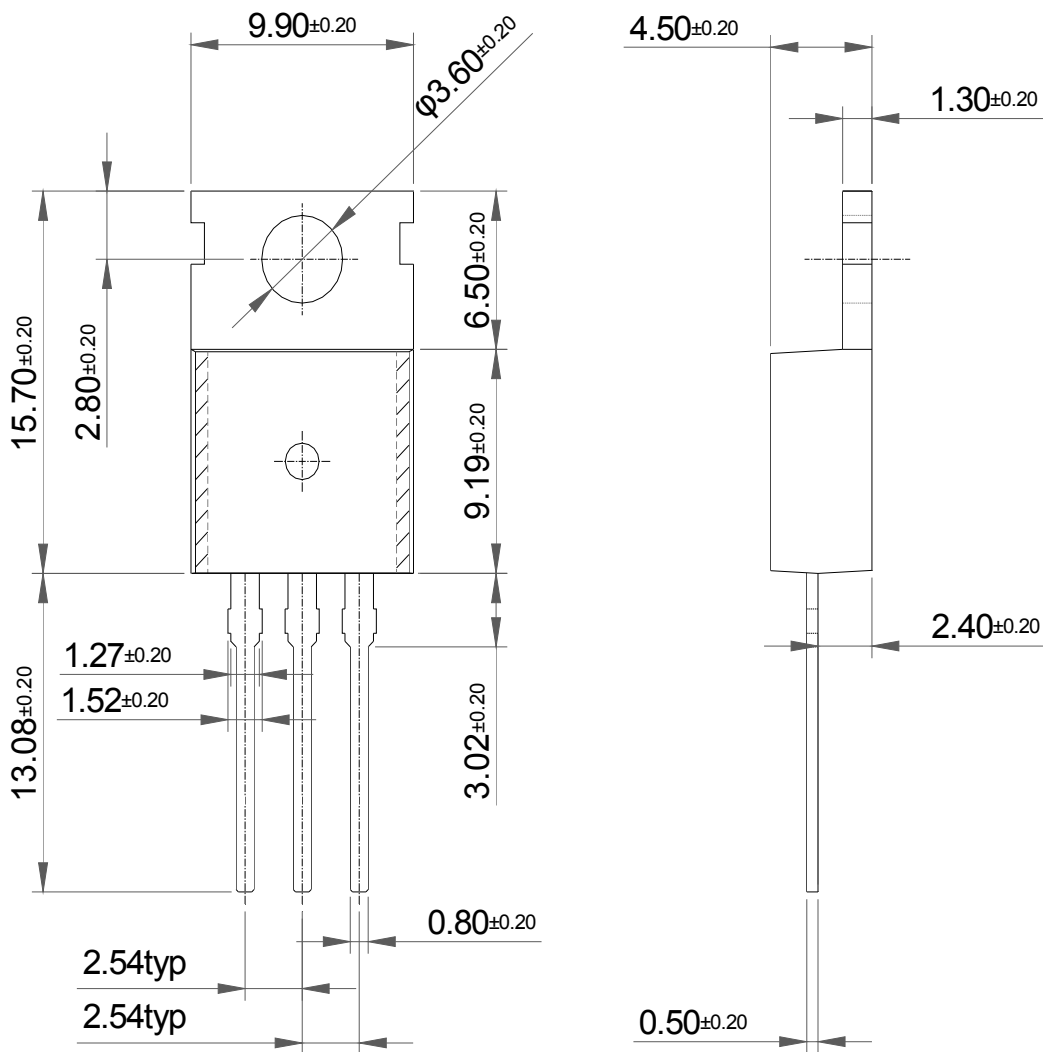


Figure 8. Power Derating

Package Dimension

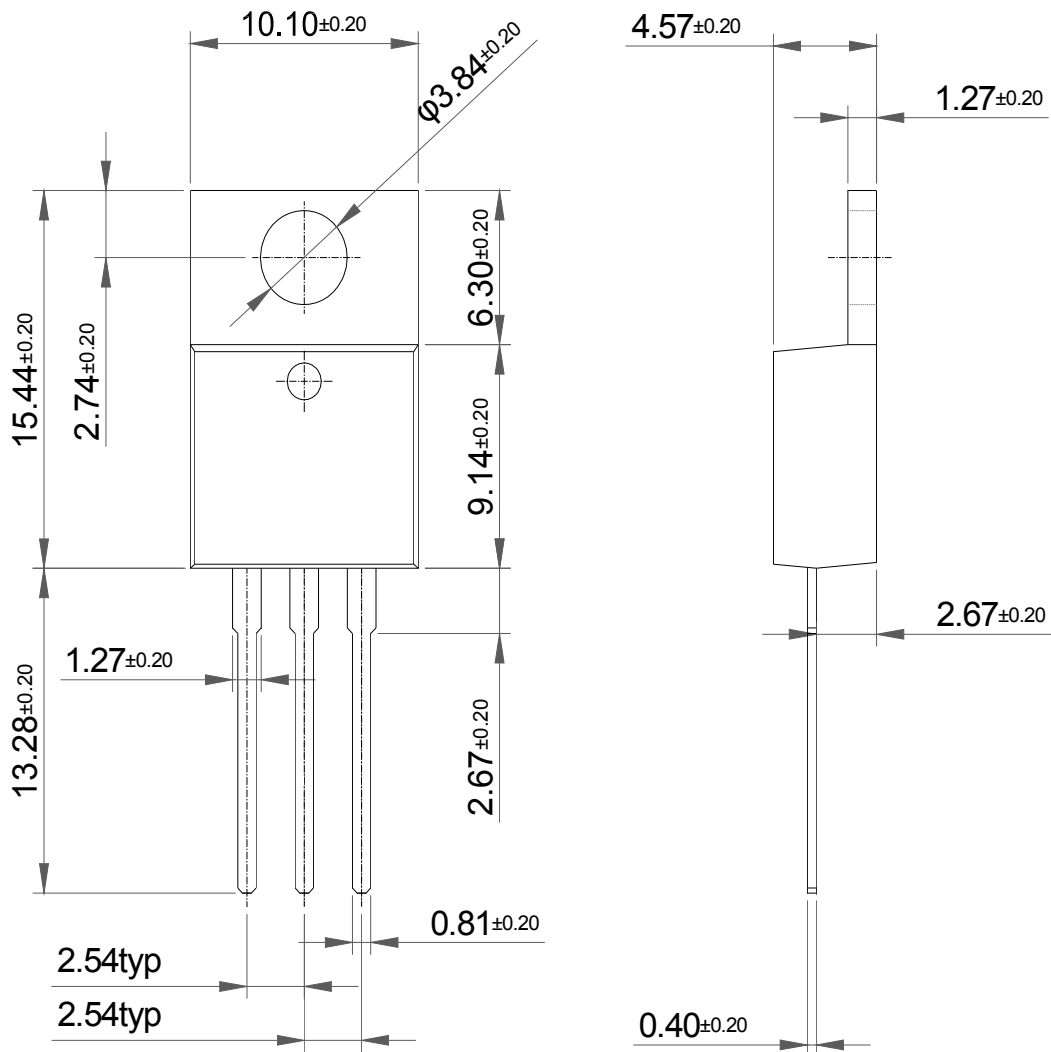
TO-220 (A)



Dimensions in Millimeters

Package Dimension

TO-220 (B)



Dimensions in Millimeters

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