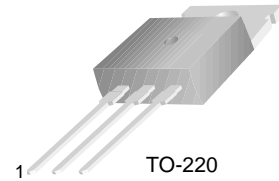


KSE13004/13005

High Voltage Switch Mode Application

- High Speed Switching
- Suitable for Switching Regulator and Motor Control



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

NPN Silicon Transistor

Absolute Maximum Ratings $T_C=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Value	Units	
V_{CBO}	Collector-Base Voltage	: KSE13004	600	V
		: KSE13005	700	V
V_{CEO}	Collector-Emitter Voltage	: KSE13004	300	V
		: KSE13005	400	V
V_{EBO}	Emitter-Base Voltage	9	V	
I_C	Collector Current (DC)	4	A	
I_{CP}	Collector Current (Pulse)	8	A	
I_B	Base Current	2	A	
P_C	Collector Dissipation ($T_C=25^\circ\text{C}$)	75	W	
T_J	Junction Temperature	150	$^\circ\text{C}$	
T_{STG}	Storage Temperature	- 65 ~ 150	$^\circ\text{C}$	

Electrical Characteristics $T_C=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
$BV_{CEO(sus)}$	Collector-Emitter Sustaining Voltage	$I_C = 10\text{mA}, I_B = 0$: KSE13004	300		V
			: KSE13005	400		V
I_{EBO}	Emitter Cut-off Current	$V_{EB} = 9\text{V}, I_C = 0$			1	mA
h_{FE}	*DC Current Gain	$V_{CE} = 5\text{V}, I_C = 1\text{A}$	10		60	
		$V_{CE} = 5\text{V}, I_C = 2\text{A}$	8		40	
$V_{CE(sat)}$	*Collector-Emitter Saturation Voltage	$I_C = 1\text{A}, I_B = 0.2\text{A}$			0.5	V
		$I_C = 2\text{A}, I_B = 0.5\text{A}$			0.6	V
		$I_C = 4\text{A}, I_B = 1\text{A}$			1	V
$V_{BE(sat)}$	*Base-Emitter Saturation Voltage	$I_C = 1\text{A}, I_B = 0.2\text{A}$			1.2	V
		$I_C = 2\text{A}, I_B = 0.5\text{A}$			1.6	V
C_{ob}	Output Capacitance	$V_{CB} = 10\text{V}, f = 0.1\text{MHz}$		65		pF
f_T	Current Gain Bandwidth Product	$V_{CE} = 10\text{V}, I_C = 0.5\text{A}$	4			MHz
t_{ON}	Turn On Time	$V_{CC} = 125\text{V}, I_C = 2\text{A}$ $I_{B1} = - I_{B2} = 0.4\text{A}$ $R_L = 62.5\Omega$			0.8	μs
t_{STG}	Storage Time				4	μs
t_F	Fall Time				0.9	μs

* Pulse test: $PW \leq 300\mu\text{s}$, Duty cycle $\leq 2\%$ Pulse

Typical Characteristics

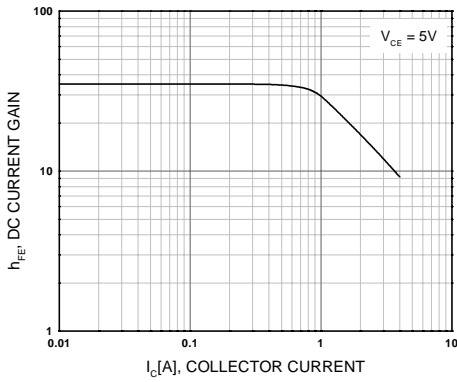


Figure 1. DC current Gain

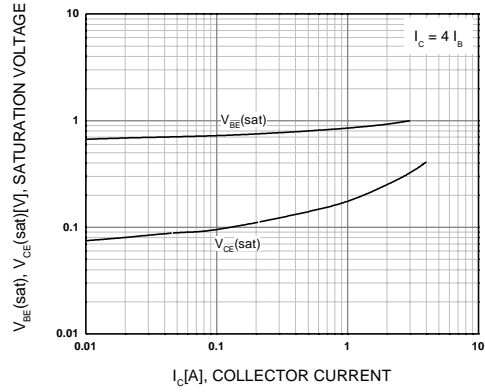


Figure 2. Base-Emitter Saturation Voltage
Collector-Emitter Saturation Voltage

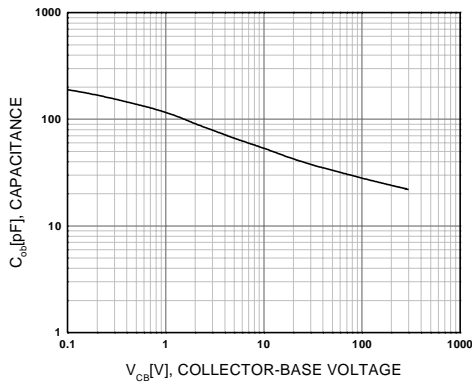


Figure 3. Collector Output Capacitance

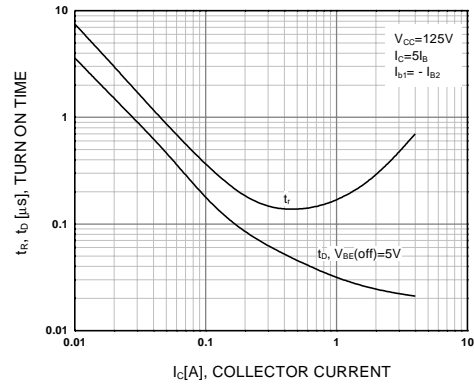


Figure 4. Turn On Time

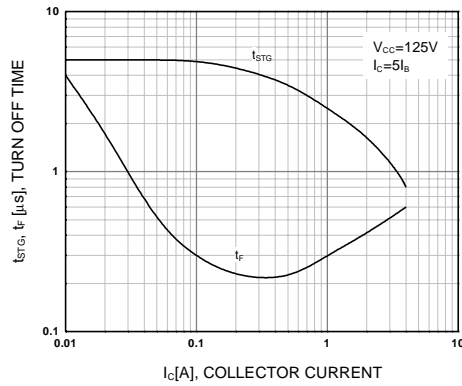


Figure 5. Turn Off Time

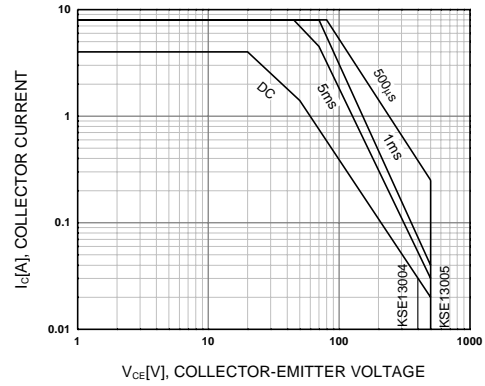


Figure 6. Safe Operating Area

Typical Characteristics (Continued)

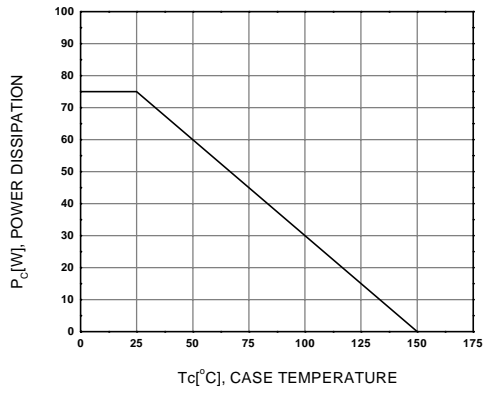
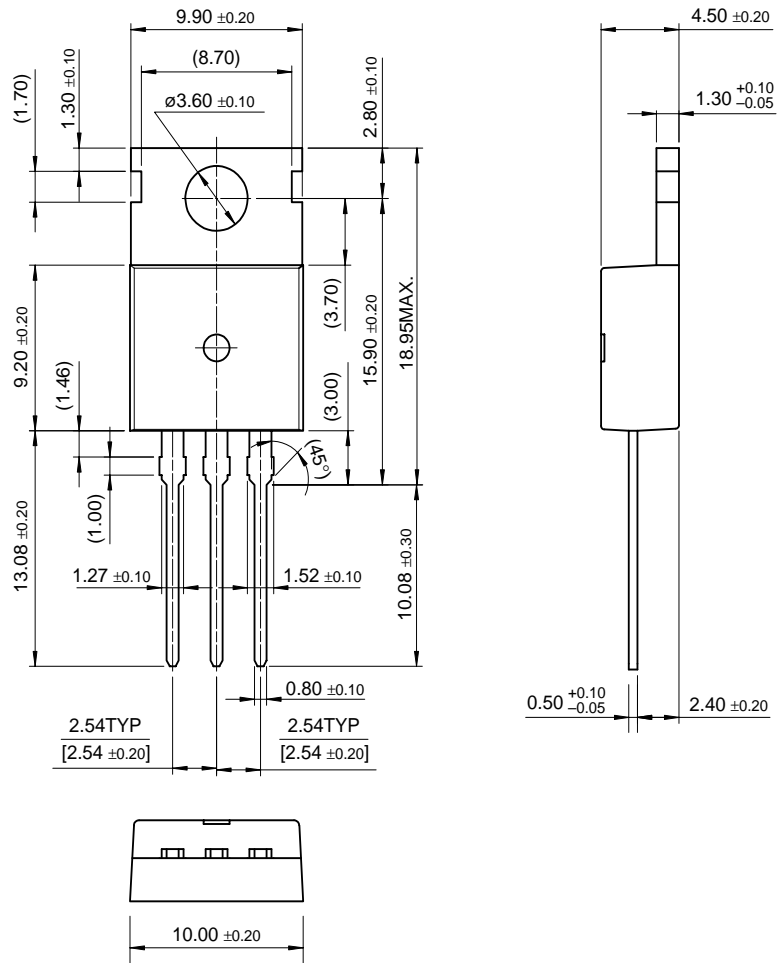


Figure 7. Power Derating

Package Dimensions

TO-220

KSE13004/13005



Dimensions in Millimeters

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Product	Product status	Package type	Leads	Packing method
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KSE13005H1ATU	Full Production	\$0.426	TO-220	3	RAIL
KSE13005H1A	Full Production	\$0.426	TO-220	3	BULK
KSE13005A	Full Production	\$0.426	TO-220	3	BULK
KSE13005H2ATU	Full Production	\$0.426	TO-220	3	RAIL

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