

# NPN Epitaxial Silicon Transistor

## KSP44, KSP45

### Features

- High-Voltage Transistor
- Collector-Emitter Voltage:
  - ♦ KSP44:  $V_{CEO} = 400\text{ V}$
  - ♦ KSP45:  $V_{CEO} = 350\text{ V}$
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

### ABSOLUTE MAXIMUM RATINGS

Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

Symbol	Parameter		Value	Unit
$V_{CBO}$	Collector-Base Voltage	KSP44	500	V
		KSP45	400	
$V_{CEO}$	Collector-Emitter Voltage	KSP44	400	V
		KSP45	350	
$V_{EBO}$	Emitter-Base Voltage		6	V
$I_C$	Collector Current		300	mA
$T_J$	Junction Temperature		150	$^\circ\text{C}$
$T_{STG}$	Storage Temperature		-55 to 150	$^\circ\text{C}$

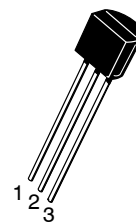
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

### THERMAL CHARACTERISTICS (Note 1)

Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

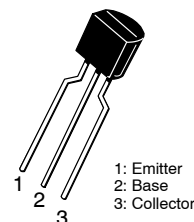
Symbol	Parameter		Value	Unit
$P_D$	Power Dissipation	$T_A = 25^\circ\text{C}$	625	mW
		$T_C = 25^\circ\text{C}$	1.5	W
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case		83.3	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient		200	$^\circ\text{C/W}$

1. PCB size: FR-4, 76 mm x 114 mm x 1.57 mm (3.0 inch x 4.5 inch x 0.062 inch) with minimum land pattern size.



STRAIGHT LEAD  
BULK PACK

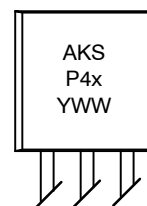
TO-92-3  
CASE 135AN



BENT LEAD  
TAPE & REEL  
AMMO PACK

TO-92 LF  
CASE 135AR

### MARKING DIAGRAM



A = Assembly Code  
 KSP4x = Device Code (x = 4 or 5)  
 Y = Year  
 WW = Work Week

### ORDERING INFORMATION

See detailed ordering and shipping information on page 2 of this data sheet.

# KSP44, KSP45

## ORDERING INFORMATION

Part Number	Top Mark	Package	Shipping <sup>†</sup>
KSP44BU	KSP44	TO-92-3 (Pb-Free), case 135AN	10,000 units / Bulk Bag
KSP44TA	KSP44	TO-92-3 (Pb-Free), case 135AR	2,000 units / Fan-Fold
KSP44TF	KSP44	TO-92-3 (Pb-Free), case 135AR	2,000 units / Tape & Reel
KSP45TA	KSP45	TO-92-3 (Pb-Free), case 135AR	2,000 units / Fan-Fold

<sup>†</sup>For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

## ELECTRICAL CHARACTERISTICS

(Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.)

Symbol	Parameter		Conditions	Min.	Max.	Unit
$BV_{CBO}$	Collector-Base Breakdown Voltage	KSP44	$I_C = 100\ \mu\text{A}$ , $I_E = 0$	500		V
		KSP45		400		
$BV_{CEO}$	Collector-Emitter Breakdown Voltage (Note 2)	KSP44	$I_C = 1\ \text{mA}$ , $I_B = 0$	400		V
		KSP45		350		
$BV_{EBO}$	Emitter-Base Breakdown Voltage		$I_E = 100\ \mu\text{A}$ , $I_C = 0$	6		V
$I_{CBO}$	Collector Cut-Off Current	KSP44	$V_{CB} = 400\ \text{V}$ , $I_E = 0$		0.1	$\mu\text{A}$
		KSP45	$V_{CB} = 320\ \text{V}$ , $I_E = 0$		0.1	
$I_{CES}$	Collector Cut-Off Current	KSP44	$V_{CE} = 400\ \text{V}$ , $I_E = 0$		0.5	$\mu\text{A}$
		KSP45	$V_{CE} = 320\ \text{V}$ , $I_E = 0$		0.5	
$I_{EBO}$	Emitter Cut-Off Current		$V_{EB} = 4\ \text{V}$ , $I_C = 0$		0.1	$\mu\text{A}$
$h_{FE}$	DC Current Gain (Note 2)		$V_{CE} = 10\ \text{V}$ , $I_C = 1\ \text{mA}$	40		
			$V_{CE} = 10\ \text{V}$ , $I_C = 10\ \text{mA}$	50	200	
			$V_{CE} = 10\ \text{V}$ , $I_C = 50\ \text{mA}$	45		
			$V_{CE} = 10\ \text{V}$ , $I_C = 100\ \text{mA}$	40		
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage (Note 2)		$I_C = 1\ \text{mA}$ , $I_B = 0.1\ \text{mA}$		0.40	V
			$I_C = 10\ \text{mA}$ , $I_B = 1\ \text{mA}$		0.50	
			$I_C = 50\ \text{mA}$ , $I_B = 5\ \text{mA}$		0.75	
$V_{BE(sat)}$	Base-Emitter Saturation Voltage (Note 2)		$I_C = 10\ \text{mA}$ , $I_B = 1\ \text{mA}$		0.75	V
$C_{ob}$	Output Capacitance		$V_{CB} = 20\ \text{V}$ , $I_E = 0$ , $f = 1\ \text{MHz}$		7	pF

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

2. Pulse test: pulse width  $\leq 300\ \mu\text{s}$ , duty cycle  $\leq 2\%$ .

TYPICAL PERFORMANCE CHARACTERISTICS

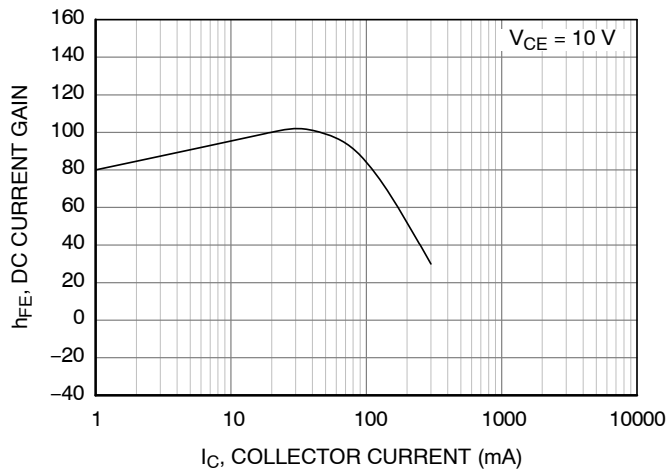


Figure 1. DC Current Gain

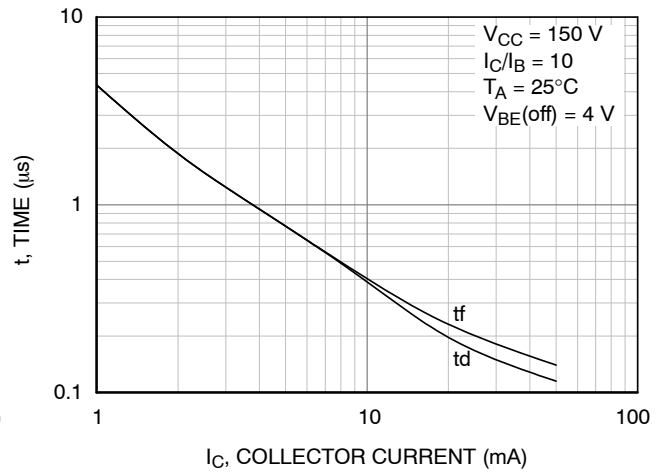


Figure 2. Turn-On Switching Times

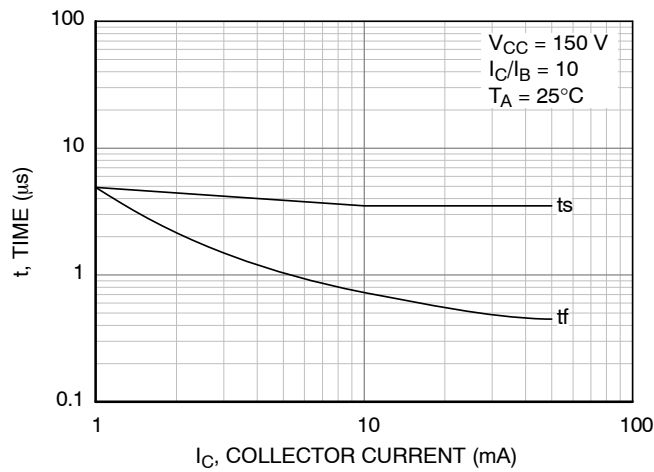


Figure 3. Turn-Off Switching Times

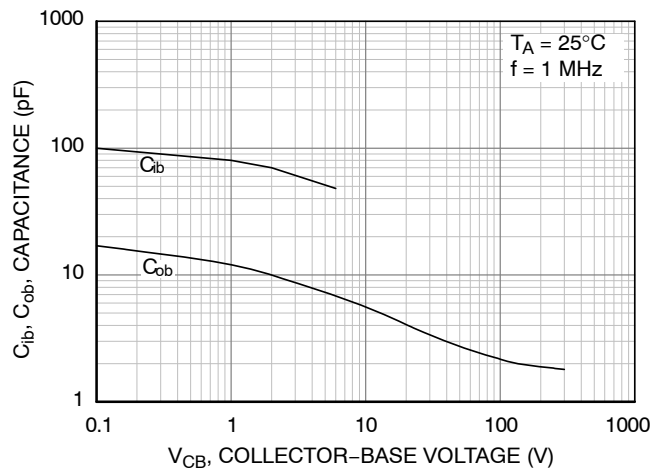


Figure 4. Capacitance

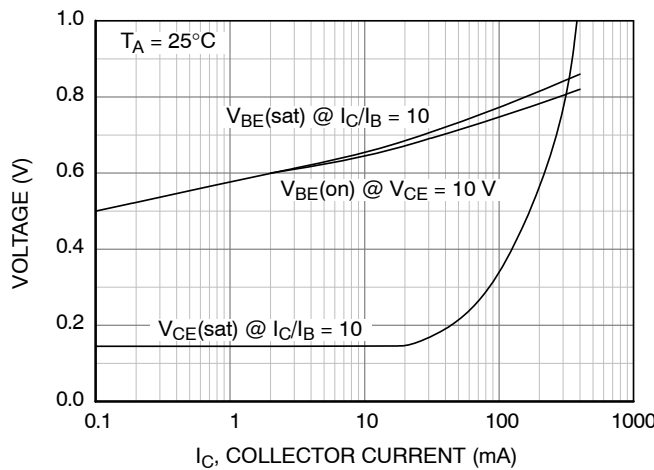


Figure 5. On Voltage

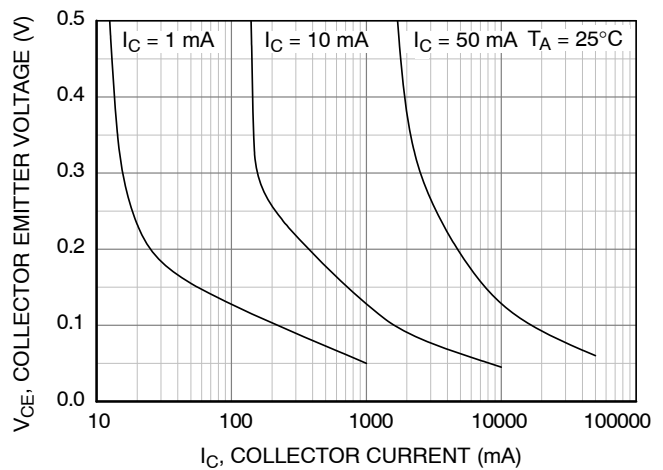
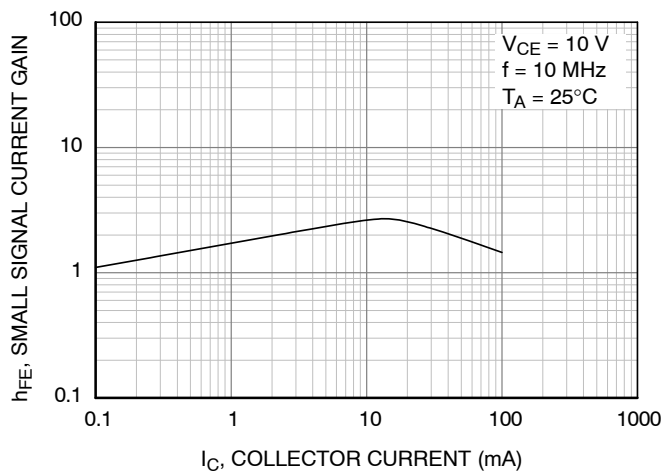


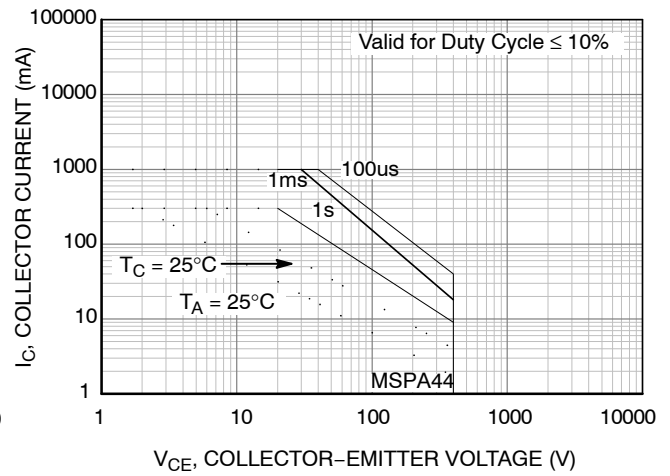
Figure 6. Collector Saturation Region

# KSP44, KSP45

## TYPICAL PERFORMANCE CHARACTERISTICS (continued)



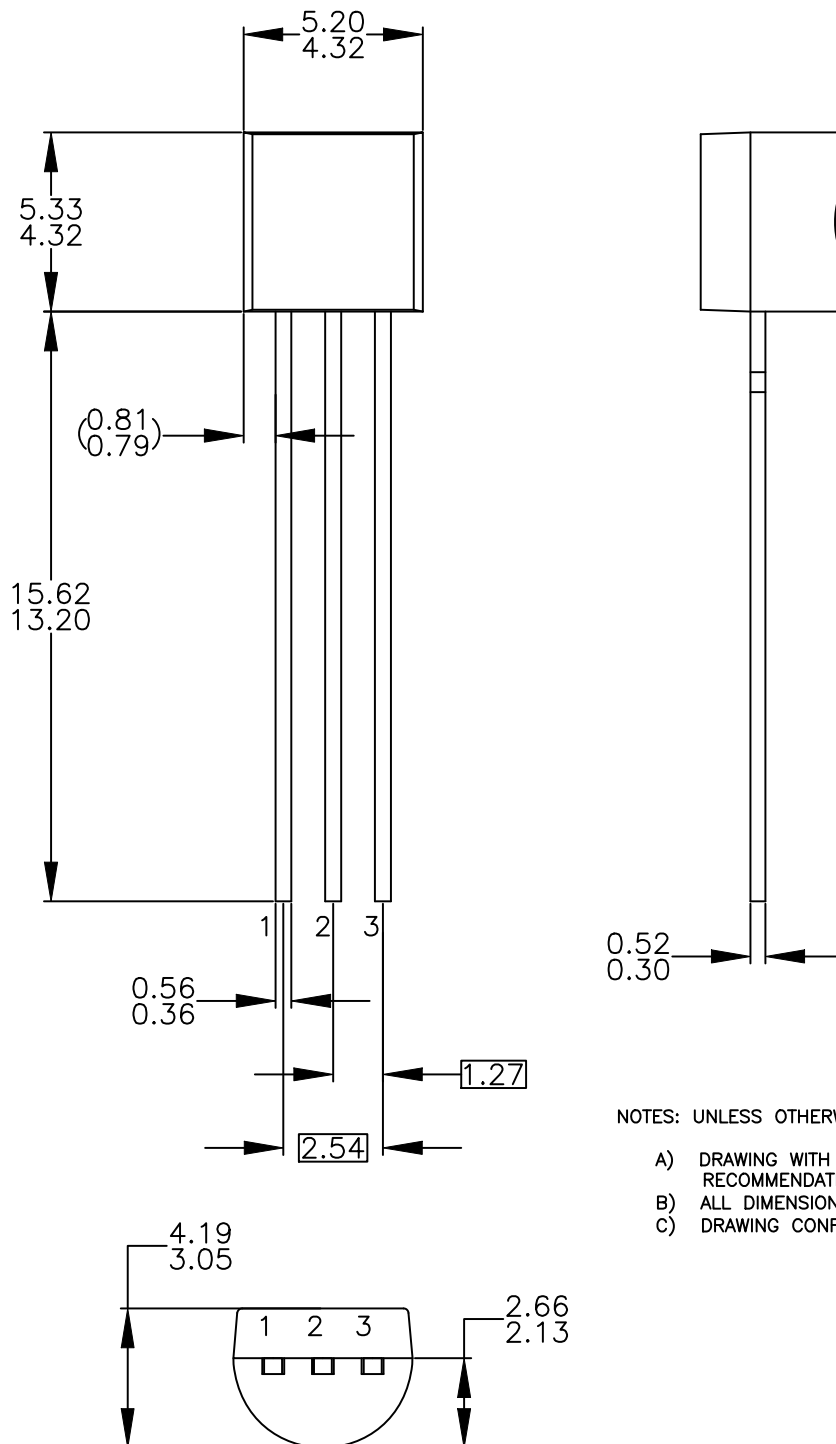
**Figure 7. High-Frequency Current Gain**



**Figure 8. Safe Operating Area**

**TO-92 3 4.825x4.76**  
**CASE 135AN**  
**ISSUE O**

DATE 31 JUL 2016



NOTES: UNLESS OTHERWISE SPECIFIED

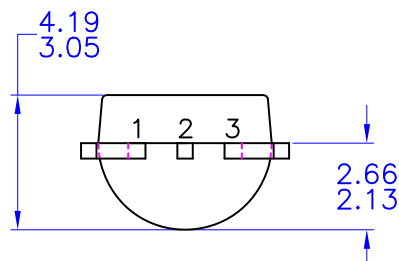
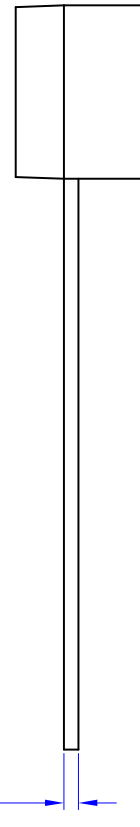
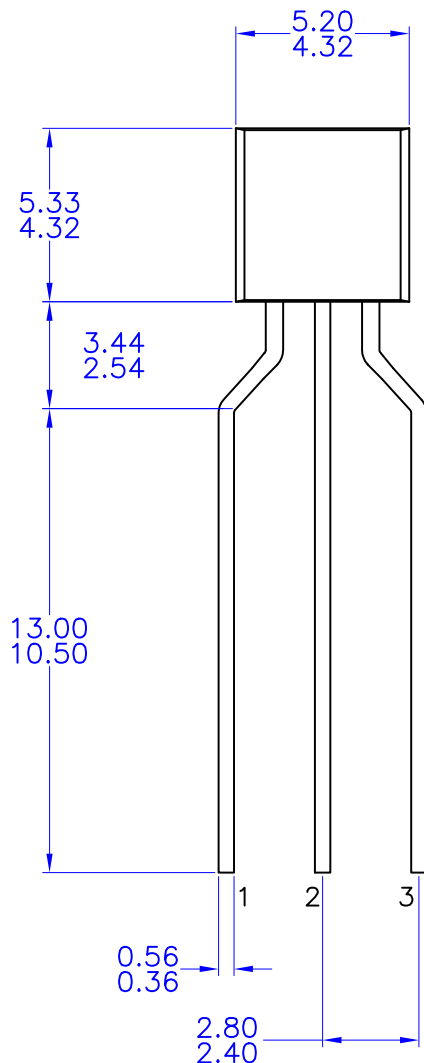
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**TO-92 3 4.83x4.76 LEADFORMED**  
CASE 135AR  
ISSUE O

DATE 30 SEP 2016



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