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September 2015

KSP44 / KSP45 NPN Epitaxial Silicon Transistor

Features

- High-Voltage Transistor
- Collector-Emitter Voltage: V_{CEO} = KSP44: 400 V
KSP45: 350 V



Ordering Information

Part Number	Top Mark	Package	Packing Method
KSP44BU	KSP44	TO-92 3L	Bulk
KSP44TA	KSP44	TO-92 3L	Ammo
KSP44TF	KSP44	TO-92 3L	Tape and Reel
KSP45TA	KSP45	TO-92 3L	Ammo

Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. 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	$^\circ\text{C}$

Thermal Characteristics⁽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	$^\circ\text{C/W}$

Note:

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.

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	$I_C = 100\text{ }\mu\text{A}, I_E = 0$	500		V
		KSP45		400		
BV_{CEO}	Collector-Emitter Breakdown Voltage ⁽²⁾	KSP44	$I_C = 1\text{ mA}, I_B = 0$	400		V
		KSP45		350		
BV_{EBO}	Emitter-Base Breakdown Voltage		$I_E = 100\text{ }\mu\text{A}, I_C = 0$	6		V
I_{CBO}	Collector Cut-Off Current	KSP44	$V_{CB} = 400\text{ V}, I_E = 0$		0.1	μA
		KSP45	$V_{CB} = 320\text{ V}, I_E = 0$		0.1	
I_{CES}	Collector Cut-Off Current	KSP44	$V_{CE} = 400\text{ V}, I_B = 0$		0.5	μA
		KSP45	$V_{CE} = 320\text{ V}, I_B = 0$		0.5	
I_{EBO}	Emitter Cut-Off Current		$V_{EB} = 4\text{ V}, I_C = 0$		0.1	μA
h_{FE}	DC Current Gain ⁽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 ⁽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 ⁽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

Note:

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

Typical Performance Characteristics

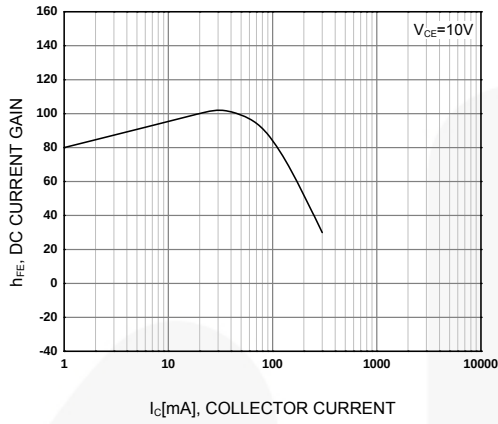


Figure 1. DC Current Gain

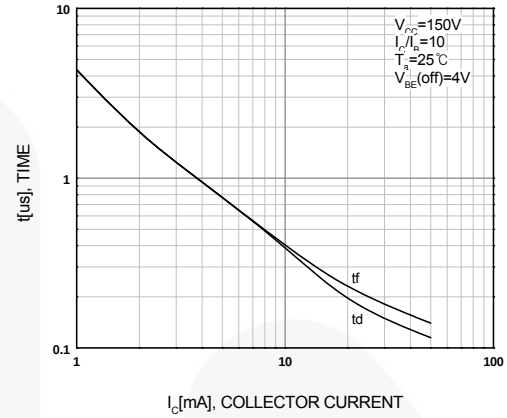


Figure 2. Turn-On Switching Times

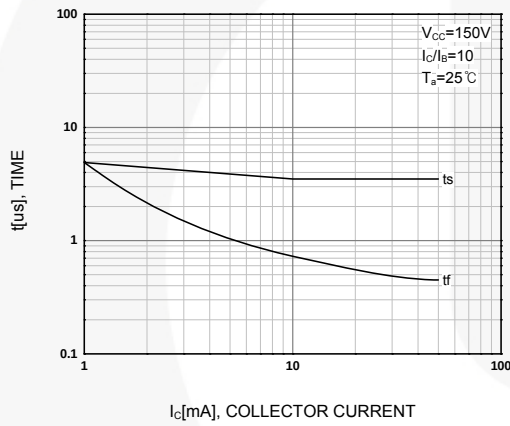


Figure 3. Turn-Off Switching Times

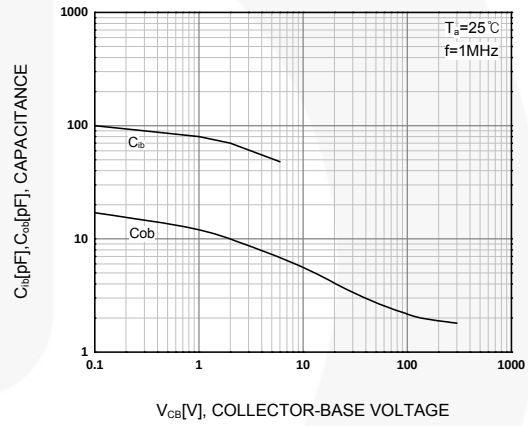


Figure 4. Capacitance

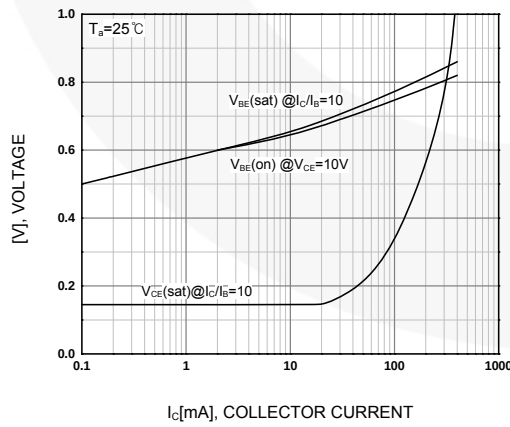


Figure 5. On Voltage

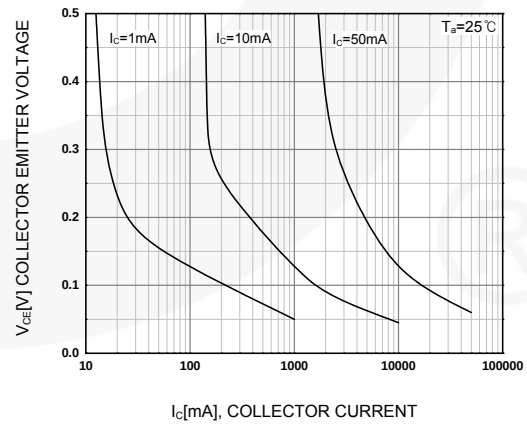


Figure 6. Collector Saturation Region

Typical Performance Characteristics (Continued)

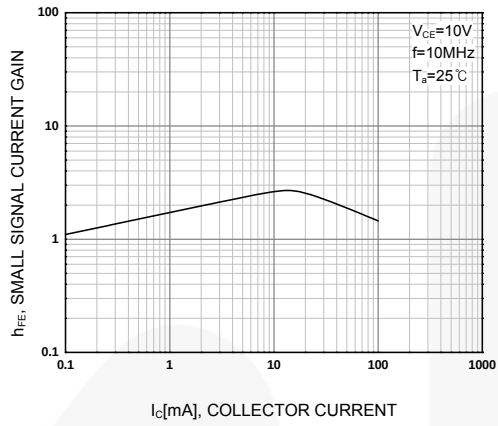


Figure 7. High-Frequency Current Gain

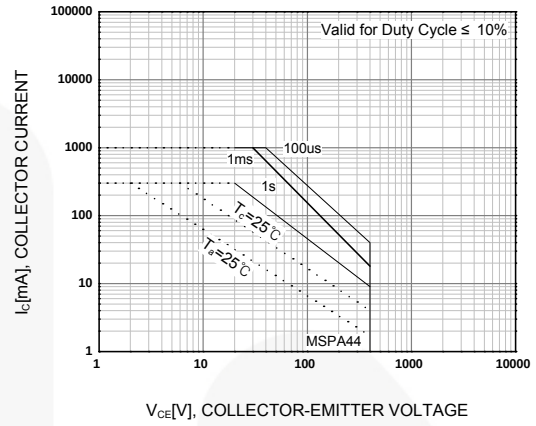
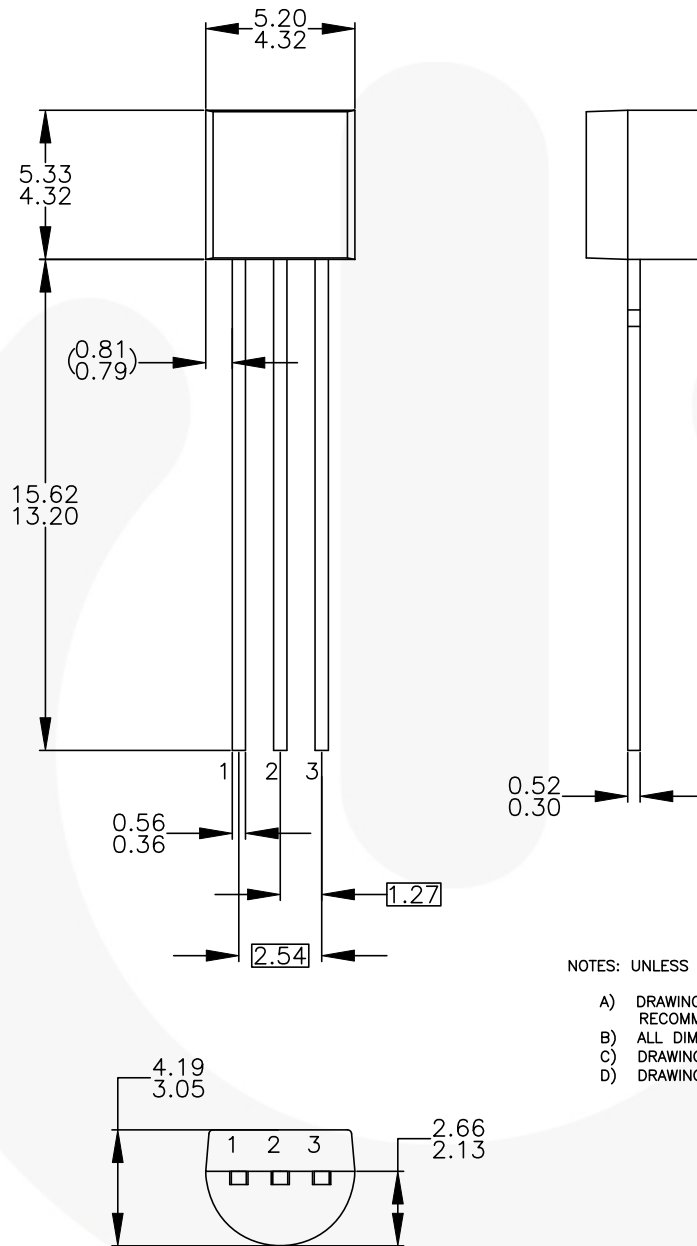


Figure 8. Safe Operating Area

Physical Dimensions



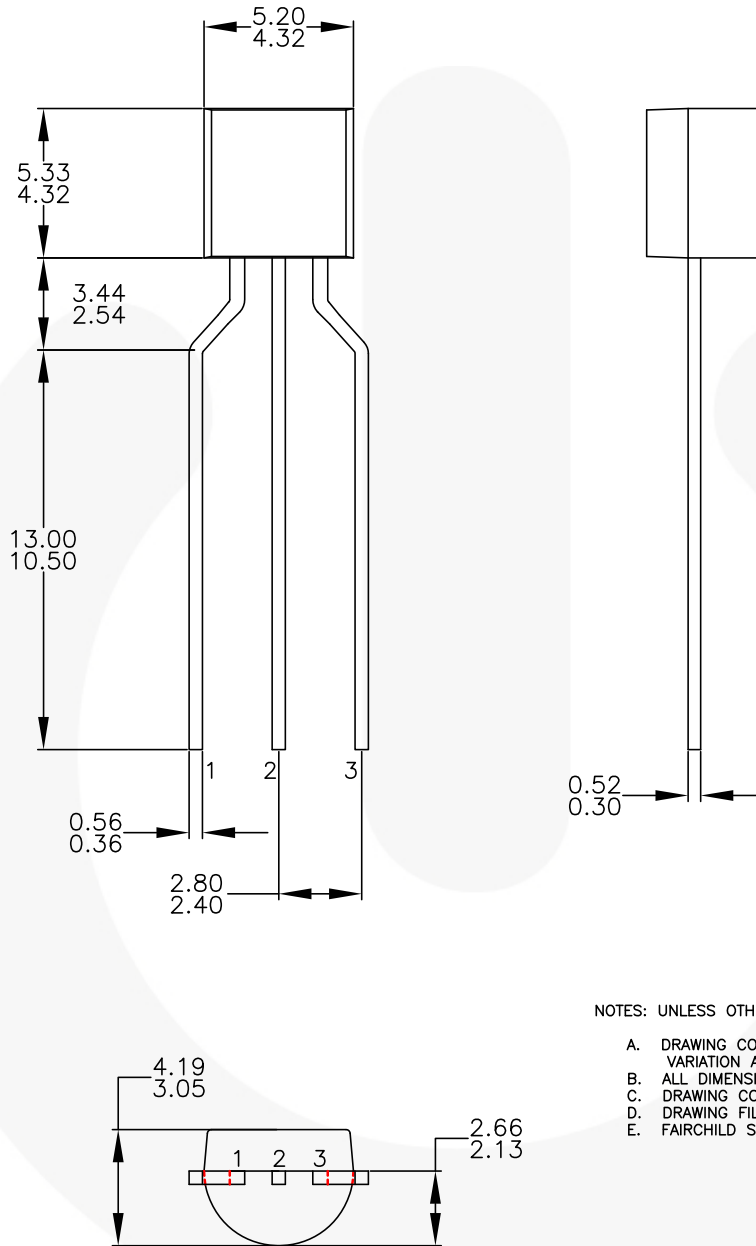
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- A) DRAWING WITH REFERENCE TO JEDEC TO-92 RECOMMENDATIONS.
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DRAWING CONFORMS TO ASME Y14.5M-2009.
- D) DRAWING FILENAME: MKT-ZA03DREV4.



Figure 9. 3-Lead, TO-92, JEDEC TO-92 Compliant Straight Lead Configuration, Bulk Type

Physical Dimensions (Continued)



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Figure 10. 3-Lead, TO-92, Molded, 0.2 In Line Spacing Lead Form, Ammo, Tape and Reel Type



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Телефон: 8 (812) 309 58 32 (многоканальный)

Факс: 8 (812) 320-02-42

Электронная почта: org@eplast1.ru

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.