

# NPN Epitaxial Silicon Transistor

## KSD5041

### Features

- AF Output Amplifier for Electronic Flash Unit
- Low Collector–Emitter Saturation Voltage
- High Performance at Low Supply Voltage
- These are Pb–Free Devices

### ABSOLUTE MAXIMUM RATINGS

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

Symbol	Parameter	Value	Unit
$V_{CBO}$	Collector–Base Voltage	40	V
$V_{CEO}$	Collector–Emitter Voltage	20	V
$V_{EBO}$	Emitter–Base Voltage	7	V
$I_C$	Collector Current	5	A
$T_J$	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

( $T_A = 25^\circ\text{C}$  unless otherwise noted.) (Note 1)

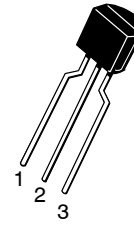
Symbol	Parameter	Value	Unit
$P_D$	Power Dissipation	0.75	W
	Derate Above $25^\circ\text{C}$	6.0	mW/ $^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance, Junction–to–Ambient	166.6	$^\circ\text{C}/\text{W}$

1. PCB size: FR–4, 76 mm  $\times$  114 mm  $\times$  1.57 mm (3.0 inch  $\times$  4.5 inch  $\times$  0.062 inch) with minimum land pattern size.

### ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$BV_{CEO}$	Collector–Emitter Breakdown Voltage	$I_C = 1\text{ mA}$ , $I_B = 0$	20	–	–	V
$BV_{EBO}$	Emitter–Base Breakdown Voltage	$I_E = 10\ \mu\text{A}$ , $I_C = 0$	7	–	–	V
$I_{CBO}$	Collector Cut–Off Current	$V_{CB} = 10\text{ V}$ , $I_E = 0$	–	–	0.1	$\mu\text{A}$
$I_{EBO}$	Emitter Cut–Off Current	$V_{EB} = 7\text{ V}$ , $I_C = 0$	–	–	0.1	$\mu\text{A}$
$h_{FE1}$	DC Current Gain	$V_{CE} = 2\text{ V}$ , $I_C = 0.5\text{ A}$	340	–	600	
$h_{FE2}$		$V_{CE} = 2\text{ V}$ , $I_C = 2\text{ A}$	150	–	–	
$V_{CE(sat)}$	Collector–Emitter Saturation Voltage	$I_C = 3\text{ A}$ , $I_B = 0.1\text{ A}$	–	–	1	V
$f_T$	Current Gain Bandwidth Product	$V_{CE} = 6\text{ V}$ , $I_C = 50\text{ mA}$	–	150	–	MHz
$C_{ob}$	Output Capacitance	$V_{CB} = 20\text{ V}$ , $I_E = 0$ , $f = 1\text{ MHz}$	–	–	50	pF

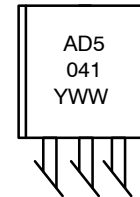
Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.



1. Emitter
2. Collector
3. Base

TO–92–3 LF  
CASE 135AR

### MARKING DIAGRAM



- A = Assembly Code  
D5041 = Device Code  
YWW = Date Code

### ORDERING INFORMATION

Device	Package	Shipping
KSD5041RTA	TO–92–3LF (Pb–Free)	2000 / Fan–Fold

TYPICAL CHARACTERISTICS

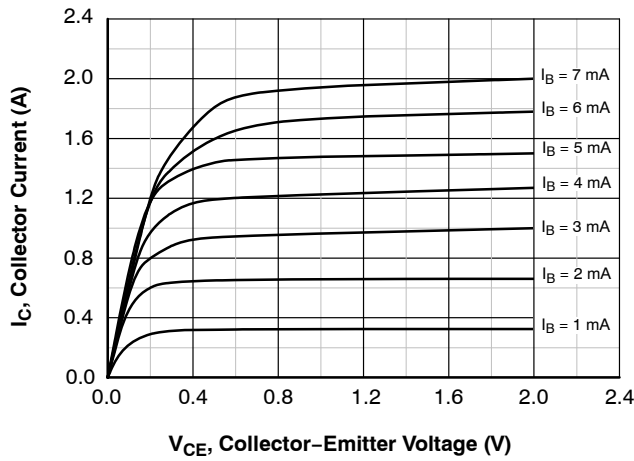


Figure 1. Static Characteristic

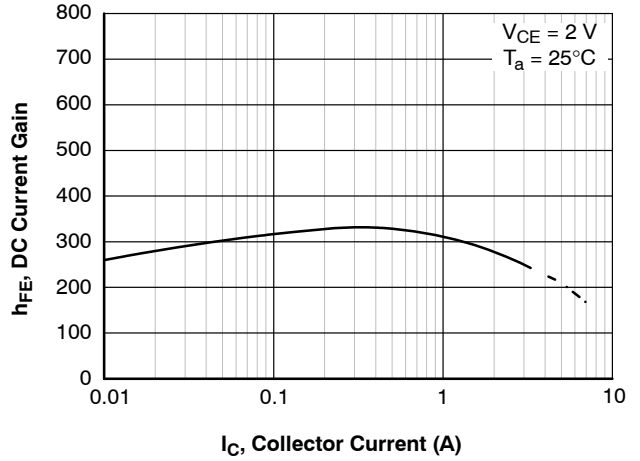


Figure 2. DC Current Gain

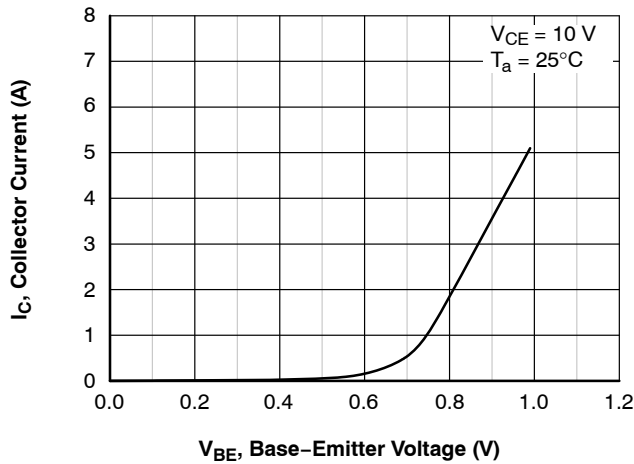


Figure 3. Base-Emitter Saturation Voltage

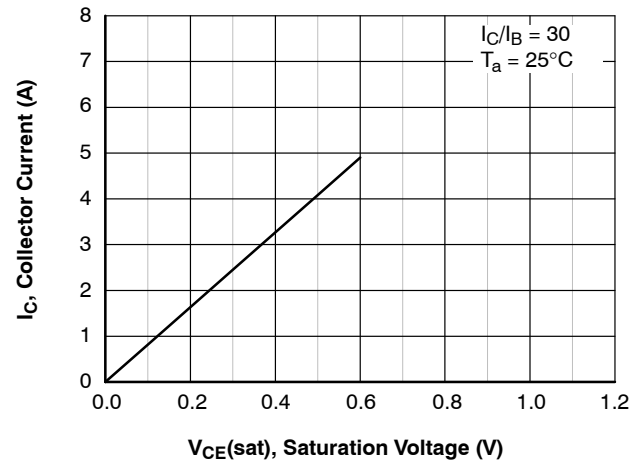


Figure 4. Collector-Emitter Saturation Voltage

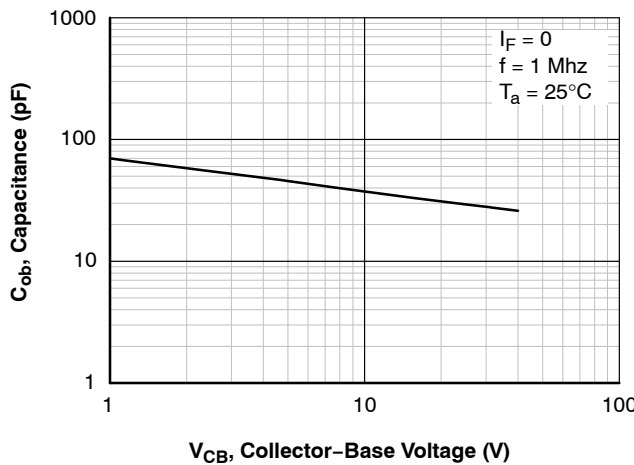


Figure 5. Collector Output Capacitance

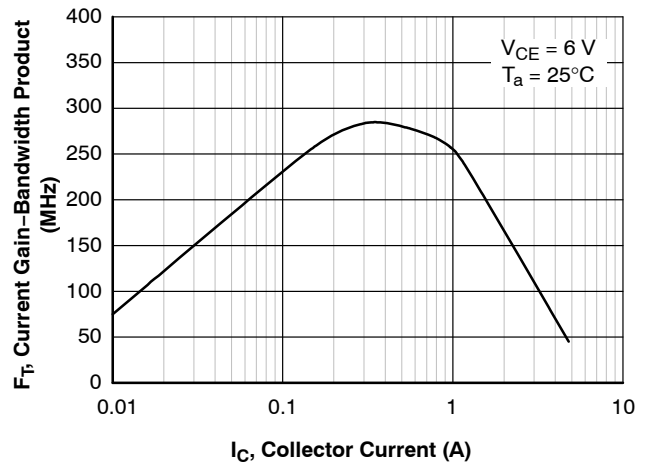


Figure 6. Current Gain Bandwidth Product

TYPICAL CHARACTERISTICS (Continued)

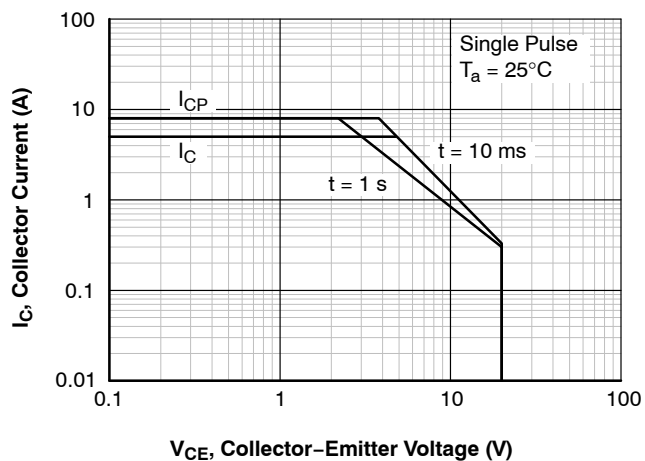


Figure 7. Safe Operating Area

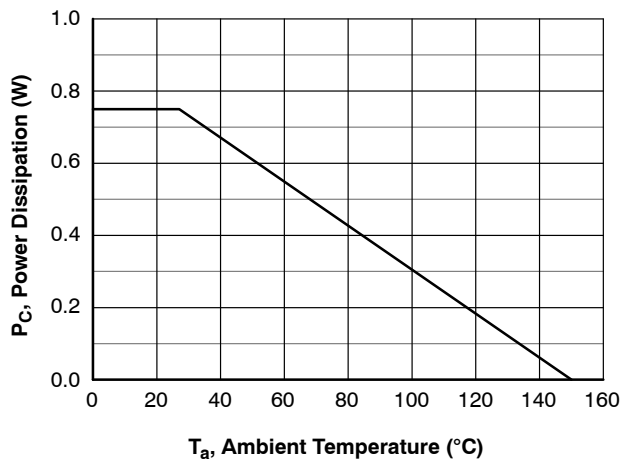


Figure 8. Power Derating

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

DATE 30 SEP 2016



NOTES: UNLESS OTHERWISE SPECIFIED

- A) DRAWING WITH REFERENCE TO JEDEC TO-92 RECOMMENDATIONS.
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DRAWING CONFORMS TO ASME Y14.5M-1994

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