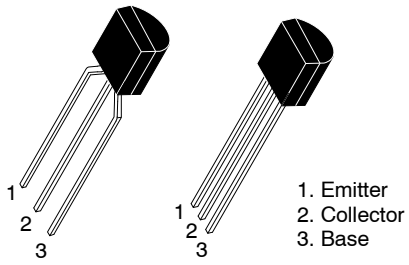
NPN Epitaxial Silicon Transistor

KSD1616A



TO−92−3 LF
CASE 135AR

TO−92−3
CASE 135AN

Features

- Audio Frequency Power Amplifier and Medium Speed Switching
- Complement to KSB1116/KSB1116A
- These are Pb−Free Devices

ABSOLUTE MAXIMUM RATINGS

(Values are at T_A = 25°C unless otherwise noted.)

Symbol	Parameter	Value	Unit
V_{CBO}	Collector−Base Voltage	120	V
V_{CEO}	Collector−Emitter Voltage	60	V
V_{EBO}	Emitter−Base Voltage	6	V
I_C	Collector Current (DC)	1	A
I_{CP}	Collector Current (Pulse) (Note 1)	2	A
T_J	Junction Temperature	150	°C
T_{STG}	Storage Temperature	−55 to 150	°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.

1. Pulse width ≤ 10 ms, duty cycle < 50%.

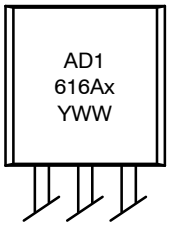
THERMAL CHARACTERISTICS

(Values are at T_A = 25°C unless otherwise noted.)

Symbol	Parameter	Max	Unit
P_D	Total Device Dissipation	0.75	W
	Derate Above 25°C	6	mW/°C
$R_{\theta JA}$	Thermal Resistance, Junction−to−Ambient	160	°C/W

2. PCB size: FR−4, 76 mm × 114 mm × 1.57 mm (3.0 inch × 4.5 inch × 0.062 inch) with minimum land pattern size.

MARKING DIAGRAM



A = Assembly Location
D1616Ax = Specific Device Code
x = G or Y
Y = Year of Production
WW = Work Week Number

ORDERING INFORMATION

Device	Package	Shipping
KSD1616AGBU	TO−92−3 (Pb−Free)	10,000 Units / Bulk Bag
KSD1616AGTA	TO−92−3 LF (Pb−Free)	2,000 Units / Fan−Fold
KSD1616AYTA	TO−92−3 LF (Pb−Free)	2,000 Units / Fan−Fold

ELECTRICAL CHARACTERISTICS

(Values are at T_A = 25°C unless otherwise noted.)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
BV_{CBO}	Collector−Base Breakdown Voltage	I_C = 100 μA, I_E = 0	120	–	–	V
BV_{CEO}	Collector−Emitter Breakdown Voltage	I_C = 1 mA, I_B = 0	60	–	–	V
BV_{EBO}	Emitter−Base Breakdown Voltage	I_E = 100 μA, I_C = 0	6	–	–	V
I_{CBO}	Collector Cut−Off Current	V_{CB} = 60 V, I_E = 0	–	–	100	nA
I_{EBO}	Emitter Cut−Off Current	V_{EB} = 6 V, I_C = 0	–	–	100	nA
h_{FE1}	DC Current Gain	V_{CE} = 2 V, I_C = 100 mA	135	–	400	
h_{FE2}	DC Current Gain	V_{CE} = 2 V, I_C = 1 A	81	–	–	
$V_{BE(on)}$	Base−Emitter On Voltage (Note 3)	V_{CE} = 2 V, I_C = 50 mA	600	640	700	mV
$V_{CE(sat)}$	Collector−Emitter Saturation Voltage (Note 3)	I_C = 1 A, I_B = 50 mA	–	0.15	0.30	V
$V_{BE(sat)}$	Base−Emitter Saturation Voltage (Note 3)	I_C = 1 A, I_B = 50 mA	–	0.9	1.2	V
C_{ob}	Output Capacitance	V_{CE} = 10 V, I_E = 0, f = 1 MHz	–	19	–	pF
f_T	Current Gain Bandwidth Product	V_{CE} = 2 V, I_C = 100 mA	100	160	–	MHz
t_{ON}	Turn−On Time	V_{CC} = 10 V, I_C = 100 mA, I_{B1} = −I_{B2} = 10 mA, $V_{BE(off)}$ = −2 V ~ −3 V	–	0.07	–	μs
t_{STG}	Storage Time		–	0.95	–	μs
t_F	Fall Time		–	0.07	–	μs

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.

3. Pulse test: pulse width < 350 μs, duty cycle ≤ 2% pulsed.

h_{FE} CLASSIFICATION

Classification	Y	G
hFE1	135 ~ 270	200 ~ 400

TYPICAL PERFORMANCE CHARACTERISTICS

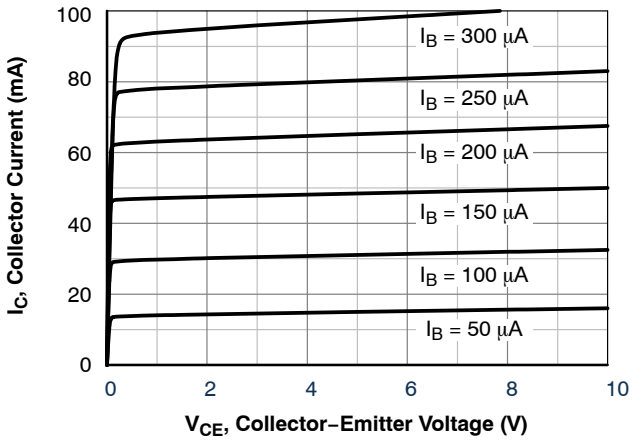


Figure 1. Static Characteristic

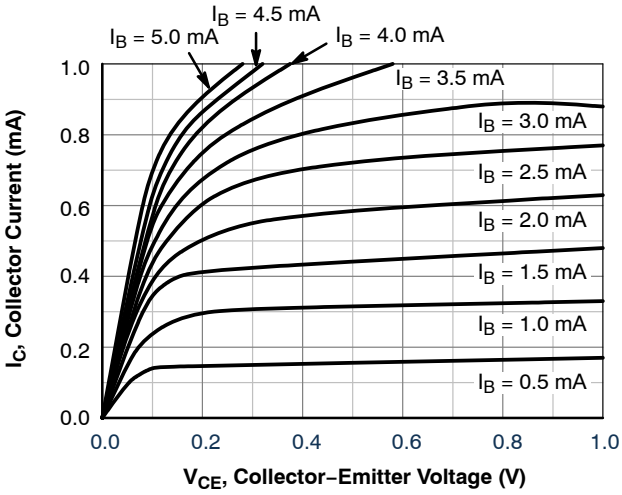


Figure 2. Static Characteristic

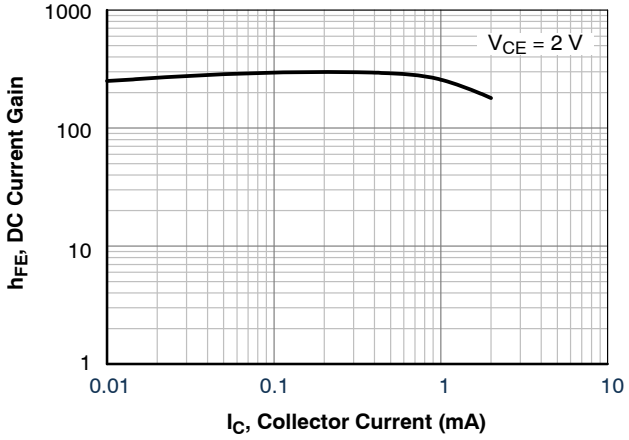


Figure 3. DC Current Gain

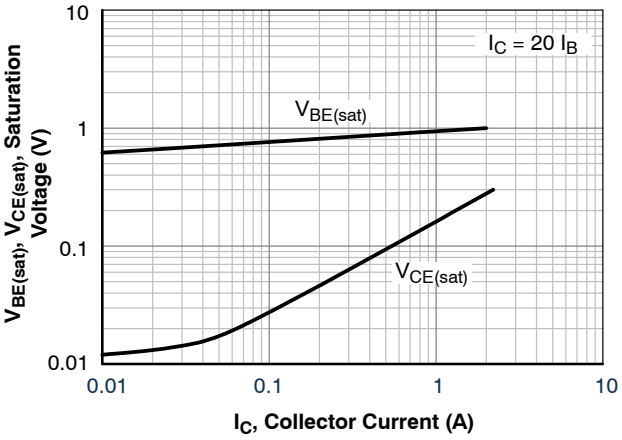


Figure 4. Base−Emitter Saturation Voltage and Collector−Emitter Saturation Voltage

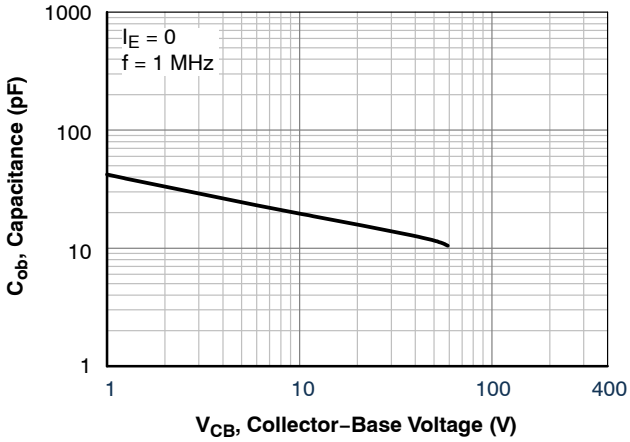


Figure 5. Collector Output Capacitance

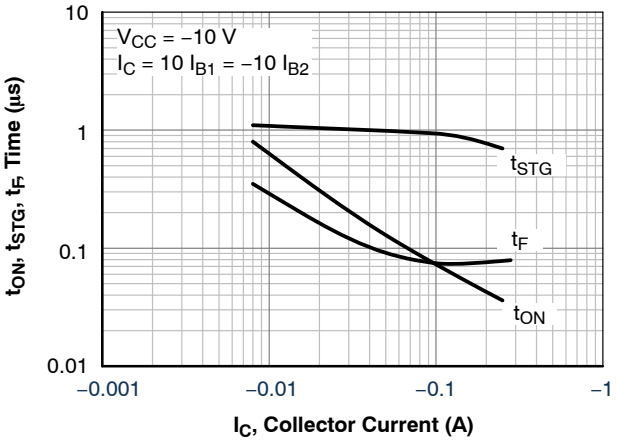


Figure 6. Switching Time

TYPICAL CHARACTERISTICS (continued)

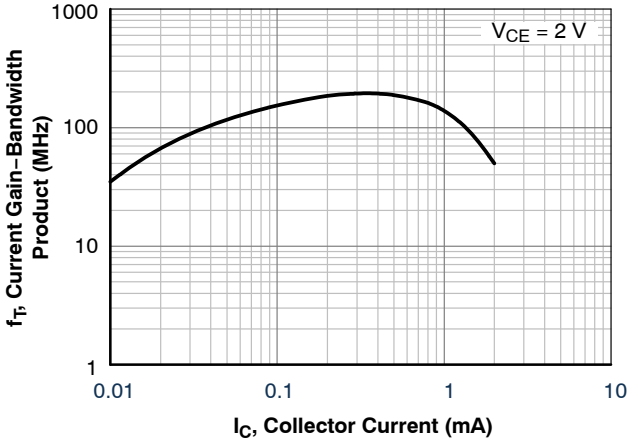


Figure 7. Current Gain Bandwidth Product

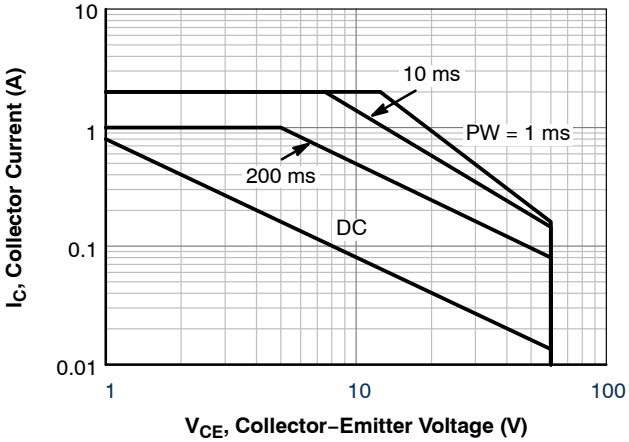


Figure 8. Safe Operating Area

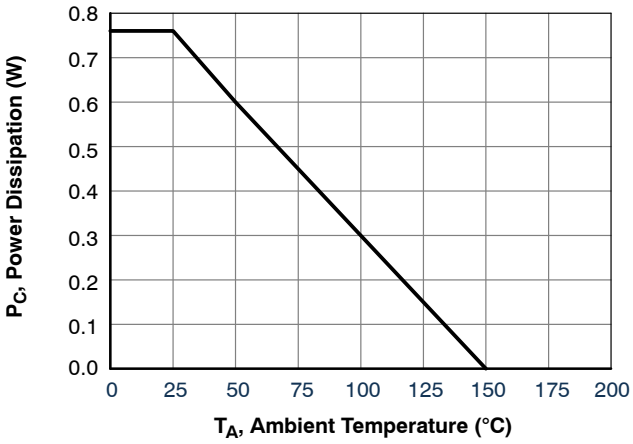


Figure 9. Power Derating

TO−92 3 4.825x4.76
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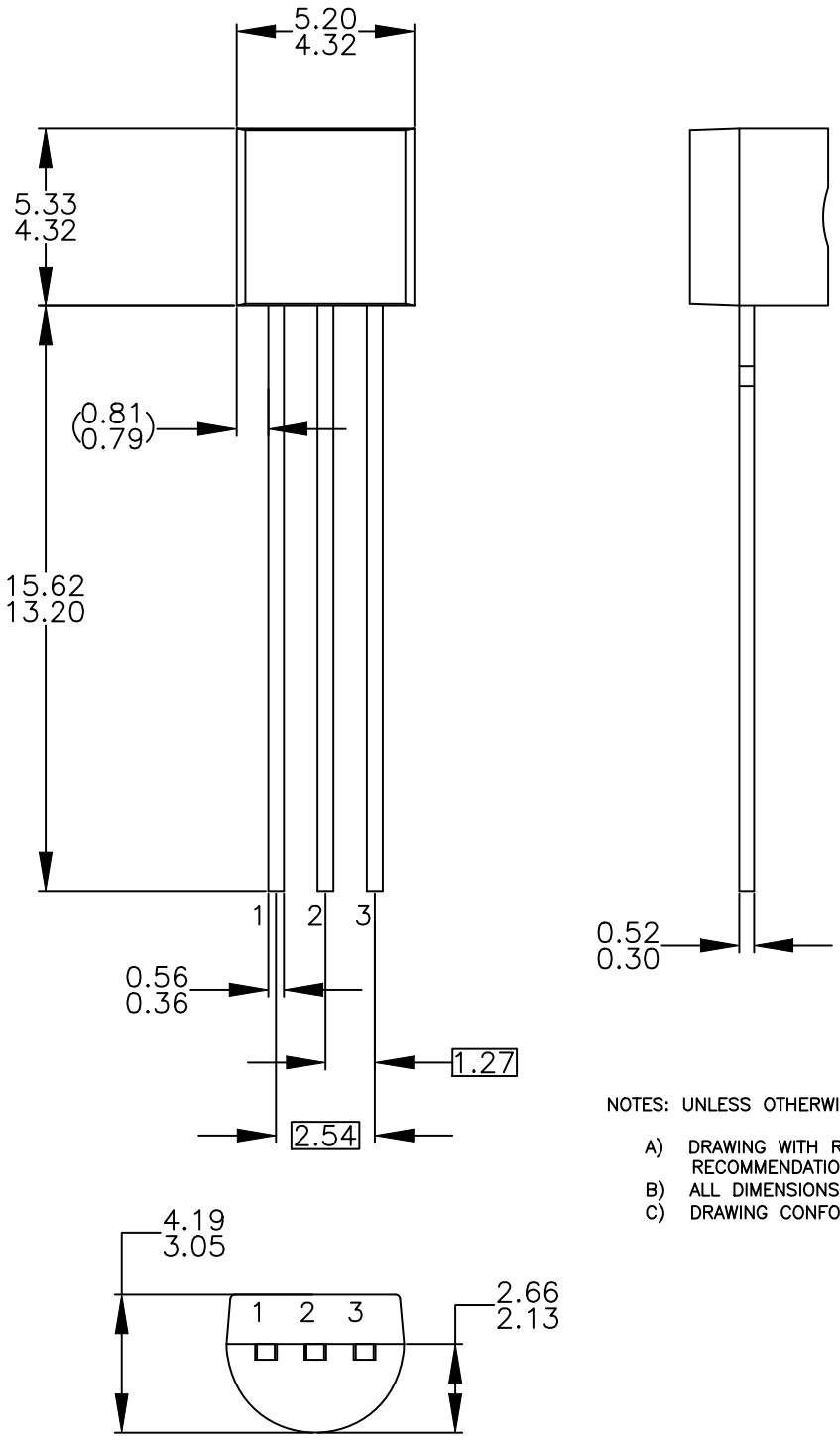
ISSUE O

DATE 31 JUL 2016



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CASE 135AR
ISSUE O

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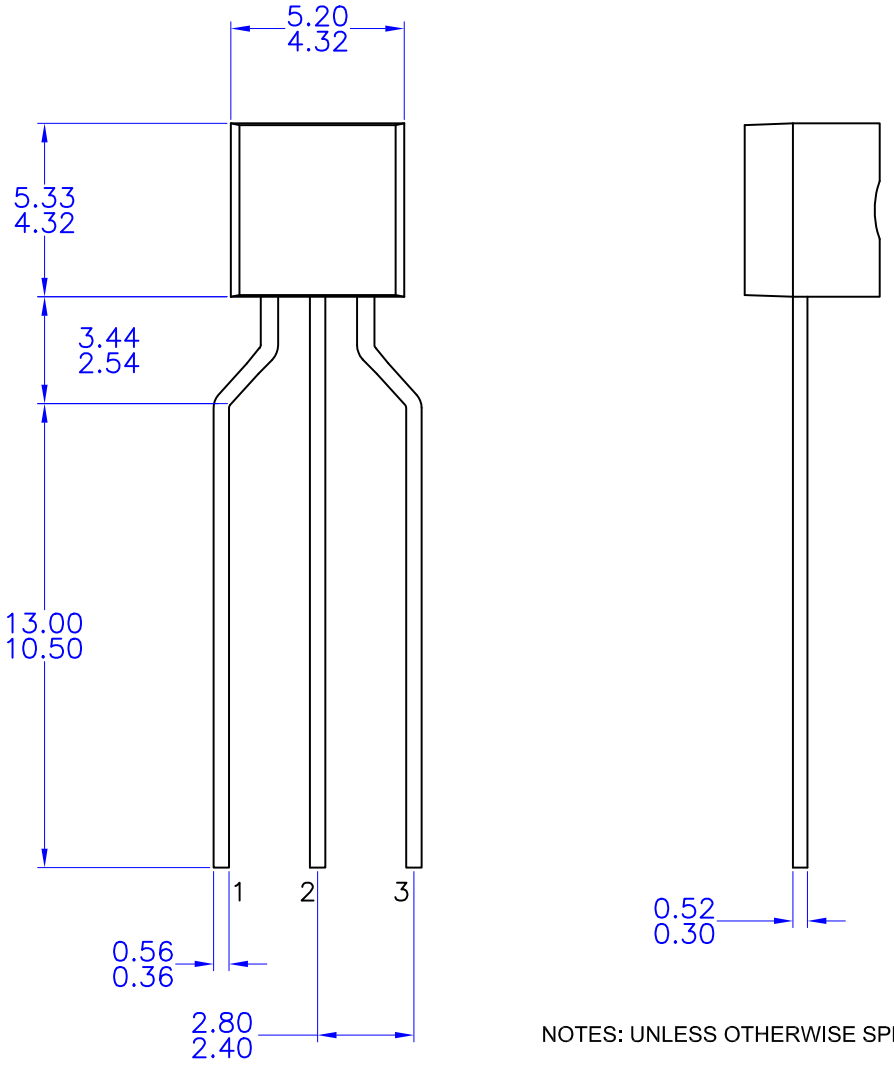

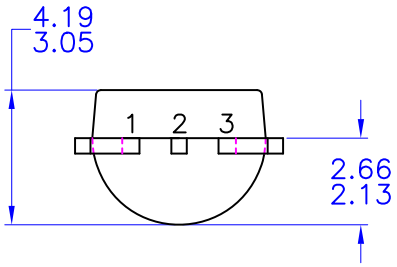

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