

2003A

PNP Epitaxial Planar Silicon Transistor

# Very Low-Noise Amp Applications

©371D

The 2SA929, 930 are transistors for very low noise AF amp. They are especially suited for use in the first stage of equalizer amp. in high-grade stereo sets. It is possible to form a complementary pair with NPN type 2SC1570.

Absolute Maximum Ratings at $T_a=25^\circ\text{C}$		2SA929	2SA930	unit
Collector to Base Voltage	$V_{CB0}$	-55	-40	V
Collector to Emitter Voltage	$V_{CEO}$	-50	-35	V
Emitter to Base Voltage	$V_{EBO}$		-5	V
Collector Current	$I_C$		-50	mA
Collector Dissipation	$P_C$		200	mW
Junction Temperature	$T_j$		125	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-55 to +125		$^\circ\text{C}$

Electrical Characteristics at $T_a=25^\circ\text{C}$			min	typ	max	unit
Collector Cutoff Current	$I_{CB0}$	$V_{CB}=-30\text{V}, I_E=0$			-0.1	$\mu\text{A}$
Emitter Cutoff Current	$I_{EBO}$	$V_{EB}=-4\text{V}, I_C=0$			-0.1	$\mu\text{A}$
Collector to Base Breakdown Voltage	$V_{(BR)CB0}$	$I_C=-10\mu\text{A}, I_E=0$	2SA929	-55		V
			2SA930	-40		V
Collector to Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C=-1\text{mA}, R_{BE}=\infty$	2SA929	-50		V
			2SA930	-35		V
Emitter to Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E=-10\mu\text{A}, I_C=0$		-5		V
DC Current Gain	$h_{FE}$	$V_{CE}=-6\text{V}, I_C=-1\text{mA}$		160*	960*	
Gain-Bandwidth Product	$f_T$	$V_{CE}=-6\text{V}, I_C=-1\text{mA}$			80	MHz
Output Capacitance	$c_{ob}$	$V_{CB}=-6\text{V}, f=1\text{MHz}$			5	pF
Collector to Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=-50\text{mA}, I_B=-5\text{mA}$			-0.5	V
Output Noise Voltage	$V_{NO}$	$V_{CC}=-30\text{V}, I_C=-1\text{mA}, R_g=56\text{kohm}, V_G=77\text{dB}(1\text{kHz})$			35	mV
					200	mV

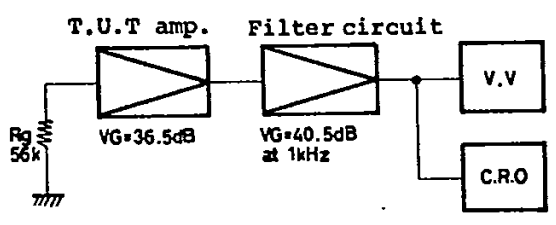
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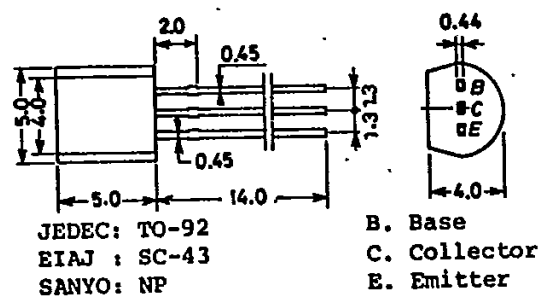
\* The 2SA929,930 are classified as follows according to  $h_{FE}$  at 1mA.

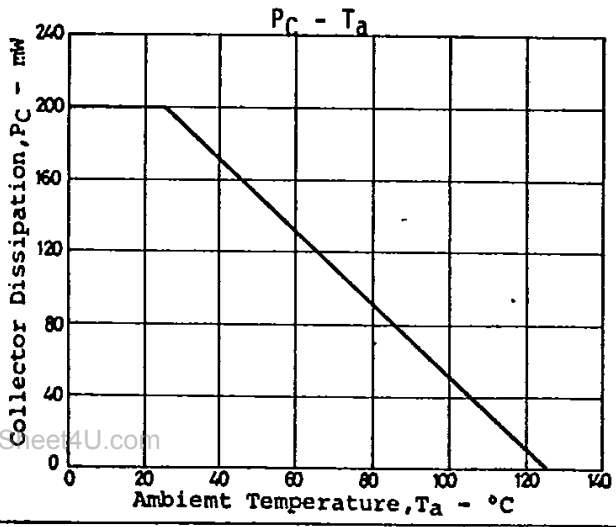
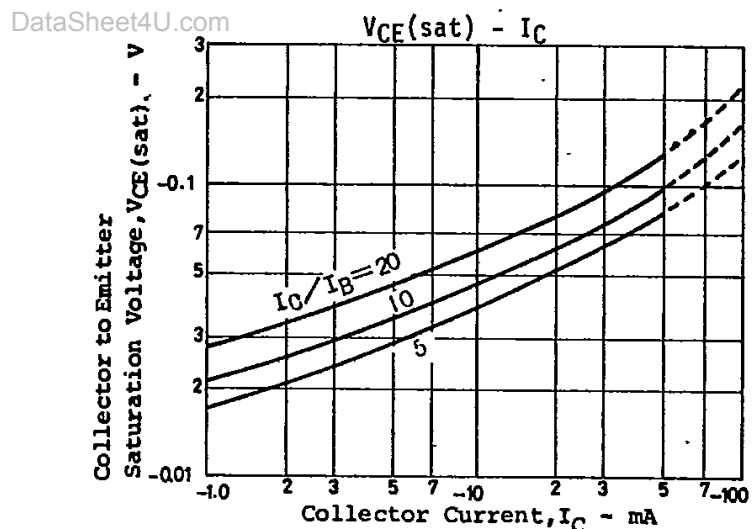
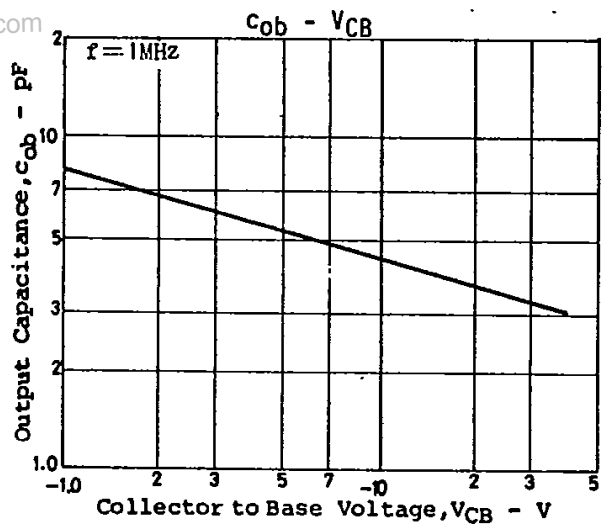
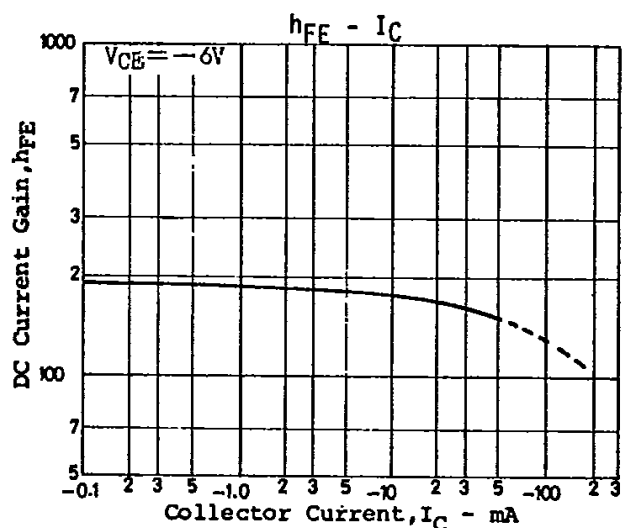
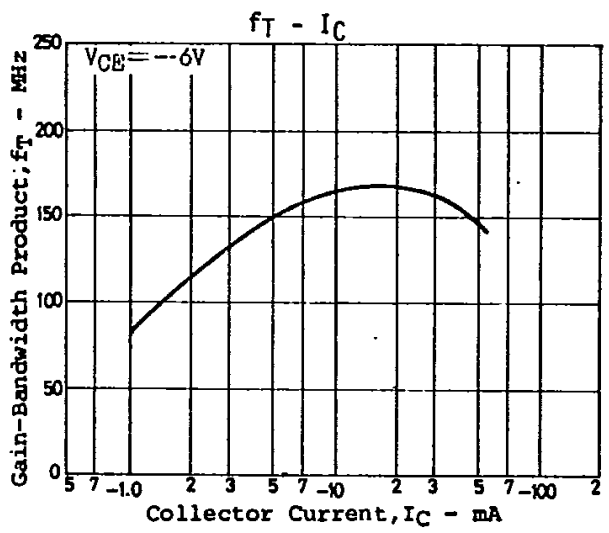
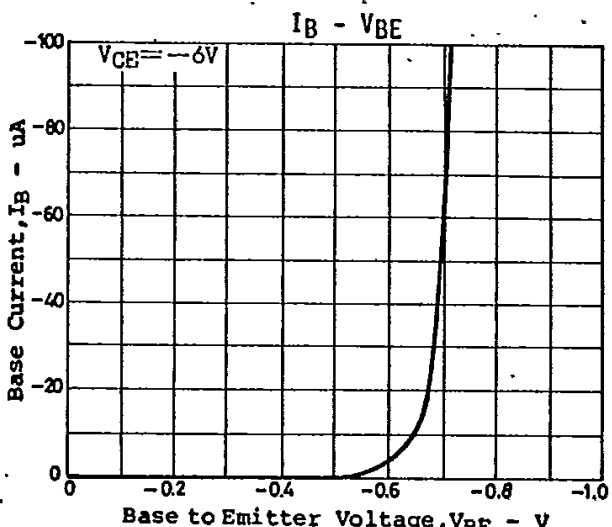
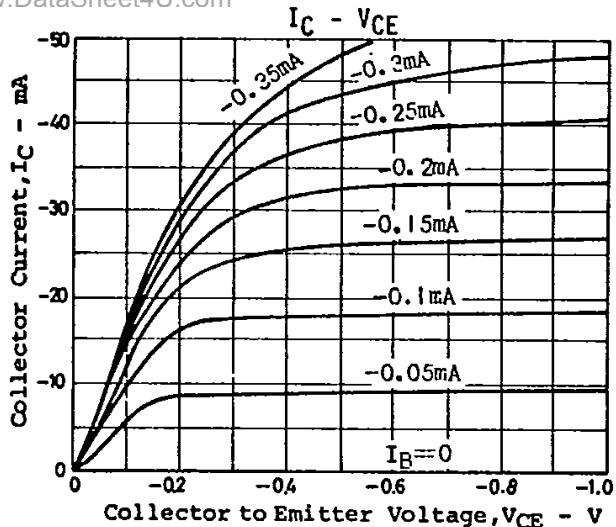
160	F	320	280	G	560	480	H	960
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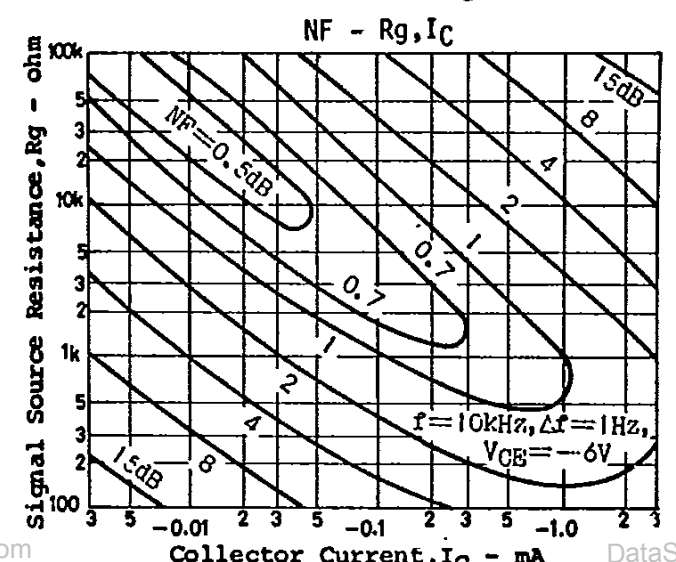
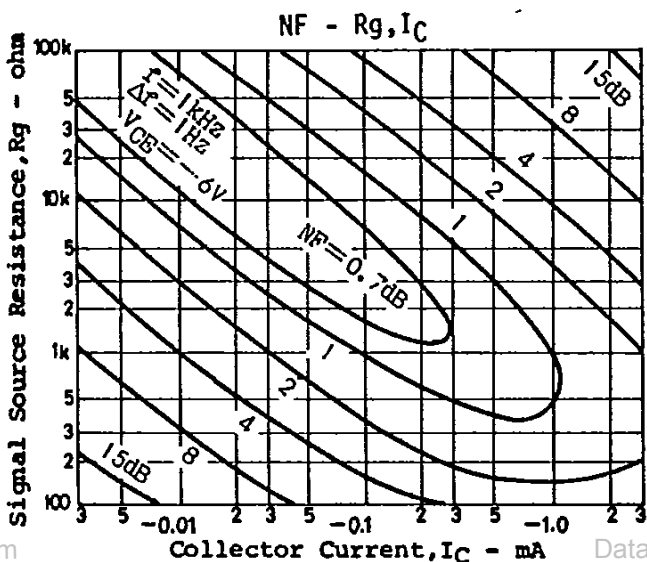
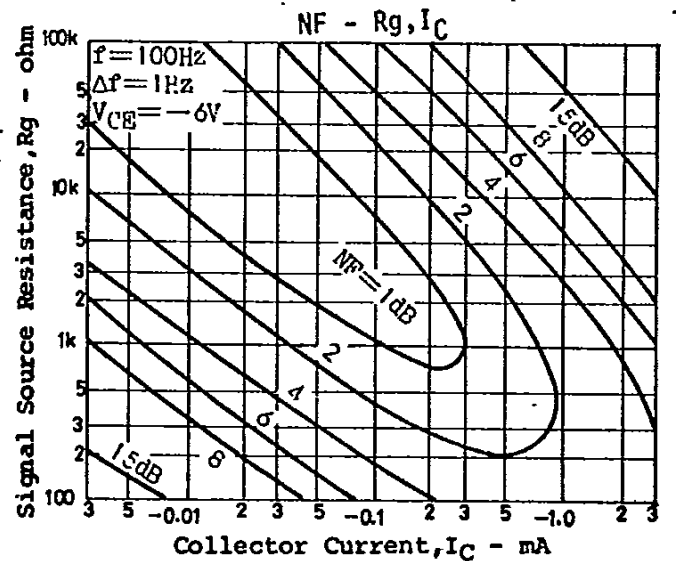
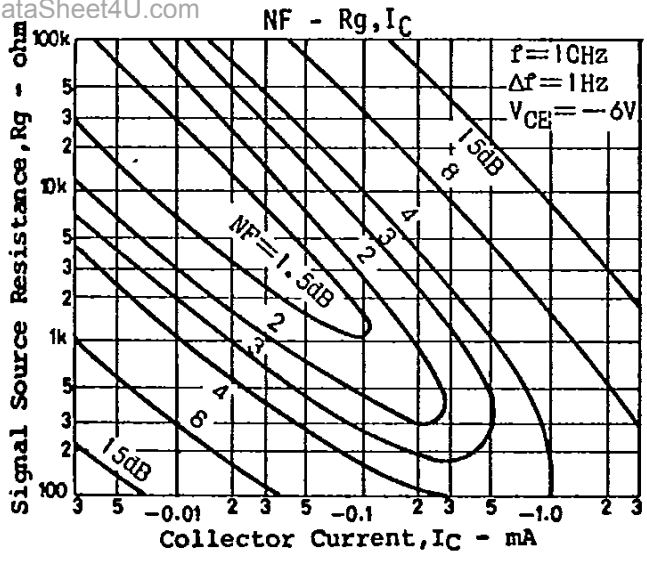
## Noise Test Circuit



## Case Outline 2003A (unit:mm)



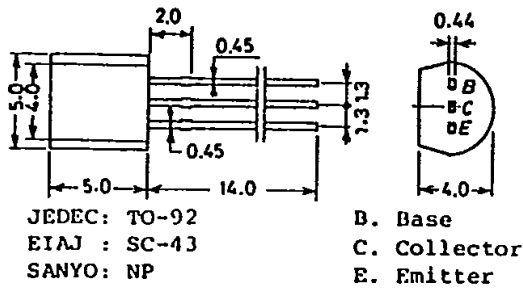




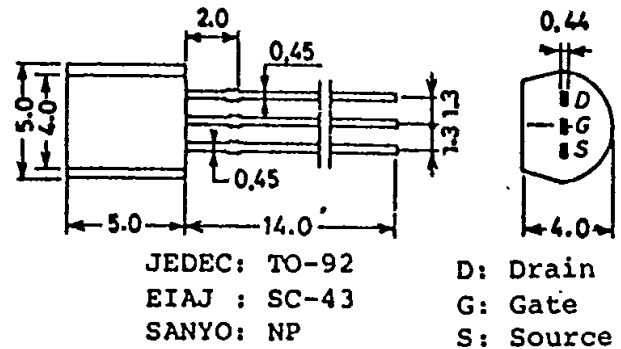
# CASE OUTLINES OF LEAD FORMED SMALL SIGNAL TRANSISTORS

- All of Sanyo lead formed small signal transistor case outlines are illustrated below.
- All dimensions are in mm, and dimensions which are not followed by min. or max. are represented by typical values.
- No marking is indicated.

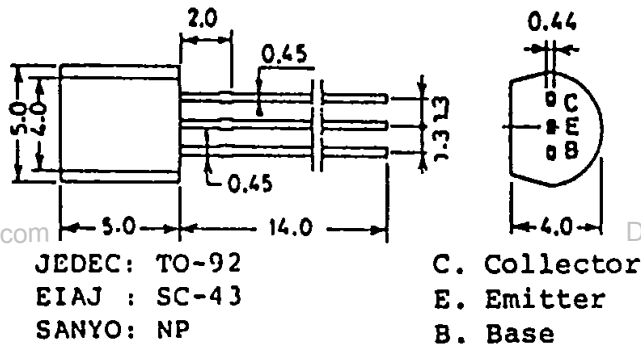
Case Outline—[2003A] unit: mm



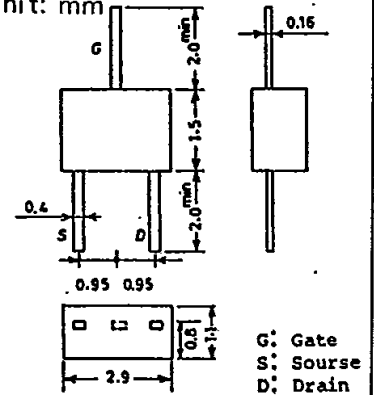
Case Outline—[2019A] unit: mm



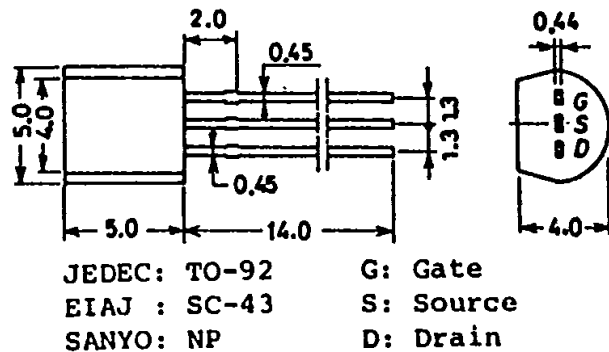
Case Outline—[2004A] unit: mm



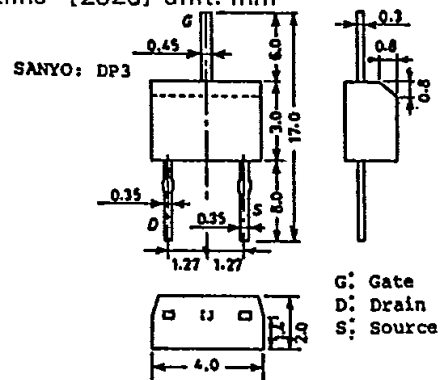
Case Outline—[2025] unit: mm



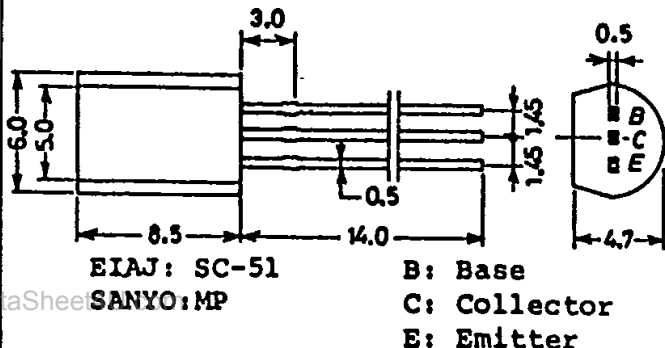
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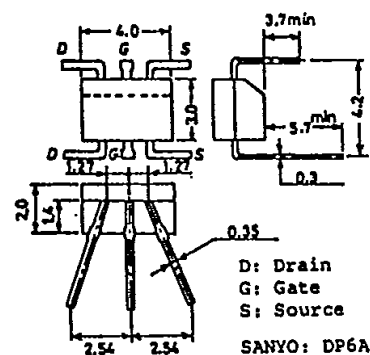
Case Outline—[2026] unit: mm



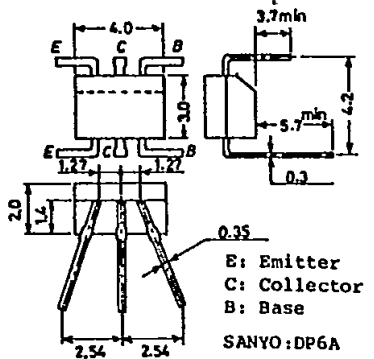
Case Outline—[2006A] unit: mm



Case Outline—[2027A] unit: mm

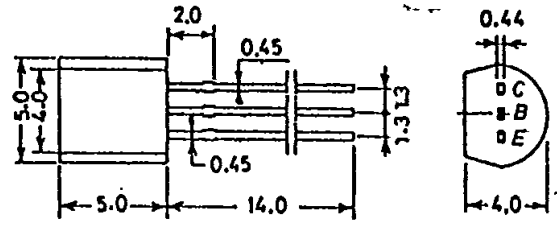


Case Outline-[2029A] unit: mm



E: Emitter  
 C: Collector  
 B: Base  
 SANYO: DP6A

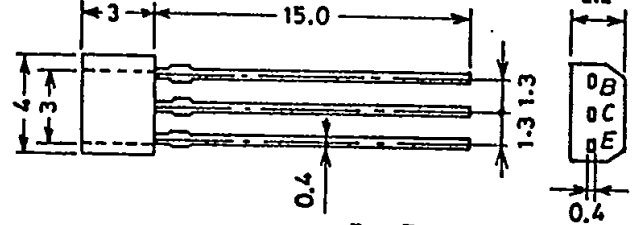
Case Outline-[2061] unit: mm



JEDEC: TO-92  
 EIAJ : SC-43

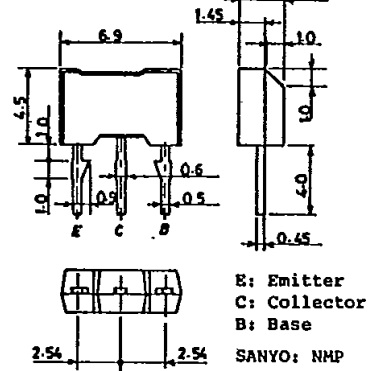
C: Collector  
 B: Base  
 E: Emitter  
 SANYO: NP

Case Outline-[2033] unit: mm



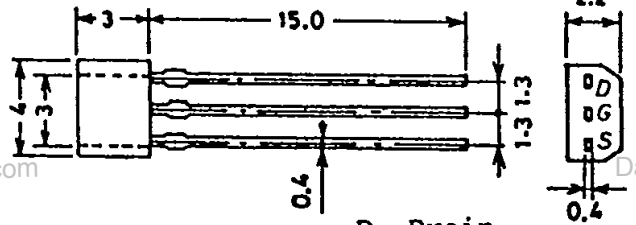
B: Base  
 C: Collector  
 E: Emitter  
 SANYO: SPA

Case Outline-[2064] unit: mm



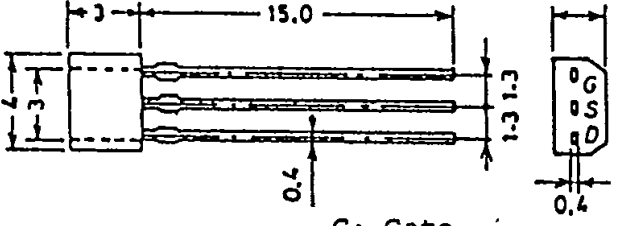
E: Emitter  
 C: Collector  
 B: Base  
 SANYO: NMP

Case Outline-[2034] unit: mm



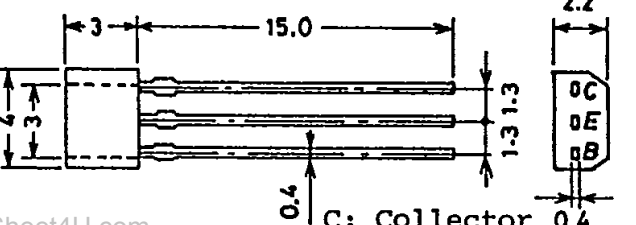
D: Drain  
 G: Gate  
 S: Source  
 SANYO: SPA

Case Outline-[2040] unit: mm



G: Gate  
 S: Source  
 D: Drain  
 SANYO: SPA

Case Outline-[2051] unit: mm



C: Collector  
 E: Emitter  
 B: Base  
 SANYO: SPA

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