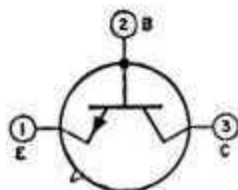


0.15W

2N1302



Ge n-p-n alloy-junction type used in medium-speed switching applications in commercial and military data-processing equipment. The n-p-n construction permits complementary operation with a matching p-n-p type, such as the 2N1303. JEDEC TO-5, Outline No.5.

MAXIMUM RATINGS

Collector-to-Base Voltage	V_{CB0}	25	V
Emitter-to-Base Voltage	V_{EB0}	25	V
Collector Current	I_C	0.3	A
Transistor Dissipation:			
T_A up to 25°C	P_T	150	mW
T_A above 25°C	P_T	See curve page 300	
Temperature Range:			
Operating (Junction)	T_J (opr)	-65 to 85	°C
Storage	T_{STG}	-65 to 100	°C
Lead-Soldering Temperature (10 s max)	T_L	230	°C

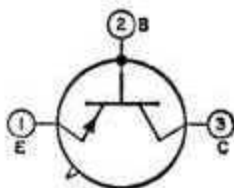
CHARACTERISTICS

Collector-to-Emitter Saturation Voltage ($I_B = 0.5$ mA, $I_C = 10$ mA)	$V_{CE(sat)}$	0.2 max	V
Base-to-Emitter Voltage ($I_B = 0.5$ mA, $I_C = 10$ mA) ..	V_{BE}	0.15 to 0.4	V
Collector-to-Emitter Reach-Through Voltage	V_{RT}	25 min	V
Collector-Cutoff Current ($V_{CB} = 25$ V, $I_E = 0$)	I_{CBO}	6 max	μ A
Emitter-Cutoff Current ($V_{EB} = 25$ V, $I_C = 0$)	I_{EBO}	6 max	μ A
Static Forward-Current Transfer Ratio:			
$V_{CE} = 1$ V, $I_C = 10$ mA	h_{FE}	20 min	
$V_{CE} = 0.35$ V, $I_C = 200$ mA	h_{FE}	10 min	
Small-Signal Forward-Current Transfer-Ratio Cutoff			
Frequency ($V_{CB} = 5$ V, $I_E = -1$ mA)	f_{hfb}	3 min	MHz
Output Capacitance ($V_{CB} = 5$ V, $I_E = 0$)	C_{ob0}	20 max	pF

2N1303

0.15W

Ge p-n-p alloy-junction type used in medium-speed switching applications in data-processing equipment. The 2N1303 is the p-n-p complement of the n-p-n type 2N1302. JEDEC TO-5, Outline No.5.



MAXIMUM RATINGS

Collector-to-Base Voltage	V_{CB0}	-30	V
Emitter-to-Base Voltage	V_{EB0}	-25	V
Collector Current	I_C	-0.3	A
Transistor Dissipation:			
T_A up to 25°C	P_T	150	mW
T_A above 25°C	P_T	See curve page 300	
Temperature Range:			
Operating (Junction)	T_J (opr)	-65 to 85	°C
Storage	T_{STG}	-65 to 100	°C
Lead-Soldering Temperature (10 s max)	T_l	230	°C

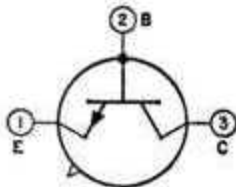
CHARACTERISTICS

Collector-to-Emitter Saturation Voltage ($I_B = -0.5$ mA, $I_C = -10$ mA)	$V_{CE(sat)}$	-0.2 max	V
Base-to-Emitter Voltage ($I_B = -0.5$ mA, $I_C = -10$ mA)	V_{BE}	-0.15 to -0.4	V
Collector-to-Emitter Reach-Through Voltage	V_{RT}	-25 min	V
Collector-Cutoff Current ($V_{CB} = -25$ V, $I_E = 0$)	I_{CBO}	-6 max	μ A
Emitter-Cutoff Current ($V_{EB} = -25$ V, $I_C = 0$)	I_{EBO}	-6 max	μ A
Static Forward-Current Transfer Ratio:			
$V_{CE} = -1$ V, $I_C = -10$ mA	h_{FE}	20 min	
$V_{CE} = -0.35$ V, $I_C = -200$ mA	h_{FE}	10 min	
Small-Signal Forward-Current Transfer-Ratio Cutoff			
Frequency ($V_{CB} = -5$ V, $I_E = 1$ mA)	f_{hftb}	3 min	MHz
Output Capacitance ($V_{CB} = -5$ V, $I_E = 0$)	C_{ob0}	20 max	pF

2N1304

0.15W

Ge n-p-n alloy-junction type used in medium-speed switching applications in data-processing equipment. The n-p-n construction permits complementary operation with a matching p-n-p type, such as the 2N1305. JEDEC TO-5, Outline No.5. This type is identical with type 2N1302 except for the following items:



CHARACTERISTICS

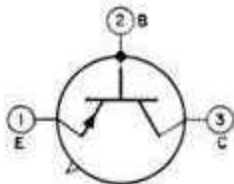
Collector-to-Emitter Saturation Voltage ($I_B = 0.25$ mA, $I_C = 10$ mA)
Base-to-Emitter Voltage ($I_B = 0.5$ mA, $I_C = 10$ mA)
Collector-to-Emitter Reach-Through Voltage
Static Forward-Current Transfer Ratio:
 $V_{CE} = 1$ V, $I_C = 10$ mA
 $V_{CE} = 0.35$ V, $I_C = 200$ mA
Small-Signal Forward-Current Transfer-Ratio Cutoff
Frequency ($V_{CE} = 5$ V, $I_E = -1$ mA)

$V_{CE}(\text{sat})$	0.2 max	V
V_{BE}	0.15 to 0.35	V
V_{RT}	20 min	V
h_{FE}	40 to 200	
h_{FE}	15 min	
f_{β}	5 min	MHz

2N1305

0.15W

Ge p-n-p alloy-junction type used in medium-speed switching applications in data-processing equipment. The 2N1305 is the p-n-p complement of the n-p-n type 2N1304. JEDEC TO-5, Outline No.5. This type is identical with type 2N1303 except for the following items:



CHARACTERISTICS

Collector-to-Emitter Saturation Voltage ($I_B = -25$ mA,
 $I_C = -10$ mA)

$V_{CE(sat)}$ -0.2 max V

Base-to-Emitter Voltage ($I_B = -0.5$ mA,
 $I_C = -10$ mA)

V_{BE} -0.15 to -0.35 V

Collector-to-Emitter Reach-Through Voltage

V_{RT} -20 min V

Static Forward-Current Transfer Ratio:

$V_{CE} = -1$ V, $I_C = -10$ mA

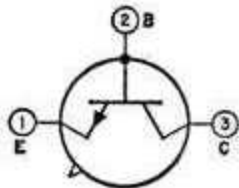
h_{FE} 40 to 200

$V_{CE} = -0.35$ V, $I_C = -200$ mA

h_{FE} 15 min

Small-Signal Forward-Current Transfer-Ratio Cutoff
Frequency ($V_{CB} = -5$ V, $I_E = 1$ mA)

f_{hfb} 5 min MHz

0.15W**2N1306**

Ge n-p-n alloy-junction type used in medium-speed switching applications in data processing equipment. The 2N1306 is the n-p-n complement of the p-n-p type 2N1307. JEDEC TO-5, Outline No.5. This type is identical with type 2N1302 except for the following items:

CHARACTERISTICS

Collector-to-Emitter Saturation Voltage ($I_B = 0.17$ mA, $I_C = 10$ mA)

Base-to-Emitter Voltage ($I_B = 0.5$ mA, $I_C = 10$ mA)

Collector-to-Emitter Reach-Through Voltage

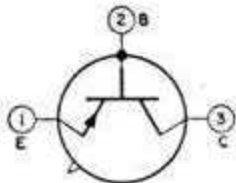
Static Forward-Current Transfer Ratio:

$V_{CE} = 1$ V, $I_C = 10$ mA

$V_{CE} = 0.35$ V, $I_C = 200$ mA

Small-Signal Forward-Current Transfer-Ratio Cutoff Frequency ($V_{CE} = 5$ V, $I_E = -1$ mA)

$V_{CE}(\text{sat})$	0.2 max	V
V_{BE}	0.15 to 0.35	V
V_{RT}	15 min	V
h_{FE}	60 to 300	
h_{FE}	20 min	
$f_{\alpha b}$	10 min	MHz

0.15W**2N1307**

Ge p-n-p alloy-junction type used in medium-speed switching applications in data-processing equipment. The 2N1307 is the p-n-p complement of the n-p-n type 2N1306. JEDEC TO-5, Outline No.5. This type is identical with type 2N1303 except for the following items:

CHARACTERISTICS

Collector-to-Emitter Saturation Voltage

($I_B = -0.17$ mA, $I_C = -10$ mA)

$V_{CE(sat)}$ -0.2 max V

Base-to-Emitter Voltage ($I_B = -0.5$ mA,

$I_C = -10$ mA)

V_{BE} -0.15 to -0.35 V

Collector-to-Emitter Reach-Through Voltage

V_{RT} -15 min V

Static Forward-Current Transfer Ratio:

$V_{CE} = -1$ V, $I_C = -10$ mA

h_{FE} 60 to 300

$V_{CE} = -0.35$ V, $I_C = -200$ mA

h_{FE} 20 min

Small-Signal Forward-Current Transfer-Ratio Cutoff

Frequency ($V_{CE} = -5$ V, $I_B = 1$ mA)

$f_{\alpha TB}$ 10 min MHz