2N1302 2N1304
2N1306 2N1308

GERMANIUM
NPN TRANSISTORS

TO-5 CASE

Central Semiconductor Corp.

www.centralsemi.com

DESCRIPTION:

The CENTRAL SEMICONDUCTOR 2N1302, 2N1304, 2N1306, and 2N1308 are germanium NPN transistors designed for computer and switching applications.

MARKING: FULL PART NUMBER

MAXIMUM RATINGS: (T_A=25°C)	**SYMBOL**		**UNITS**
Collector-Base Voltage	V_{CBO}	25	V
Emitter-Base Voltage	V_{EBO}	25	V
Continuous Collector Current	I_C	300	mA
Power Dissipation	P_D	150	mW
Operating Junction Temperature	T_J	-65 to +85	°C
Storage Temperature	T_{stg}	-65 to +100	°C

ELECTRICAL CHARACTERISTICS: (T_A=25°C)

SYMBOL	**TEST CONDITIONS**	**MIN**	**TYP**	**MAX**	**UNITS**
I_{CBO}	V_{CB}=25V			6.0	μA
I_{EBO}	V_{EB}=25V			6.0	μA
BV_{CBO}	I_C=100μA	25			V
BV_{EBO}	I_E=100μA	25			V
$V_{CE(SAT)}$	I_C=10mA, I_B=0.5mA (2N1302)			0.20	V
$V_{CE(SAT)}$	I_C=10mA, I_B=0.25mA (2N1304)			0.20	V
$V_{CE(SAT)}$	I_C=10mA, I_B=0.17mA (2N1306)			0.20	V
$V_{CE(SAT)}$	I_C=10mA, I_B=0.13mA (2N1308)			0.20	V
$V_{BE(SAT)}$	I_C=10mA, I_B=0.5mA (2N1302)	0.15		0.40	V
$V_{BE(SAT)}$	I_C=10mA, I_B=0.5mA (2N1304, 06, 08)	0.15		0.35	V
h_{FE}	V_{CE}=1.0V, I_C=10mA (2N1302)	20			
h_{FE}	V_{CE}=1.0V, I_C=10mA (2N1304)	40		200	
h_{FE}	V_{CE}=1.0V, I_C=10mA (2N1306)	60		300	
h_{FE}	V_{CE}=1.0V, I_C=10mA (2N1308)	80			
h_{FE}	V_{CE}=0.35V, I_C=200mA (2N1302)	10			
h_{FE}	V_{CE}=0.35V, I_C=200mA (2N1304)	15			
h_{FE}	V_{CE}=0.35V, I_C=200mA (2N1306, 08)	20			
h_{ib}	V_{CB}=5.0V, I_E=1.0mA, f=1.0kHz		28		Ω
h_{rb}	V_{CB}=5.0V, I_E=1.0mA, f=1.0kHz		5.0		$x10^{-4}$
h_{ob}	V_{CB}=5.0V, I_E=1.0mA, f=1.0kHz		0.34		μS
h_{fe}	V_{CB}=5.0V, I_E=1.0mA, f=1.0kHz		140		
NF	V_{CB}=5.0V, I_E=1.0mA, f=1.0kHz		3.0		dB
C_{ob}	V_{CB}=5.0V, f=1.0MHz		20		pF
C_{ib}	V_{EB}=5.0V, f=1.0MHz		13		pF

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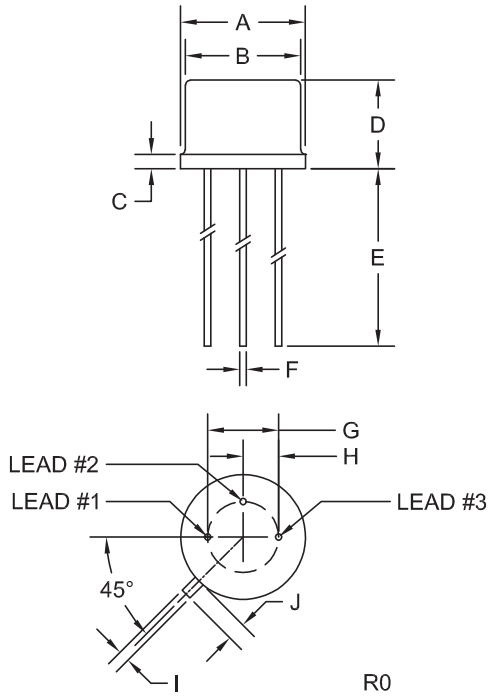
ELECTRICAL CHARACTERISTICS - Continued: (T_A=25°C)

SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
t_d	I_C=10mA, I_{B1}=1.3mA, I_{B2}=0.7mA, $V_{BE(OFF)}$=0.8V, R_L=1.0kΩ		0.07		μs
t_r			0.20		μs
t_s			0.70		μs
t_f			0.40		μs
f_{hfb}	V_{CB}=5.0V, I_E=1.0mA (2N1302)	3.0			MHz
f_{hfb}	V_{CB}=5.0V, I_E=1.0mA (2N1304)	5.0			MHz
f_{hfb}	V_{CB}=5.0V, I_E=1.0mA (2N1306)	10			MHz
f_{hfb}	V_{CB}=5.0V, I_E=1.0mA (2N1308)	15			MHz

TO-5 CASE - MECHANICAL OUTLINE



DIMENSIONS				
	INCHES		MILLIMETERS	
SYMBOL	MIN	MAX	MIN	MAX
A (DIA)	0.335	0.370	8.51	9.40
B (DIA)	0.315	0.335	8.00	8.51
C	-	0.040	-	1.02
D	0.240	0.260	6.10	6.60
E	1.500	1.752	38.1	44.5
F (DIA)	0.016	0.021	0.41	0.53
G (DIA)	0.200		5.08	
H	0.100		2.54	
I	0.028	0.034	0.71	0.86
J	0.029	0.045	0.74	1.14

TO-5 (REV: R0)

LEAD CODE:
1) Emitter
2) Base
3) Collector

MARKING: FULL PART NUMBER

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