NJL0281D (NPN)
NJL0302D (PNP)

Complementary ThermalTrak™ Transistors

The ThermalTrak family of devices has been designed to eliminate thermal equilibrium lag time and bias trimming in audio amplifier applications. They can also be used in other applications as transistor die protection devices.

Features

- Thermally Matched Bias Diode
- Instant Thermal Bias Tracking
- Absolute Thermal Integrity
- High Safe Operating Area
- Pb−Free Packages are Available*

Benefits

- Eliminates Thermal Equilibrium Lag Time and Bias Trimming
- Superior Sound Quality Through Improved Dynamic Temperature Response
- Significantly Improved Bias Stability
- Simplified Assembly
  - Reduced Labor Costs
  - Reduced Component Count
- High Reliability

Applications

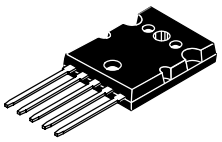
- High−End Consumer Audio Products
  - Home Amplifiers
  - Home Receivers
- Professional Audio Amplifiers
  - Theater and Stadium Sound Systems
  - Public Address Systems (PAs)

*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

ON Semiconductor®

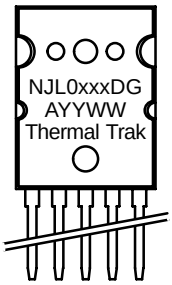
http://onsemi.com

BIPOLAR POWER TRANSISTORS
15 AMP, 260 VOLT, 180 WATT

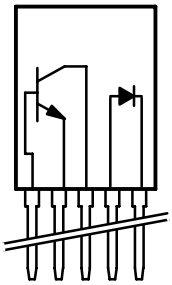


TO−264, 5 LEAD
CASE 340AA
STYLE 1

MARKING DIAGRAM



SCHEMATIC



NJL0xxxD = Device Code
xxx = 281 or 302
G = Pb−Free Package
A = Assembly Location
YY = Year
WW = Work Week

ORDERING INFORMATION

Device	Package	Shipping
NJL0281D	TO−264	25 Units / Rail
NJL0281DG	TO−264 (Pb−Free)	25 Units / Rail
NJL0302D	TO−264	25 Units / Rail
NJL0302DG	TO−264 (Pb−Free)	25 Units / Rail

MAXIMUM RATINGS (T_J = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Collector−Emitter Voltage	V_{CEO}	260	Vdc
Collector−Base Voltage	V_{CBO}	260	Vdc
Emitter−Base Voltage	V_{EBO}	5	Vdc
Collector−Emitter Voltage − 1.5 V	V_{CEX}	260	Vdc
Collector Current − Continuous − Peak (Note 1)	I_C	15 25	Adc
Base Current − Continuous	I_B	1.5	Adc
Total Power Dissipation @ T_C = 25°C Derate Above 25°C	P_D	180 1.43	W W/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	− 65 to +150	°C
DC Blocking Voltage	V_R	200	V
Average Rectified Forward Current	$I_{F(AV)}$	1.0	A

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction−to−Case	$R_{\theta JC}$	0.694	°C/W

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. Pulse Test: Pulse Width = 5 ms, Duty Cycle < 10%.

ATTRIBUTES

Characteristic		Value
ESD Protection	Human Body Model Machine Model	>8000 V > 400 V
Flammability Rating		UL 94 V−0 @ 0.125 in

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector−Emitter Sustaining Voltage (I_C = 100 mAdc, I_B = 0)	$V_{CEO(sus)}$	260	−	Vdc
Collector Cutoff Current (V_{CB} = 260 Vdc, I_E = 0)	I_{CBO}	−	10	μAdc
Emitter Cutoff Current (V_{EB} = 5 Vdc, I_C = 0)	I_{EBO}	−	5	μAdc
ON CHARACTERISTICS				
DC Current Gain (I_C = 500 mAdc, V_{CE} = 5 Vdc) (I_C = 1 Adc, V_{CE} = 5 Vdc) (I_C = 3 Adc, V_{CE} = 5 Vdc)	h_{FE}	 75 75 75	 150 150 150	
Collector−Emitter Saturation Voltage (I_C = 5 Adc, I_B = 0.5 Adc)	$V_{CE(sat)}$	−	1.0	Vdc
Base−Emitter On Voltage (I_C = 5 Adc, V_{CE} = 5 Vdc)	$V_{CE(on)}$	−	1.2	Vdc
DYNAMIC CHARACTERISTICS				
Current−Gain − Bandwidth Product (I_C = 1 Adc, V_{CE} = 5 Vdc, f_{test} = 1 MHz)	f_T	30	−	MHz
Output Capacitance (V_{CB} = 10 Vdc, I_E = 0, f_{test} = 1 MHz)	C_{ob}	−	400	pF
Maximum Instantaneous Forward Voltage (Note 2) (i_F = 1.0 A, T_J = 25°C) (i_F = 1.0 A, T_J = 150°C)	v_F	 1.1 0.93		V
Maximum Instantaneous Reverse Current (Note 2) (Rated dc Voltage, T_J = 25°C) (Rated dc Voltage, T_J = 150°C)	i_R	 10 100		μA
Maximum Reverse Recovery Time (i_F = 1.0 A, di/dt = 50 A/μs)	t_{rr}	100		ns

2. Diode Pulse Test: Pulse Width = 300 μs, Duty Cycle ≤ 2.0%.

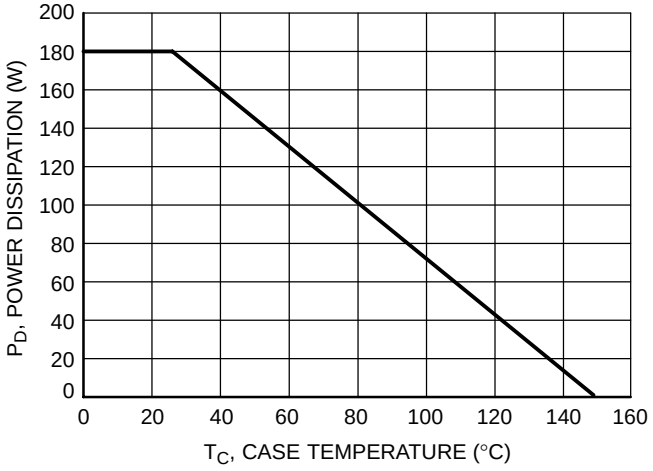


Figure 1. Power Derating

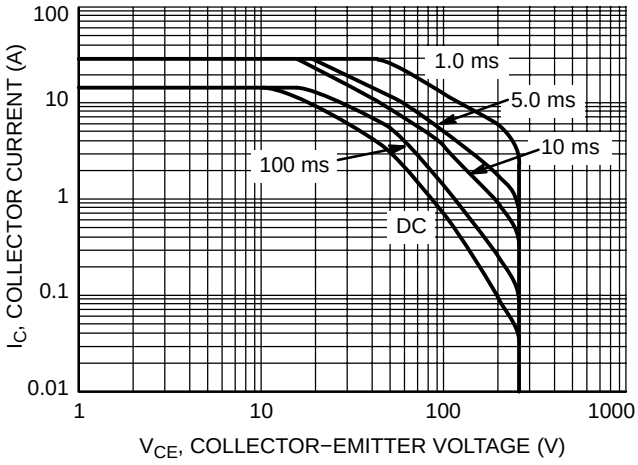


Figure 2. Safe Operating Area

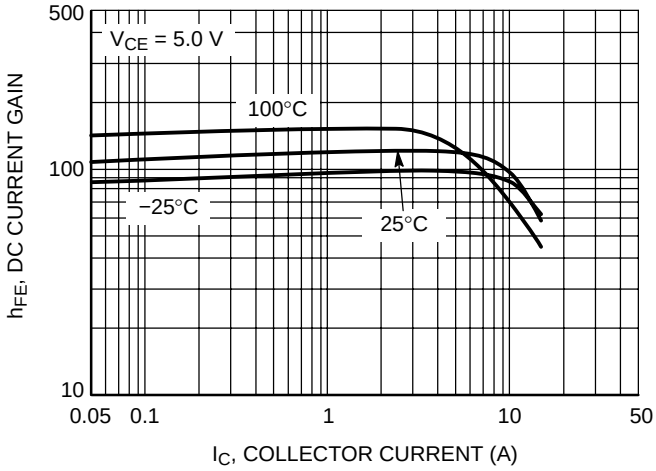


Figure 3. NJL0281A DC Current Gain

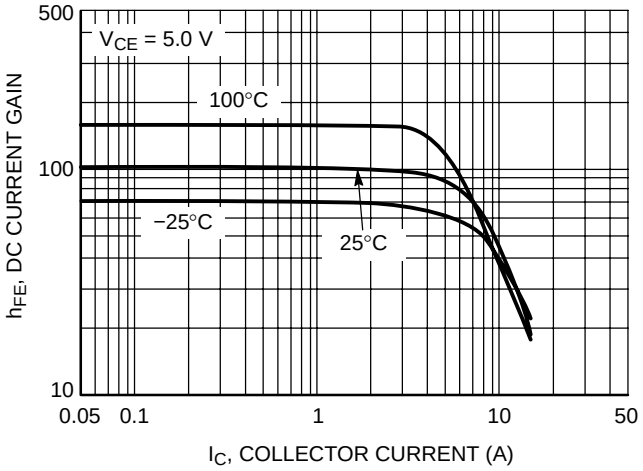


Figure 4. NJL0302A DC Current Gain

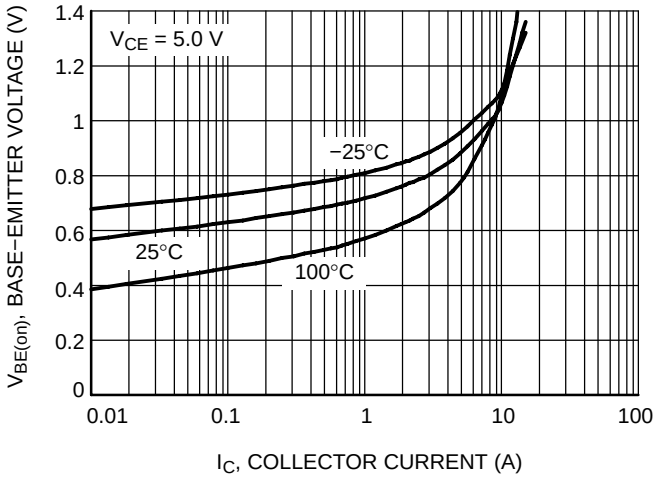


Figure 5. NJL0281A Base−Emitter Voltage

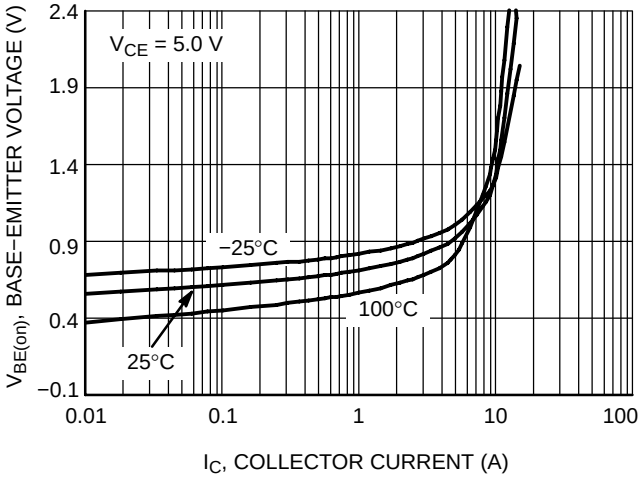


Figure 6. NJL0302A Base−Emitter Voltage

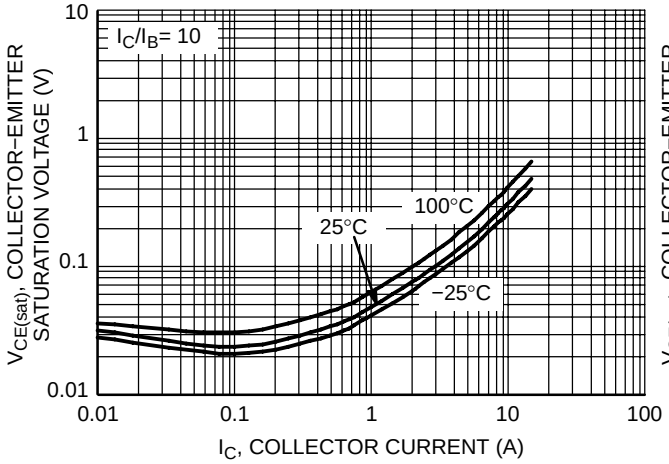


Figure 7. NJL0281A Saturation Voltage

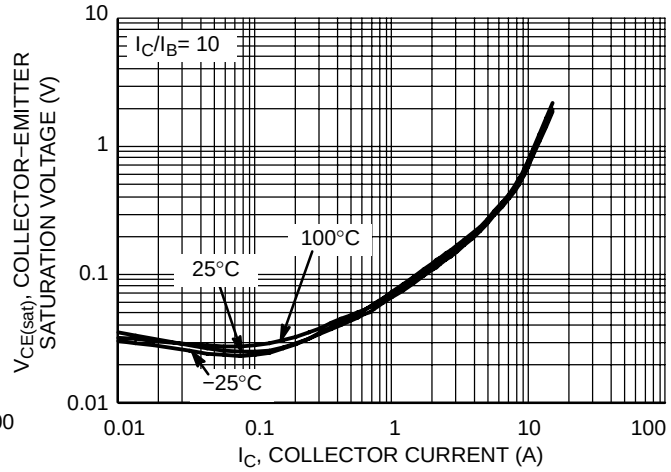


Figure 8. NJL0302A Saturation Voltage

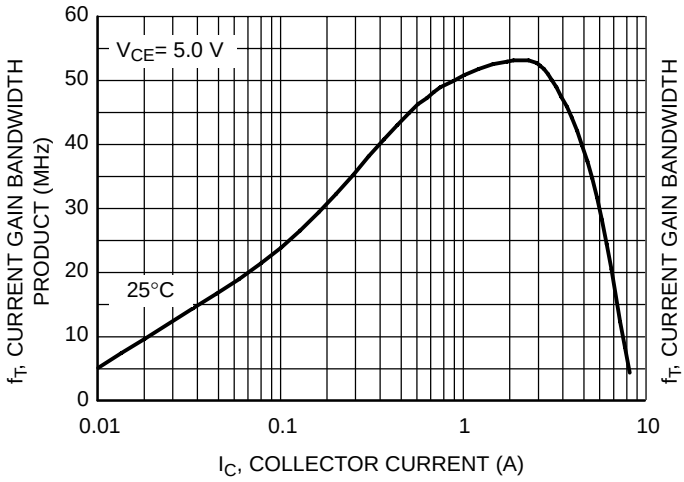


Figure 9. NJL0281A Current Gain Bandwidth Product

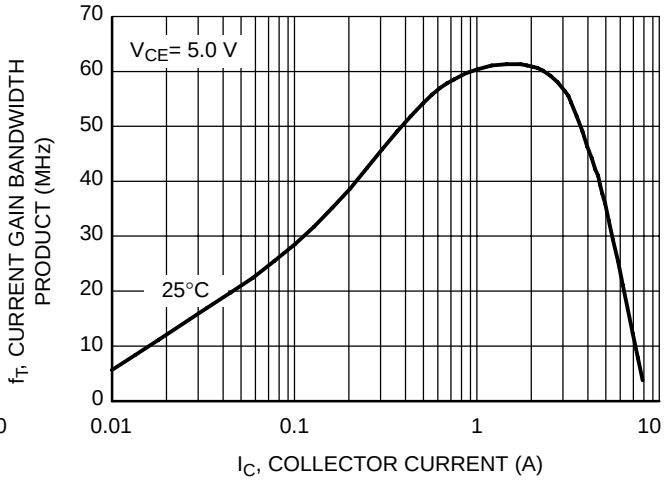


Figure 10. NJL0302A Current Gain Bandwidth Product

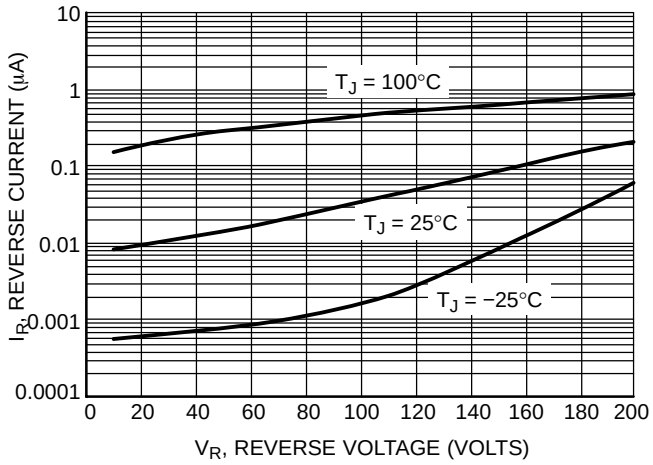


Figure 11. Typical Reverse Current

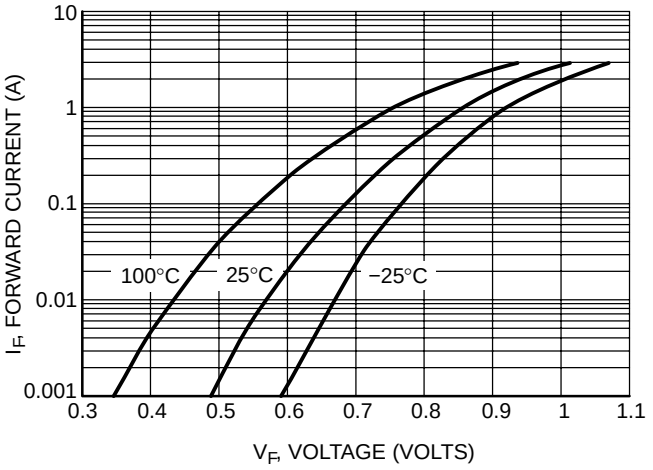


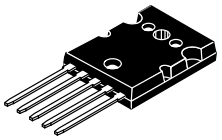
Figure 12. Typical Forward Voltage

MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

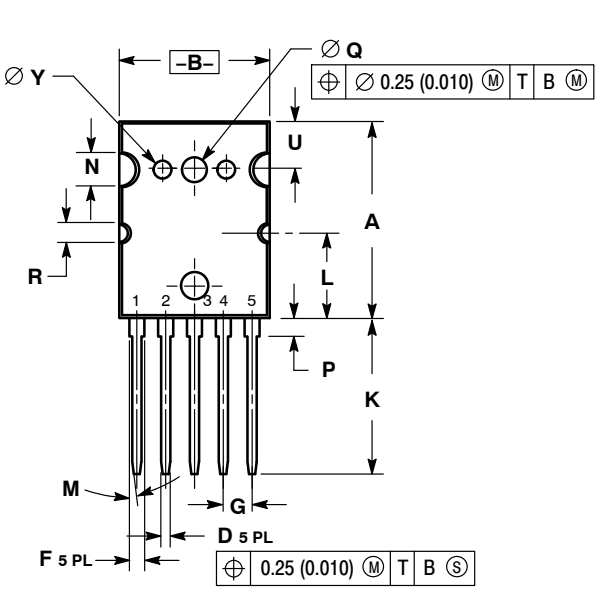
ON Semiconductor®

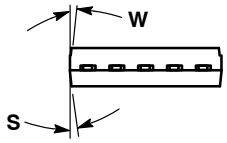
TO−264, 5 LEAD
CASE 340AA−01
ISSUE O

DATE 03 FEB 2005



SCALE 1:2



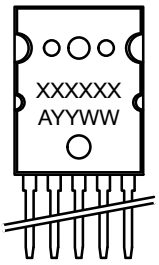


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.

	MILLIMETERS			INCHES		
DIM	MIN	NOM	MAX	MIN	NOM	MAX
A	25.857	25.984	26.111	1.018	1.023	1.028
B	19.761	19.888	20.015	0.778	0.783	0.788
C	4.699	4.890	5.182	0.185	0.199	0.204
D	1.219 BSC			0.0480 BSC		
E	1.890	2.042	2.184	0.0748	0.0804	0.0860
F	1.981 BSC			0.0780 BSC		
G	3.81 BSC			0.150 BSC		
H	2.667	2.718	2.769	0.1050	0.1070	0.1090
J	0.584 BSC			0.0230 BSC		
K	20.422	20.549	20.676	0.804	0.809	0.814
L	11.28 REF			0.444 REF		
M	0 °	−−−	7 °	0 °	−−−	7 °
N	4.57 REF			0.180 REF		
P	2.259	2.386	2.513	0.0889	0.0939	0.0989
Q	3.480 BSC			0.1370 BSC		
R	2.54 REF			0.100 REF		
S	0 °	−−−	8 °	0 °	−−−	8 °
U	6.17 REF			0.243 REF		
W	0 °	−−−	6 °	0 °	−−−	6 °
Y	2.388 BSC			0.0940 BSC		

STYLE 1:
PIN 1. BASE
2. EMITTER
3. COLLECTOR
4. ANODE
5. CATHODE

GENERIC MARKING DIAGRAM*



XXXXXX = Specific Device Code
A = Assembly Location
YY = Year
WW = Work Week
G or ▪ = Pb−Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “ ▪”, may or may not be present.

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DESCRIPTION:	**TO−264, 5 LEAD**	**PAGE 1 OF 1**

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