



THERMAL CHARACTERISTICS (Note 1)

- Base Voltage

Collector Current - Continuous

Total Device Dissipation @ T_A = 25°C

Derate above 25°C

Total Power Dissipation @ $T_A = 60^{\circ}C$

Total Device Dissipation @ T_C = 25°C Derate above 25°C

Operating and Storage Junction

Temperature Range

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	200	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	83.3	°C/W

5.0

200

625

5.0

250

1.5

12

-55 to +150

 V_{EBO}

 I_{C}

 P_D

 P_D

 P_{D}

T_J, T_{stg}

Vdc

mAdc

mW

mW/°C

mW

W

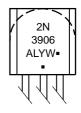
mW/°C

٥С

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. Indicates Data in addition to JEDEC Requirements.

MARKING DIAGRAM



A = Assembly Location

L = Wafer Lot

Y = Year

W = Work Week

= Pb-Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 3 of this data sheet.

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

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ELECTRICAL CHARACTERISTICS ($T_A = 25^{\circ}C$ unless otherwise noted)

Characteristic		Symbol	Min	Max	Unit	
OFF CHARACTERI	STICS				•	•
Collector – Emitter Breakdown Voltage (Note 2) $(I_C = 1.0 \text{ mAdc}, I_B = 0)$		V _{(BR)CEO}	40	-	Vdc	
Collector-Base Bre	Collector – Base Breakdown Voltage $(I_C = 10 \mu Adc, I_E =$		V _{(BR)CBO}	40	-	Vdc
Emitter-Base Breakdown Voltage		$(I_E = 10 \mu Adc, I_C = 0)$	V _{(BR)EBO}	5.0	-	Vdc
Base Cutoff Current		(V _{CE} = 30 Vdc, V _{EB} = 3.0 Vdc)	I _{BL}	-	50	nAdc
Collector Cutoff Current		$(V_{CE} = 30 \text{ Vdc}, V_{EB} = 3.0 \text{ Vdc})$	I _{CEX}	-	50	nAdc
ON CHARACTERIS	TICS (Note 2)					
DC Current Gain $ \begin{array}{c} (I_{C} = 0.1 \text{ mAdc, } V_{CE} = 1.0 \text{ Vdc}) \\ (I_{C} = 1.0 \text{ mAdc, } V_{CE} = 1.0 \text{ Vdc}) \\ (I_{C} = 10 \text{ mAdc, } V_{CE} = 1.0 \text{ Vdc}) \\ (I_{C} = 50 \text{ mAdc, } V_{CE} = 1.0 \text{ Vdc}) \\ (I_{C} = 100 \text{ mAdc, } V_{CE} = 1.0 \text{ Vdc}) \\ \end{array} $		h _{FE}	60 80 100 60 30	- 300 - -	_	
Collector – Emitter Saturation Voltage $ \begin{aligned} \text{(I}_{\text{C}} &= 10 \text{ mAdc, I}_{\text{B}} = 1.0 \text{ mAdc)} \\ \text{(I}_{\text{C}} &= 50 \text{ mAdc, I}_{\text{B}} = 5.0 \text{ mAdc} \end{aligned} $		V _{CE(sat)}		0.25 0.4	Vdc	
Base – Emitter Saturation Voltage $ \begin{array}{c} (I_C = 10 \text{ mAdc}, \ I_B = 1.0 \text{ mAdc}) \\ (I_C = 50 \text{ mAdc}, \ I_B = 5.0 \text{ mAdc}) \end{array} $		V _{BE(sat)}	0.65 -	0.85 0.95	Vdc	
SMALL-SIGNAL C	HARACTERISTICS					
Current-Gain - Bandwidth Product (I _C = 10 mAdc, V _{CE} = 20 Vdc, f = 100 MHz)		f _T	250	-	MHz	
Output Capacitance	Output Capacitance $(V_{CB} = 5.0 \text{ Vdc}, I_E = 0, f = 1.0 \text{ MHz})$		C _{obo}	_	4.5	pF
Input Capacitance	Input Capacitance $(V_{EB} = 0.5 \text{ Vdc}, I_{C} = 0, f = 1.0 \text{ MHz})$		C _{ibo}	_	10	pF
Input Impedance	Input Impedance (I _C = 1.0 mAdc, V_{CE} = 10 Vdc, f = 1.0 kHz)		h _{ie}	2.0	12	kΩ
Voltage Feedback Ratio $(I_C = 1.0 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}, f = 1.0 \text{ kHz})$		h _{re}	0.1	10	X 10 ⁻⁴	
Small–Signal Current Gain ($I_C = 1.0 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}, f = 1.0 \text{ kHz}$)		h _{fe}	100	400	_	
Output Admittance ($I_C = 1.0 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}, f = 1.0 \text{ kHz}$)		h _{oe}	3.0	60	μmhos	
Noise Figure (I _C = 100 μ Adc, V _{CE} = 5.0 Vdc, R _S = 1.0 k Ω , f = 1.0 kHz)		NF	-	4.0	dB	
SWITCHING CHAR	ACTERISTICS					
Delay Time	$(V_{CC} = 3.0 \text{ Vdc}, V_{BE} = 0.5 \text{ Vdc}, I_{C} = 10 \text{ mAdc}, I_{B1} = 1.0 \text{ mAdc})$		t _d	_	35	ns
Rise Time			t _r	_	35	ns
Storage Time	(V _{CC} = 3.0 Vdc, I	C = 10 mAdc, I _{B1} = I _{B2} = 1.0 mAdc)	t _s	-	225	ns
Fall Time	(V _{CC} = 3.0 Vdc, I	$_{\rm C}$ = 10 mAdc, $I_{\rm B1}$ = $I_{\rm B2}$ = 1.0 mAdc)	t _f	_	75	ns

^{2.} Pulse Test: Pulse Width ≤ 300 μs; Duty Cycle ≤ 2%.

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ORDERING INFORMATION

Device	Package	Shipping [†]
2N3906	TO-92	5000 Units / Bulk
2N3906G	TO-92 (Pb-Free)	5000 Units / Bulk
2N3906RL1	TO-92	2000 / Tape & Reel
2N3906RL1G	TO-92 (Pb-Free)	2000 / Tape & Reel
2N3906RLRA	TO-92	2000 / Tape & Reel
2N3906RLRAG	TO-92 (Pb-Free)	2000 / Tape & Reel
2N3906RLRM	TO-92	•

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TYPICAL AUDIO SMALL

TYPICAL STATIC CHARACTERISTICS

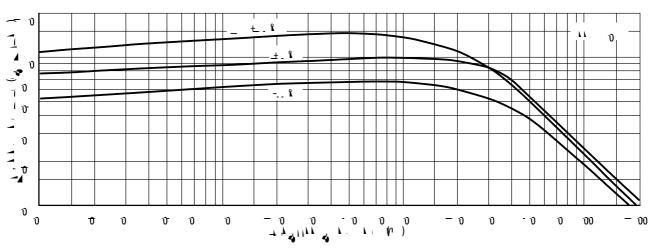
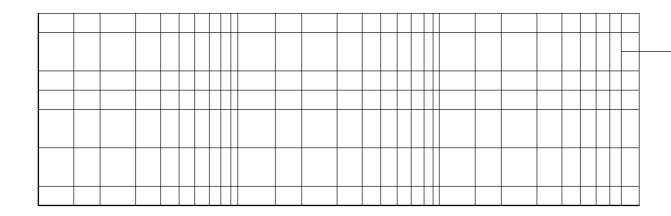


Figure 13. DC Current Gain



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Y 1:. \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	Y 2: N 1. BA 2. 3.	Y 3: N 1. AN 2. AN 3. A
Y 6:	Y 7:	Y 8:
N 1. A	N 1. U	N 1. A N
2. U & UB A	2. A N	2. A
3. A N	3. A	3. U & UB A
Y 11:	Y 12:	Y 13:
N 1. AN	N 1. A N NA 1	N1. AN 1
2. A & AN	2. A	2. A
3. A	3. A N NA 2	3. A 2
Y 16:	Y 17:	Y 18:
N 1. AN	N 1.	N 1. AN
2. A	2. BA	2. A
3. A	3.	3. N NN
Y 21:	Y 22:	Y 23:
N 1.	N 1. U	N 1. A
2.	2. A	2. U
3. BA	3. A N	3. A N
Y 26:	Y 27:	Y 28:
N 1.	N 1.	N 1. A
2. UN 2	2. UB A	N 1. AN Y 8:
3. U U	3.	2. 3. AN
Y 31: N1. A 2. AN 3. U	Y 32: N 1. BA 2. Y 3.	

2. A

