MPS3638A Datasheet

DiGi Electronics Part Number	MPS3638A-DG
Manufacturer	onsemi
Manufacturer Product Number	MPS3638A
Description	TRANS PNP 25V 0.5A TO92
Detailed Description	Bipolar (BJT) Transistor PNP 25 V 500 mA 150MHz 625 mW Through Hole TO-92 (TO-226)

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Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
MPS3638A	onsemi
Series:	Product Status:
-	Obsolete
Transistor Type:	Current - Collector (Ic) (Max):
PNP	500 mA
Voltage - Collector Emitter Breakdown (Max):	Vce Saturation (Max) @ Ib, Ic:
25 V	1V @ 30mA, 300mA
Current - Collector Cutoff (Max):	DC Current Gain (hFE) (Min) @ Ic, Vce:
35nA	20 @ 300mA, 2V
Power - Max:	Frequency - Transition:
625 mW	150MHz
Operating Temperature:	Mounting Type:
-55°C ~ 150°C (TJ)	Through Hole
Package / Case:	Supplier Device Package:
TO-226-3, TO-92-3 Long Body	TO-92 (TO-226)
Base Product Number:	
MPS363	

Environmental & Export classification

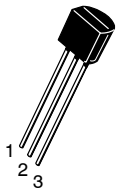
RoHS Status:	Moisture Sensitivity Level (MSL):
RoHS non-compliant	1 (Unlimited)
REACH Status:	ECCN:
REACH Unaffected	EAR99
HTSUS:	
8541.21.0075	

ON Semiconductor™

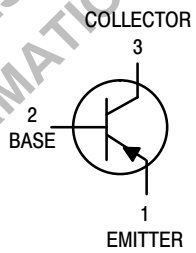
Switching Transistor
PNP Silicon

MPS3638A

- **This device is available in Pb−free package(s). Specifications herein apply to both standard and Pb−free devices. Please see our website at www.onsemi.com for specific Pb−free orderable part numbers, or contact your local ON Semiconductor sales office or representative.**



CASE 29−11, STYLE 1
TO−92 (TO−226AA)



MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector − Emitter Voltage	V_{CEO}	−25	Vdc
Collector − Emitter Voltage	V_{CES}	−25	Vdc
Collector − Base Voltage	V_{CBO}	−25	Vdc
Emitter − Base Voltage	V_{EBO}	−4.0	Vdc
Collector Current — Continuous	I_C	−500	mAdc
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	625 5.0	mW mW/°C
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	1.5 12	Watts mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−55 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$[1]	200	°C/W
Thermal Resistance, Junction to Case	$R_{\theta JC}$	83.3	°C/W

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector − Emitter Breakdown Voltage (I_C = −100 μAdc, V_{BE} = 0)	$V_{(BR)CES}$	−25	—	Vdc
Collector − Emitter Sustaining Voltage[2] (I_C = −10 mAdc, I_B = 0)	$V_{CEO(sus)}$	−25	—	Vdc
Collector − Base Breakdown Voltage (I_C = −100 μAdc, I_E = 0)	$V_{(BR)CBO}$	−25	—	Vdc
Emitter − Base Breakdown Voltage (I_E = −100 μAdc, I_C = 0)	$V_{(BR)EBO}$	−4.0	—	Vdc
Collector Cutoff Current (V_{CE} = −15 Vdc, V_{BE} = 0) (V_{CE} = −15 Vdc, V_{BE} = 0, T_A = −65°C)	I_{CES}	 — —	 −0.035 −2.0	μAdc
Emitter Cutoff Current (V_{EB} = −3.0 V, I_C = 0)	I_{EBO}	—	−35	nA
Base Current (V_{CE} = −15 Vdc, V_{BE} = 0)	I_B	—	−0.035	μAdc

1. $R_{\theta JA}$ is measured with the device soldered into a typical printed circuit board.
2. Pulse Test: Pulse Width ≤ 300 μs; Duty Cycle ≤ 2.0%.

March, 2006 − Rev. 2
Publication Order Number:
MPS3638A/D

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ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted) (Continued)

Characteristic	Symbol	Min	Max	Unit
ON CHARACTERISTICS[2]				
DC Current Gain	h_{FE}			—
(I_C = −1.0 mAdc, V_{CE} = −10 Vdc)		80	—	
(I_C = −10 mAdc, V_{CE} = −10 Vdc)		100	—	
(I_C = −50 mAdc, V_{CE} = −1.0 Vdc)		100	—	
(I_C = −300 mAdc, V_{CE} = −2.0 Vdc)		20	—	
Collector − Emitter Saturation Voltage	$V_{CE(sat)}$			Vdc
(I_C = −50 mAdc, I_B = −2.5 mAdc)		—	−0.25	
(I_C = −300 mAdc, I_B = −30 mAdc)		—	−1.0	
Base − Emitter Saturation Voltage	$V_{BE(sat)}$			Vdc
(I_C = −50 mAdc, I_B = −2.5 mAdc)		—	−1.1	
(I_C = −300 mAdc, I_B = −30 mAdc)		−0.80	−2.0	
SMALL− SIGNAL CHARACTERISTICS				
Current − Gain — Bandwidth Product	f_T			MHz
(V_{CE} = −3.0 Vdc, I_C = −50 mAdc, f = 100 MHz)		150	—	
Output Capacitance	C_{obo}			pF
(V_{CB} = −10 Vdc, I_E = 0, f = 1.0 MHz)		—	10	
Input Capacitance	C_{ibo}			pF
(V_{EB} = −0.5 Vdc, I_C = 0, f = 1.0 MHz)		—	25	
Input Impedance	h_{ie}			kΩ
(I_C = −10 mAdc, V_{CE} = −10 Vdc, f = 1.0 kHz)		—	2000	
Voltage Feedback Ratio	h_{re}			X 10^{-4}
(I_C = −10 mAdc, V_{CE} = −10 Vdc, f = 1.0 kHz)		—	15	
Small−Signal Current Gain	h_{fe}			—
(I_C = −10 mAdc, V_{CE} = −10 Vdc, f = 1.0 kHz)		100	—	
Output Admittance	h_{oe}			mmhos
(I_C = −10 mAdc, V_{CE} = −10 Vdc, f = 1.0 kHz)		—	1.2	
SWITCHING CHARACTERISTICS				
Delay Time	(V_{CC} = −10 Vdc, I_C = −300 mAdc, I_{B1} = −30 mAdc)	t_d	—	20	ns
Rise Time		t_r	—	70	ns
Storage Time	(V_{CC} = −10 Vdc, I_C = −300 mAdc, I_{B1} = −30 mAdc, I_{B2} = −30 mAdc)	t_s	—	140	ns
Fall Time		t_f	—	70	ns
Turn−On Time	(I_C = −300 mAdc, I_{B1} = −30 mAdc)	t_{on}	—	75	ns
Turn−Off Time	(I_C = −300 mAdc, I_{B1} = −30 mAdc, I_{B2} = 30 mAdc)	t_{off}	—	170	ns

2. Pulse Test: Pulse Width ≤ 300 μs; Duty Cycle ≤ 2.0%.

SWITCHING TIME EQUIVALENT TEST CIRCUIT

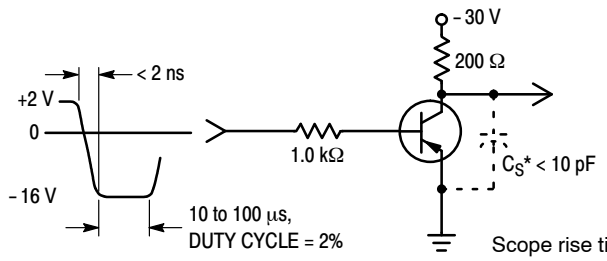

Figure 1. Turn−On Time

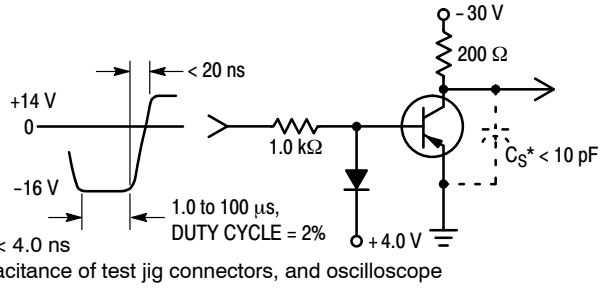

Figure 2. Turn−Off Time

TRANSIENT CHARACTERISTICS

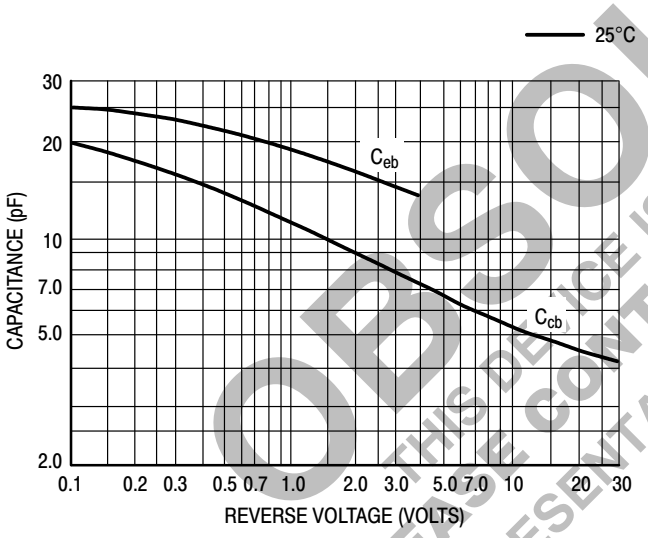

Figure 3. Capacitances

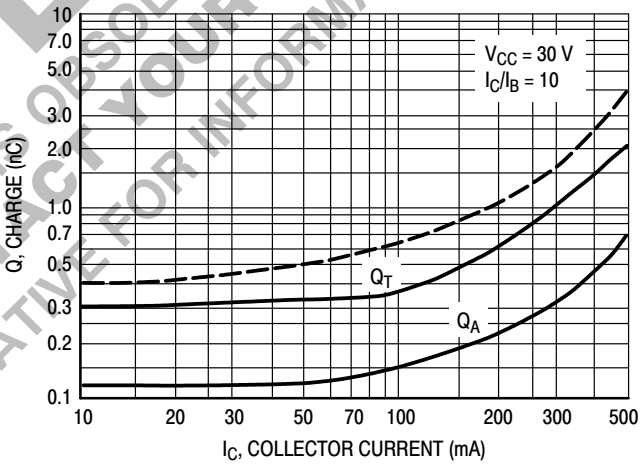

Figure 4. Charge Data

TRANSIENT CHARACTERISTICS (Continued)

25°C 100°C

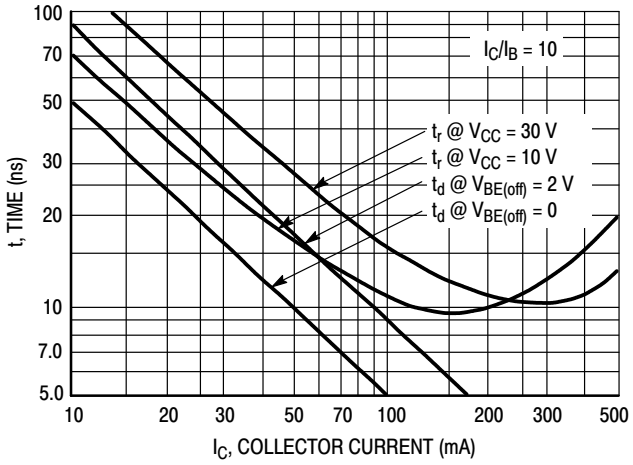

Figure 5. Turn−On Time

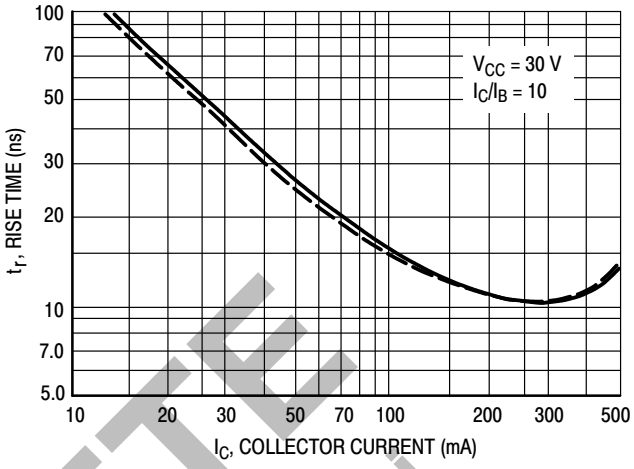

Figure 6. Rise Time

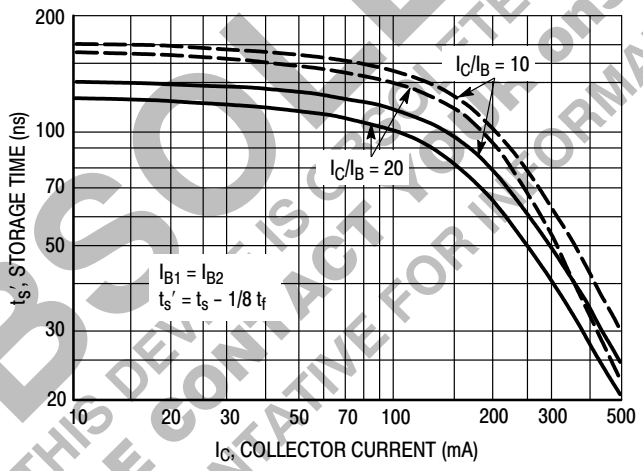

Figure 7. Storage Time

SMALL−SIGNAL CHARACTERISTICS

NOISE FIGURE

V_{CE} = −10 Vdc, T_A = 25°C

Bandwidth = 1.0 Hz

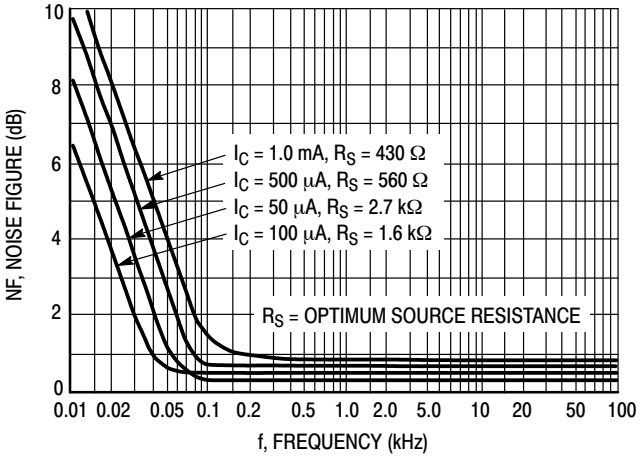

Figure 8. Frequency Effects

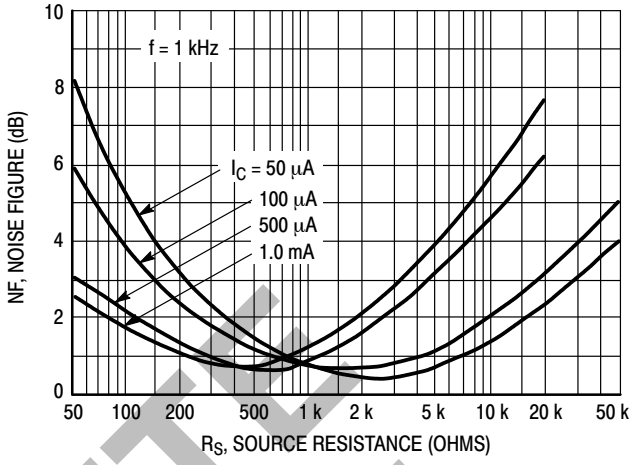

Figure 9. Source Resistance Effects

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h PARAMETERS

V_{CE} = −10 Vdc, f = 1.0 kHz, T_A = 25°C

This group of graphs illustrates the relationship between h_{fe} and other "h" parameters for this series of transistors. To obtain these curves, a high−gain and a low−gain unit were selected from the 2N4402 line, and the same units were used to develop the correspondingly−numbered curves on each graph.

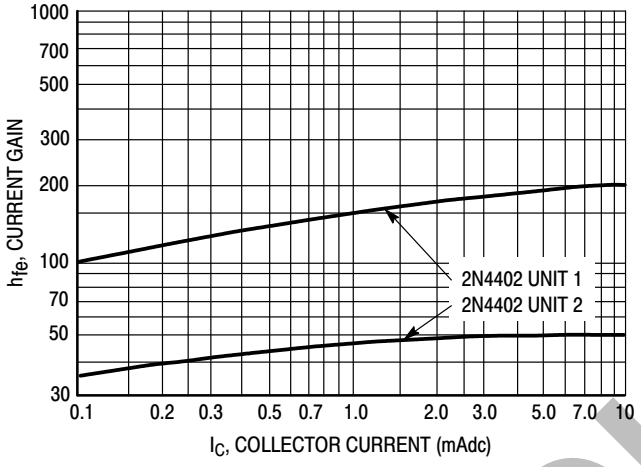

Figure 10. Current Gain

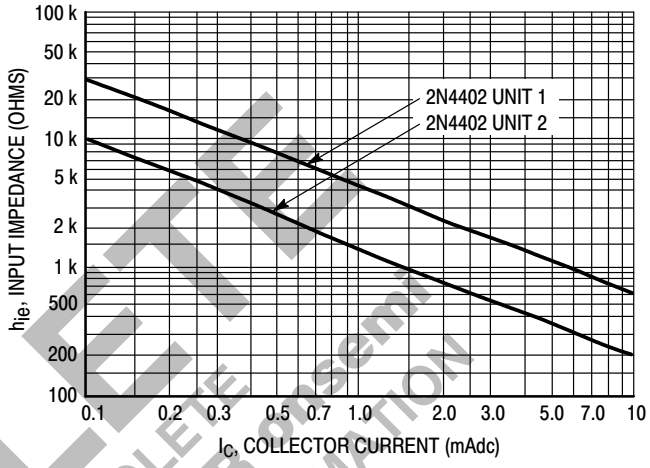

Figure 11. Input Impedance

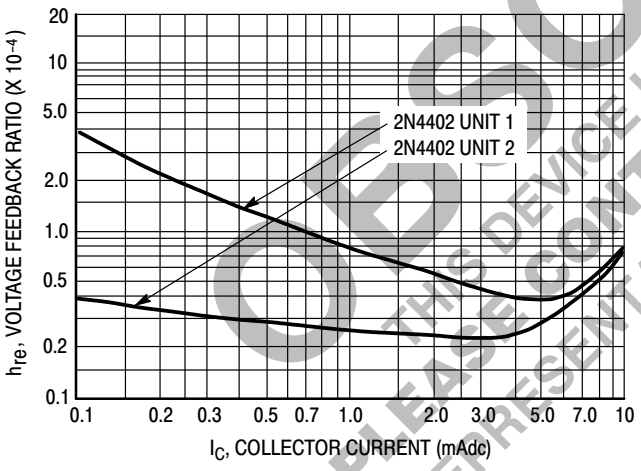

Figure 12. Voltage Feedback Ratio

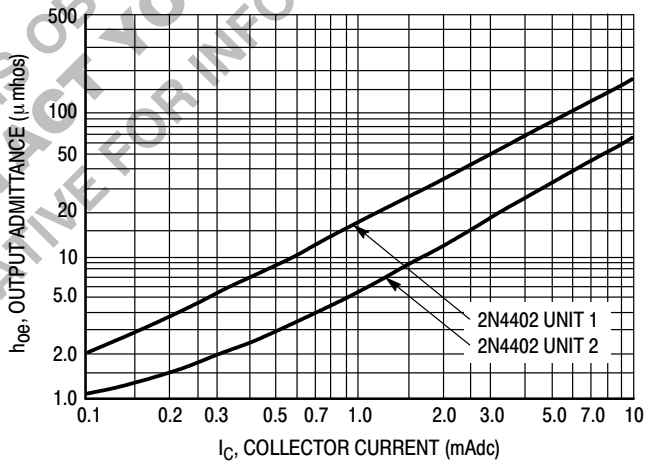

Figure 13. Output Admittance

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STATIC CHARACTERISTICS

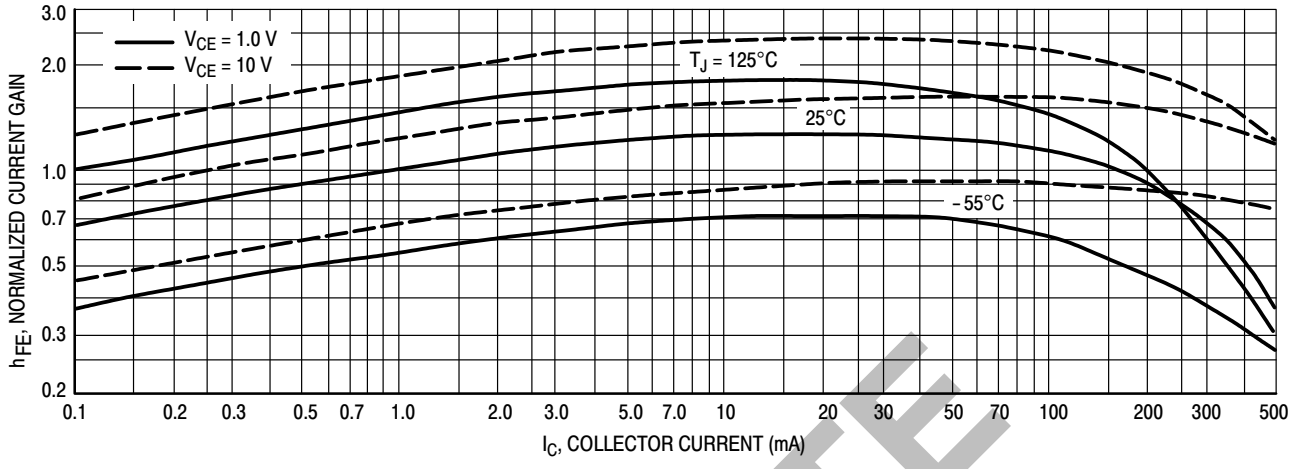

Figure 14. DC Current Gain

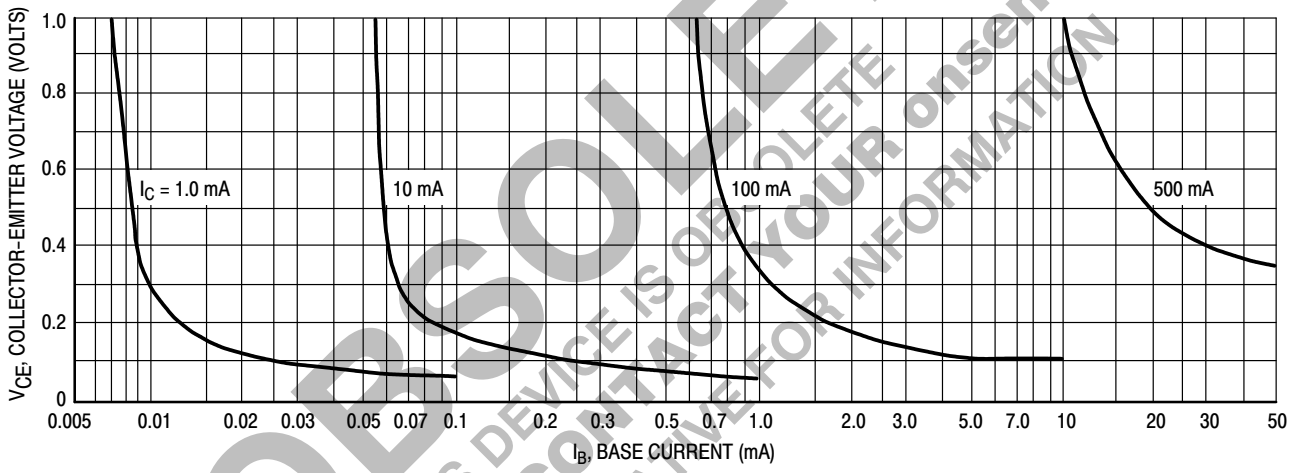

Figure 15. Collector Saturation Region

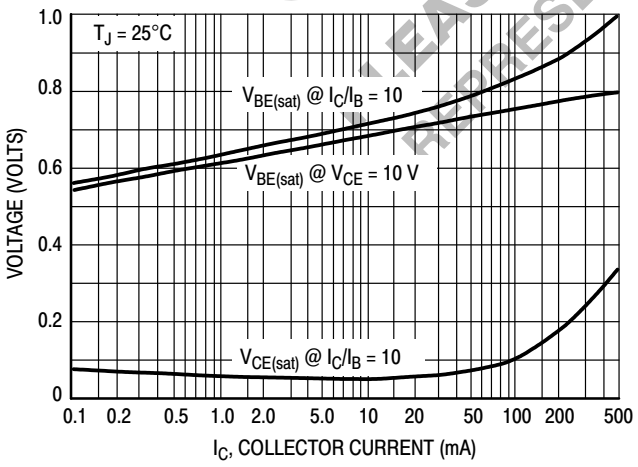

Figure 16. "On" Voltages

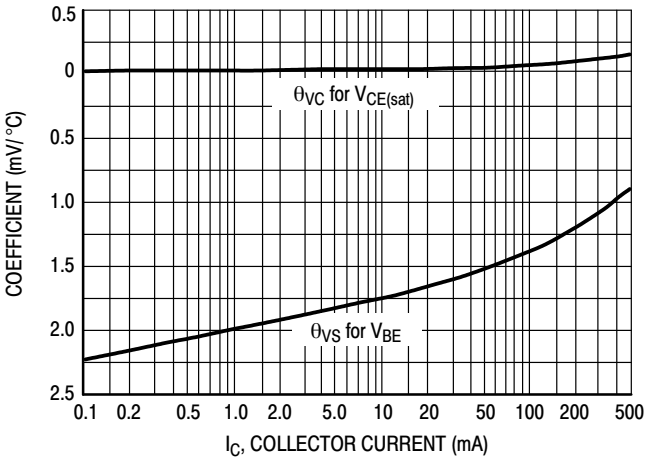

Figure 17. Temperature Coefficients

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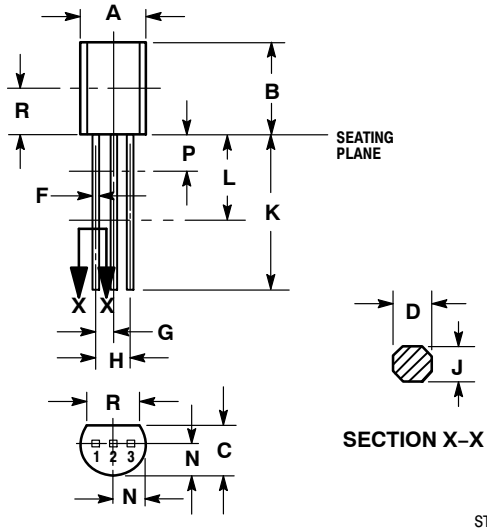
PACKAGE DIMENSIONS

CASE 029–11
(TO–226AA)
ISSUE AD



SECTION X–X

NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. DIMENSION F APPLIES BETWEEN P AND L. DIMENSIONS D AND J APPLY BETWEEN L AND K MIMIMUM. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.175	0.205	4.44	5.21
B	0.290	0.310	7.37	7.87
C	0.125	0.165	3.18	4.19
D	0.018	0.021	0.457	0.533
F	0.016	0.019	0.407	0.482
G	0.045	0.055	1.15	1.39
H	0.095	0.105	2.42	2.66
J	0.018	0.024	0.46	0.61
K	0.500	---	12.70	---
L	0.250	---	6.35	---
N	0.080	0.105	2.04	2.66
P	---	0.100	---	2.54
R	0.135	---	3.43	---

STYLE 1:
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2. BASE
3. COLLECTOR

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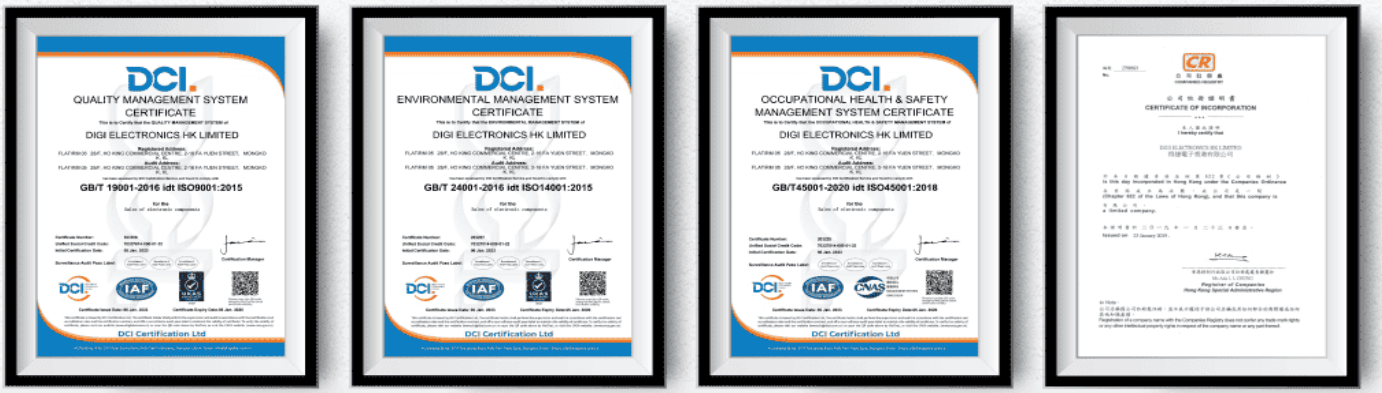

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