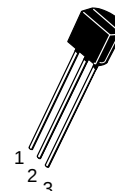
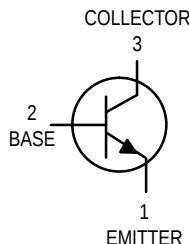


High Voltage Transistors

NPN Silicon

MPSA42*
MPSA43

*Motorola Preferred Device



CASE 29-11, STYLE 1
TO-92 (TO-226AA)

MAXIMUM RATINGS

Rating	Symbol	MPSA42	MPSA43	Unit
Collector–Emitter Voltage	V_{CEO}	300	200	Vdc
Collector–Base Voltage	V_{CBO}	300	200	Vdc
Emitter–Base Voltage	V_{EBO}	6.0	6.0	Vdc
Collector Current — Continuous	I_C	500		mAdc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	625	5.0	mW mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	1.5	12	Watts mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	–55 to +150		$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	200	$^\circ\text{C}/\text{mW}$
Thermal Resistance, Junction to Case	$R_{\theta JC}$	83.3	$^\circ\text{C}/\text{mW}$

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

Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage ⁽¹⁾ ($I_C = 1.0 \text{ mAdc}$, $I_B = 0$)	MPSA42 MPSA43	$V_{(BR)CEO}$	300 200	— —	Vdc
Collector–Base Breakdown Voltage ($I_C = 100 \mu\text{Adc}$, $I_E = 0$)	MPSA42 MPSA43	$V_{(BR)CBO}$	300 200	— —	Vdc
Emitter–Base Breakdown Voltage ($I_E = 100 \mu\text{Adc}$, $I_C = 0$)		$V_{(BR)EBO}$	6.0	—	Vdc
Collector Cutoff Current ($V_{CB} = 200 \text{ Vdc}$, $I_E = 0$) ($V_{CB} = 160 \text{ Vdc}$, $I_E = 0$)	MPSA42 MPSA43	I_{CBO}	— —	0.1 0.1	μAdc
Emitter Cutoff Current ($V_{EB} = 6.0 \text{ Vdc}$, $I_C = 0$) ($V_{EB} = 4.0 \text{ Vdc}$, $I_C = 0$)	MPSA42 MPSA43	I_{EBO}	— —	0.1 0.1	μAdc

1. Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2.0\%$.

Preferred devices are Motorola recommended choices for future use and best overall value.



MPSA42 MPSA43**ELECTRICAL CHARACTERISTICS** ($T_A = 25^\circ\text{C}$ unless otherwise noted) (Continued)

Characteristic	Symbol	Min	Max	Unit
ON CHARACTERISTICS⁽¹⁾				
DC Current Gain ($I_C = 1.0\text{ mA}$, $V_{CE} = 10\text{ Vdc}$) ($I_C = 10\text{ mA}$, $V_{CE} = 10\text{ Vdc}$) ($I_C = 30\text{ mA}$, $V_{CE} = 10\text{ Vdc}$)	h_{FE}	25 40 40	— — —	—
Collector–Emitter Saturation Voltage ($I_C = 20\text{ mA}$, $I_B = 2.0\text{ mA}$) MPSA42 MPSA43	$V_{CE(sat)}$	— —	0.5 0.4	Vdc
Base–Emitter Saturation Voltage ($I_C = 20\text{ mA}$, $I_B = 2.0\text{ mA}$)	$V_{BE(sat)}$	—	0.9	Vdc
SMALL–SIGNAL CHARACTERISTICS				
Current–Gain — Bandwidth Product ($I_C = 10\text{ mA}$, $V_{CE} = 20\text{ Vdc}$, $f = 100\text{ MHz}$)	f_T	50	—	MHz
Collector–Base Capacitance ($V_{CB} = 20\text{ Vdc}$, $I_E = 0$, $f = 1.0\text{ MHz}$) MPSA42 MPSA43	C_{cb}	— —	3.0 4.0	pF

1. Pulse Test: Pulse Width $\leq 300\text{ }\mu\text{s}$, Duty Cycle $\leq 2.0\%$.

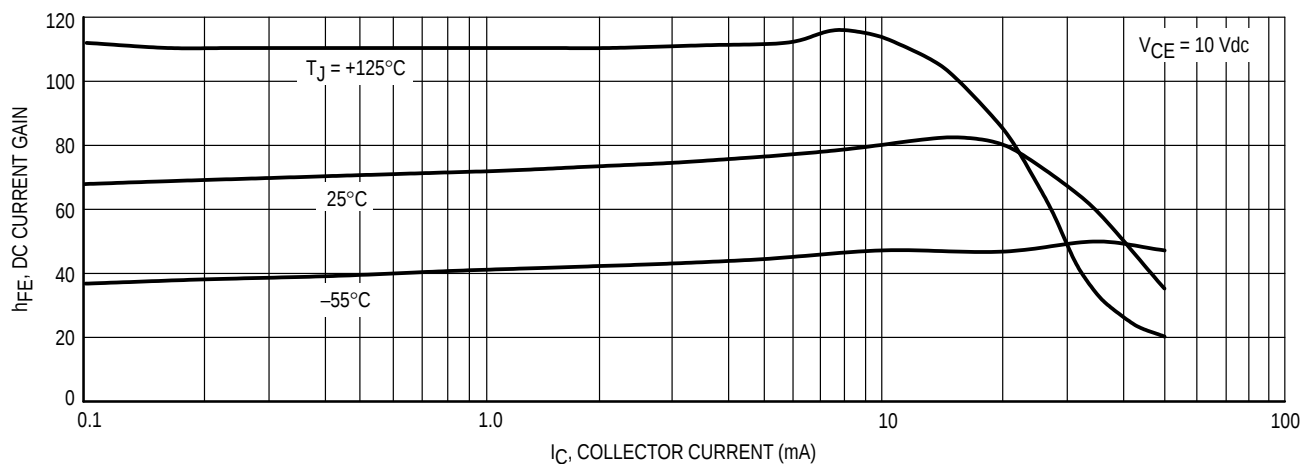


Figure 1. DC Current Gain

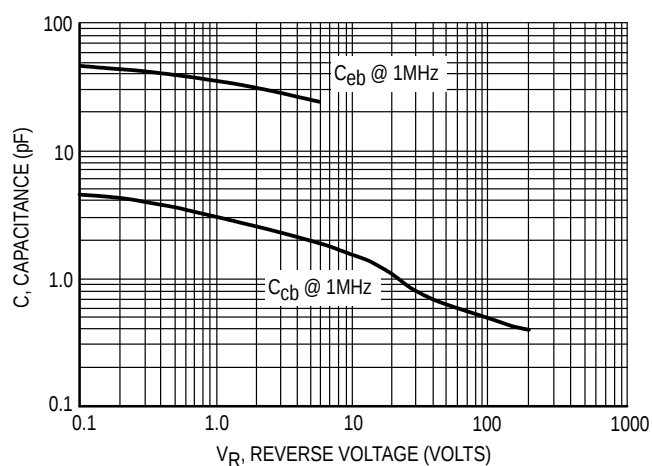


Figure 2. Capacitance

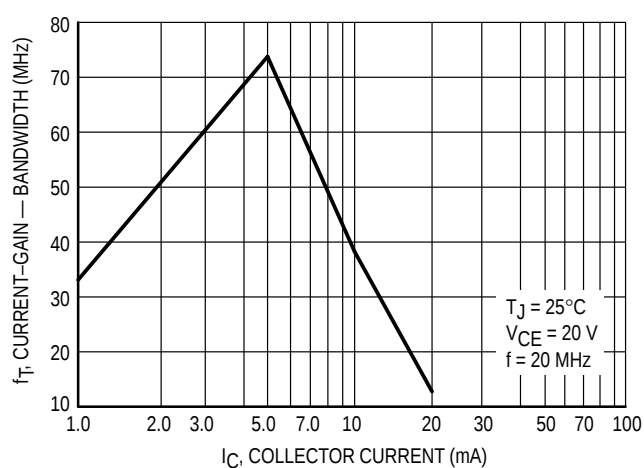


Figure 3. Current-Gain - Bandwidth

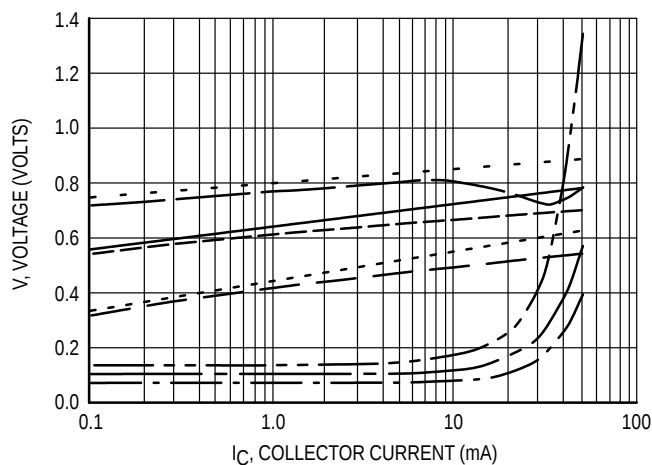
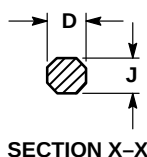
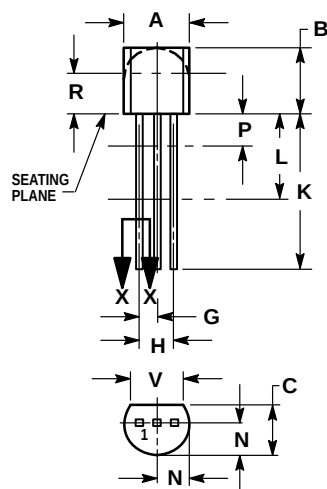


Figure 4. "ON" Voltages

- $V_{CE(sat)}$ @ 25°C , $I_C/I_B = 10$
- $V_{CE(sat)}$ @ 125°C , $I_C/I_B = 10$
- $V_{CE(sat)}$ @ -55°C , $I_C/I_B = 10$
- $V_{BE(sat)}$ @ 25°C , $I_C/I_B = 10$
- $V_{BE(sat)}$ @ 125°C , $I_C/I_B = 10$
- $V_{BE(sat)}$ @ -55°C , $I_C/I_B = 10$
- $V_{BE(on)}$ @ 25°C , $V_{CE} = 10 \text{ V}$
- $V_{BE(on)}$ @ 125°C , $V_{CE} = 10 \text{ V}$
- $V_{BE(on)}$ @ -55°C , $V_{CE} = 10 \text{ V}$

PACKAGE DIMENSIONS



**CASE 029-11
(TO-226AA)
ISSUE AJ**

NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.175	0.205	4.45	5.20
B	0.170	0.210	4.32	5.33
C	0.125	0.165	3.18	4.19
D	0.016	0.021	0.407	0.533
G	0.045	0.055	1.15	1.39
H	0.095	0.105	2.42	2.66
J	0.015	0.020	0.39	0.50
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	0.115	—	2.93	—
V	0.135	—	3.43	—

STYLE 1:

1. PIN 1. EMITTER
2. BASE
3. COLLECTOR

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