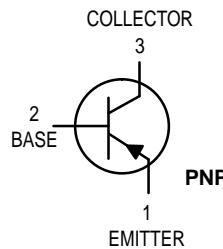
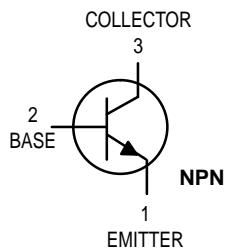


Amplifier Transistors



NPN
MPS650
MPS651*
PNP
MPS750
MPS751*

Voltage and current are
negative for PNP transistors

*Motorola Preferred Devices

MAXIMUM RATINGS

Rating	Symbol	MPS650 MPS750	MPS651 MPS751	Unit
Collector-Emitter Voltage	V_{CE}	40	60	Vdc
Collector-Base Voltage	V_{CB}	60	80	Vdc
Emitter-Base Voltage	V_{EB}		5.0	Vdc
Collector Current — Continuous	I_C		2.0	Adc
Total Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D		625 5.0	mW mW/ $^\circ\text{C}$
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D		1.5 12	Watt 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	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case	$R_{\theta JC}$	83.3	$^\circ\text{C/W}$

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				

Collector-Emitter Breakdown Voltage ⁽¹⁾ ($I_C = 10 \text{ mA}$, $I_B = 0$)	MPS650, MPS750 MPS651, MPS751	$V_{(\text{BR})\text{CEO}}$	40 60	— —	Vdc
Collector-Base Breakdown Voltage ($I_C = 100 \mu\text{A}$, $I_E = 0$)	MPS650, MPS750 MPS651, MPS751	$V_{(\text{BR})\text{CBO}}$	60 80	— —	Vdc
Emitter-Base Breakdown Voltage ($I_C = 0$, $I_E = 10 \mu\text{A}$)		$V_{(\text{BR})\text{EBO}}$	5.0	—	Vdc
Collector Cutoff Current ($V_{CB} = 60 \text{ Vdc}$, $I_E = 0$) ($V_{CB} = 80 \text{ Vdc}$, $I_E = 0$)	MPS650, MPS750 MPS651, MPS751	I_{CBO}	— —	0.1 0.1	μAdc
Emitter Cutoff Current ($V_{EB} = 4.0 \text{ V}$, $I_C = 0$)		I_{EBO}	—	0.1	μAdc

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

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

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

Characteristic	Symbol	Min	Max	Unit
ON CHARACTERISTICS(1)				
DC Current Gain (I _C = 50 mA, V _{CE} = 2.0 V) (I _C = 500 mA, V _{CE} = 2.0 V) (I _C = 1.0 A, V _{CE} = 2.0 V) (I _C = 2.0 A, V _{CE} = 2.0 V)	h _{FE}	75 75 75 40	— — — —	— — — —
Collector-Emitter Saturation Voltage (I _C = 2.0 A, I _B = 200 mA) (I _C = 1.0 A, I _B = 100 mA)	V _{CE(sat)}	— —	0.5 0.3	V _{dc}
Base-Emitter On Voltage (I _C = 1.0 A, V _{CE} = 2.0 V)	V _{BE(on)}	—	1.0	V _{dc}
Base-Emitter Saturation Voltage (I _C = 1.0 A, I _B = 100 mA)	V _{BE(sat)}	—	1.2	V _{dc}

SMALL-SIGNAL CHARACTERISTICS

Current-Gain — Bandwidth Product ⁽²⁾ (I _C = 50 mA _{dc} , V _{CE} = 5.0 V _{dc} , f = 100 MHz)	f _T	75	—	MHz
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1. Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle = 2.0%.
 2. f_T is defined as the frequency at which |h_{fe}| extrapolates to unity.

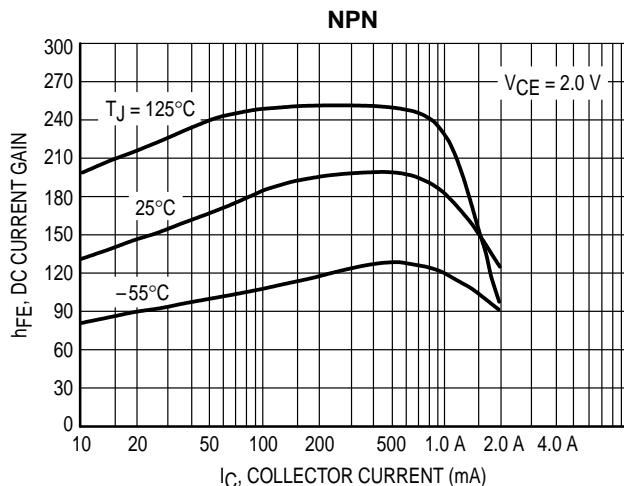


Figure 1. MPS650, MPS651
Typical DC Current Gain

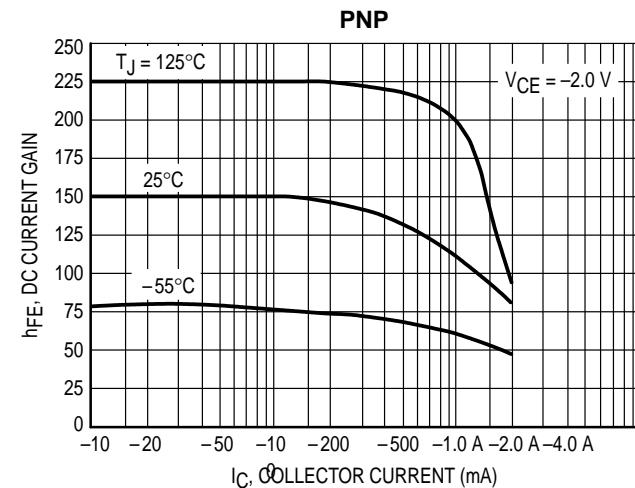


Figure 2. MPS750, MPS751
Typical DC Current Gain

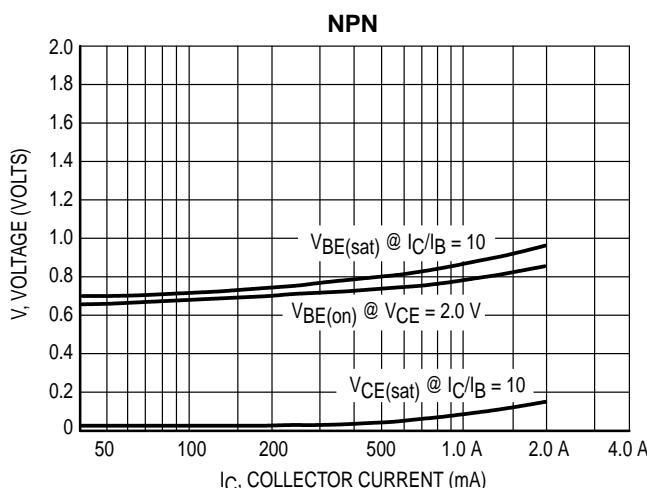


Figure 3. MPS650, MPS651
On Voltages

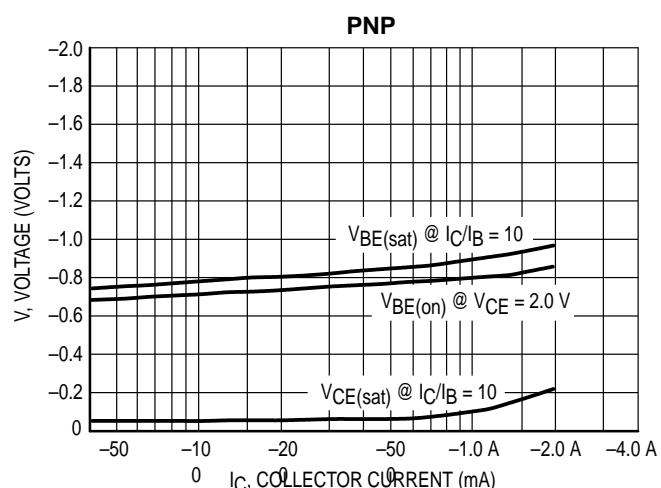
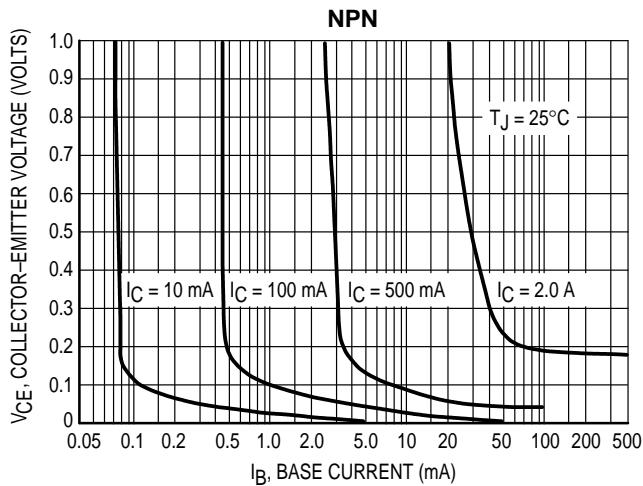
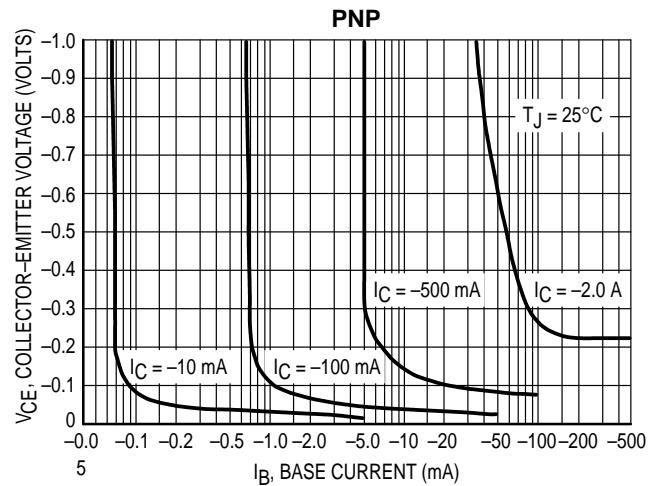


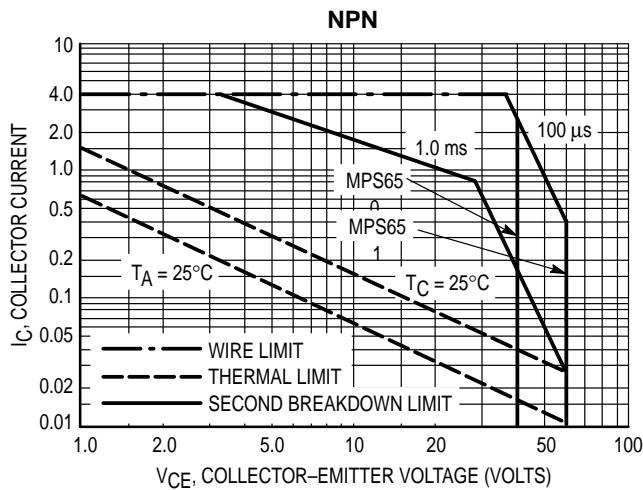
Figure 4. MPS750, MPS751
On Voltages



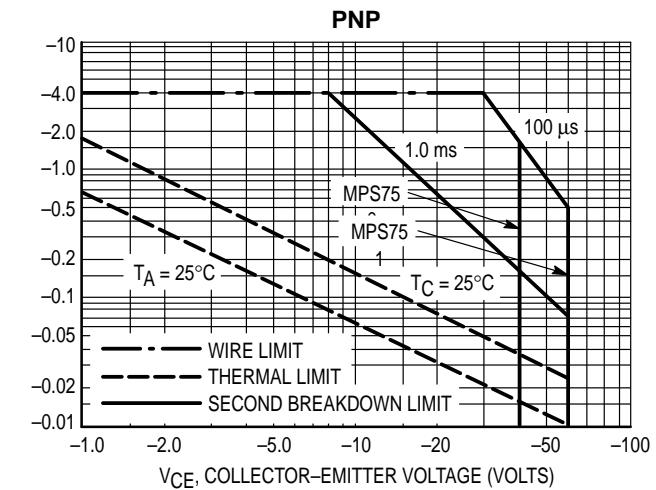
**Figure 5. MPS650, MPS651
Collector Saturation Region**



**Figure 6. MPS750, MPS751
Collector Saturation Region**

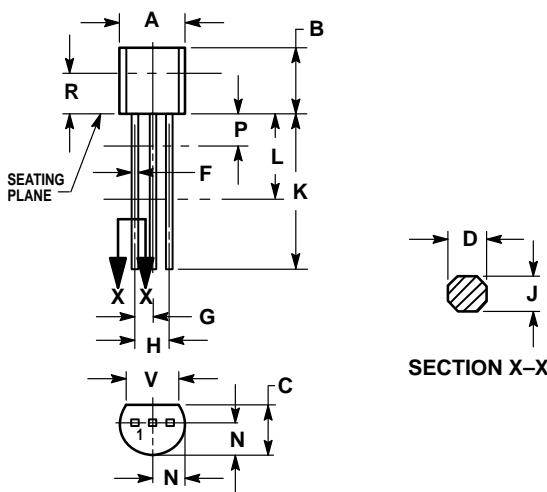


**Figure 7. MPS650, MPS651 SOA,
Safe Operating Area**



**Figure 8. MPS750, MPS751 SOA,
Safe Operating Area**

PACKAGE DIMENSIONS



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. DIMENSION D AND J APPLY BETWEEN L AND K MINIMUM. 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	0.022	0.41	0.55
F	0.016	0.019	0.41	0.48
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	—

**CASE 029-04
(TO-226AA)
ISSUE AD**

STYLE 1:
PIN 1. Emitter
2. Base
3. Collector

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