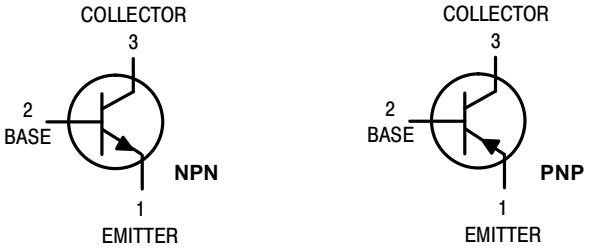
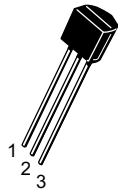
Amplifier Transistors



NPN
MPS650
MPS651*
PNP
MPS750
MPS751*

Voltage and current are negative for PNP transistors

***ON Semiconductor Preferred Devices**



CASE 29–10, STYLE 1
TO–92 (TO–226AL)

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°C Derate above 25°C	P_D	625 5.0		mW mW/°C
Total Power Dissipation @ T_C = 25°C Derate above 25°C	P_D	1.5 12		Watt 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	$R_{\theta JA}$	200	°C/W
Thermal Resistance, Junction to Case	$R_{\theta JC}$	83.3	°C/W

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

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector–Emitter Breakdown Voltage[1] (I_C = 10 mAdc, I_B = 0)	 MPS650, MPS750 MPS651, MPS751	$V_{(BR)CEO}$	 40 60	 — —	Vdc
Collector–Base Breakdown Voltage (I_C = 100 μAdc, I_E = 0)	 MPS650, MPS750 MPS651, MPS751	$V_{(BR)CBO}$	 60 80	 — —	Vdc
Emitter–Base Breakdown Voltage (I_C = 0, I_E = 10 μAdc)		$V_{(BR)EBO}$	5.0	—	Vdc
Collector Cutoff Current (V_{CB} = 60 Vdc, I_E = 0) (V_{CB} = 80 Vdc, I_E = 0)	 MPS650, MPS750 MPS651, MPS751	I_{CBO}	 — —	 0.1 0.1	μAdc
Emitter Cutoff Current (V_{EB} = 4.0 V, I_C = 0)		I_{EBO}	—	0.1	μAdc

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

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

March, 2001 – Rev. 1
Publication Order Number:
MPS650/D

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

Characteristic	Symbol	Min	Max	Unit
ON CHARACTERISTICS[1]				
DC Current Gain	h_{FE}			—
(I_C = 50 mA, V_{CE} = 2.0 V)		75	—	
(I_C = 500 mA, V_{CE} = 2.0 V)		75	—	
(I_C = 1.0 A, V_{CE} = 2.0 V)		75	—	
(I_C = 2.0 A, V_{CE} = 2.0 V)		40	—	
Collector–Emitter Saturation Voltage	$V_{CE(sat)}$			Vdc
(I_C = 2.0 A, I_B = 200 mA)		—	0.5	
(I_C = 1.0 A, I_B = 100 mA)		—	0.3	
Base–Emitter On Voltage (I_C = 1.0 A, V_{CE} = 2.0 V)	$V_{BE(on)}$	—	1.0	Vdc
Base–Emitter Saturation Voltage (I_C = 1.0 A, I_B = 100 mA)	$V_{BE(sat)}$	—	1.2	Vdc
SMALL–SIGNAL CHARACTERISTICS				
Current–Gain — Bandwidth Product[2] (I_C = 50 mAdc, V_{CE} = 5.0 Vdc, f = 100 MHz)	f_T	75	—	MHz

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle = 2.0%.
2. f_T is defined as the frequency at which $|h_{fe}|$ extrapolates to unity.

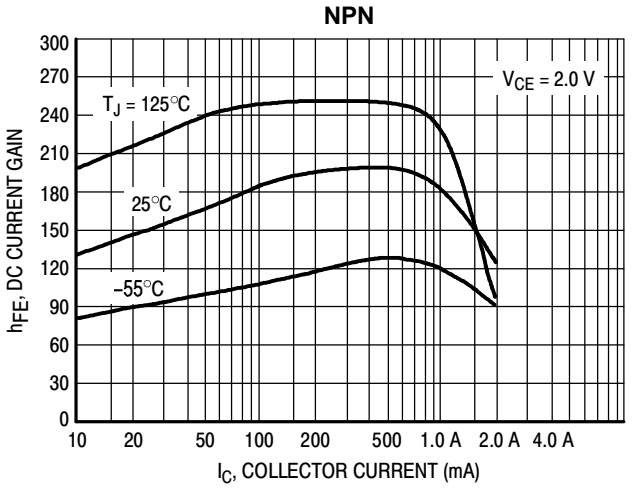


Figure 1. MPS650, MPS651 Typical DC Current Gain

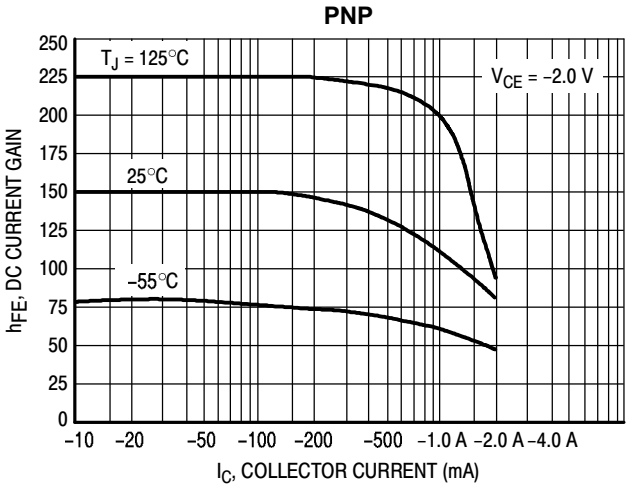


Figure 2. MPS750, MPS751 Typical DC Current Gain

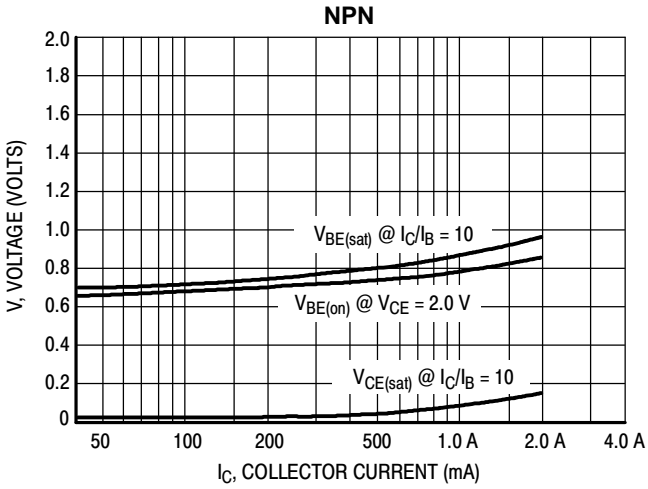


Figure 3. MPS650, MPS651 On Voltages

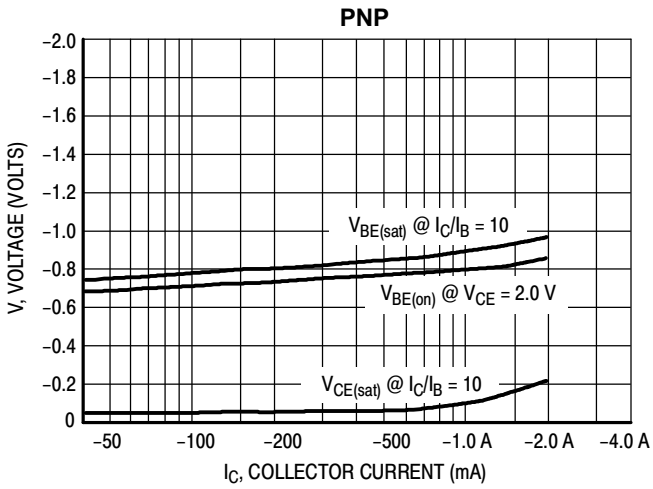


Figure 4. MPS750, MPS751 On Voltages

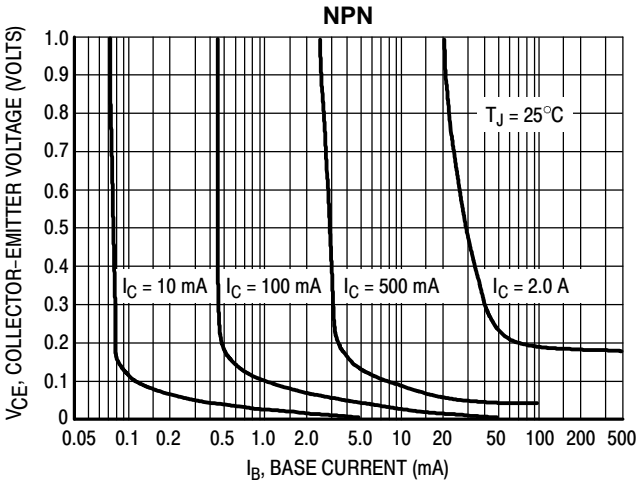


Figure 5. MPS650, MPS651 Collector Saturation Region

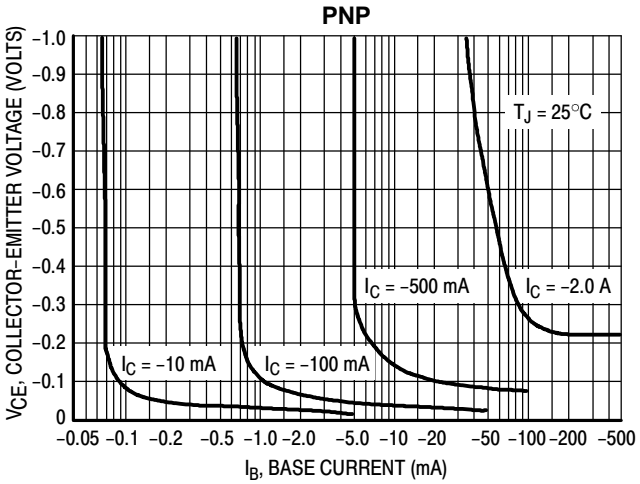


Figure 6. MPS750, MPS751 Collector Saturation Region

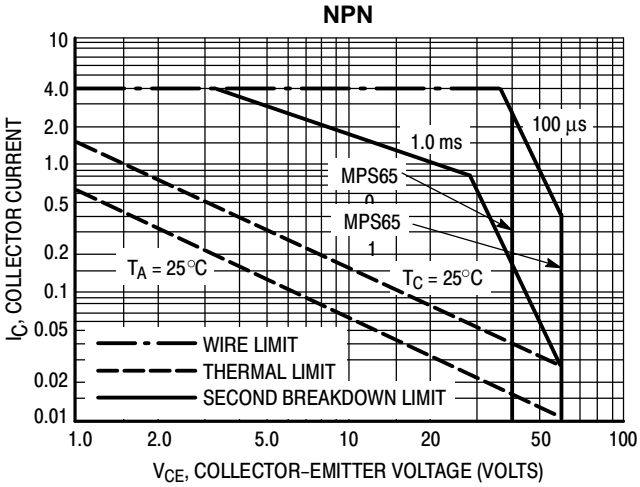


Figure 7. MPS650, MPS651 SOA, Safe Operating Area

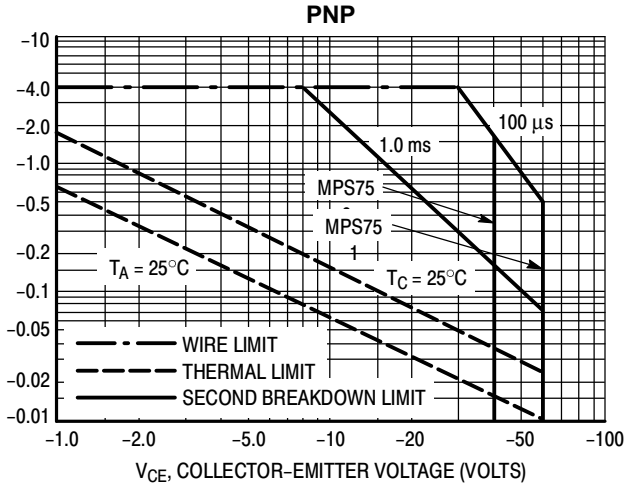


Figure 8. MPS750, MPS751 SOA, Safe Operating Area