MPS650, MPS651, NPN
MPS750, MPS751, PNP

MPS651 and MPS751 are Preferred Devices

Amplifier Transistors

ON Semiconductor®

http://onsemi.com

Features

- Pb−Free Packages are Available*

MAXIMUM RATINGS

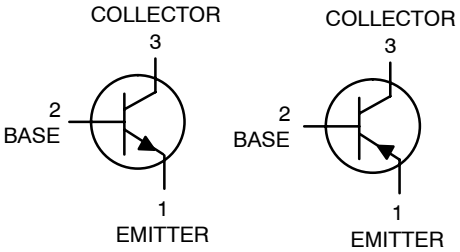
Rating	Symbol	MPS650 MPS750	MPS651 MPS751	Unit
Collector − Emitter Voltage	V_{CE}	40	60	Vdc
Collector − Base Voltage	V_{CB}	60	80	Vdc
Emitter − Base Voltage	V_{EB}	5.0		Vdc
Collector Current − Continuous	I_C	2.0		Adc
Total Power Dissipation @ T_A = 25°C Derate above 25°C	P_D	625 5.0		mW mW/°C
Total Power Dissipation @ T_C = 25°C Derate above 25°C	P_D	1.5 12		W mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−55 to +150		°C

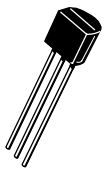
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

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

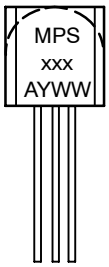
*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.





TO−92
CASE 29−11

MARKING DIAGRAM



xxx = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 5 of this data sheet.

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

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

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector – Emitter Breakdown Voltage (Note 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
ON CHARACTERISTICS (Note 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	Vdc
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 (Note 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.

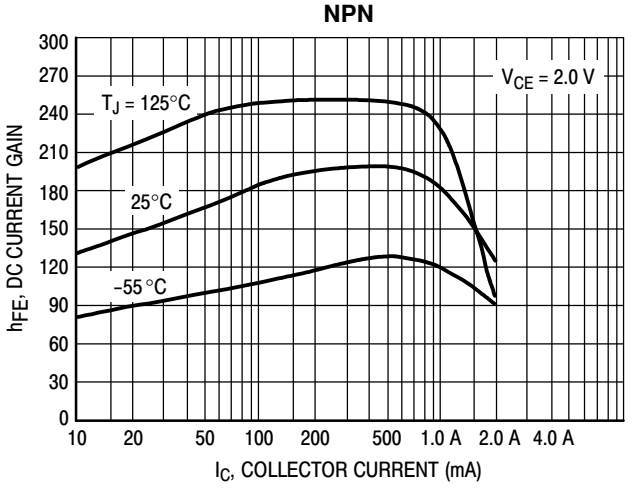


Figure 1. MPS650, MPS651 Typical DC Current Gain

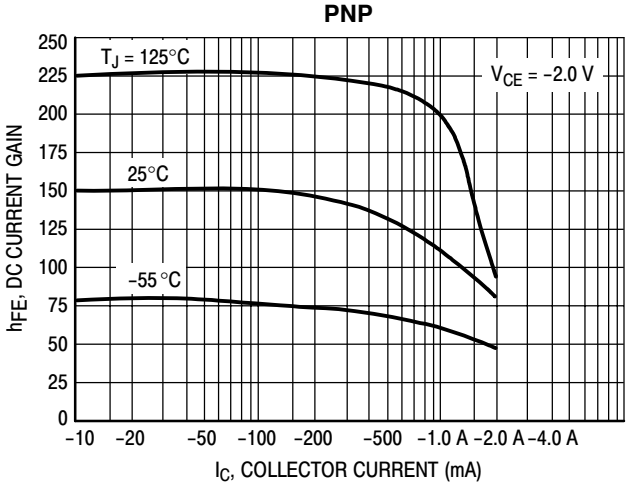


Figure 2. MPS750, MPS751 Typical DC Current Gain

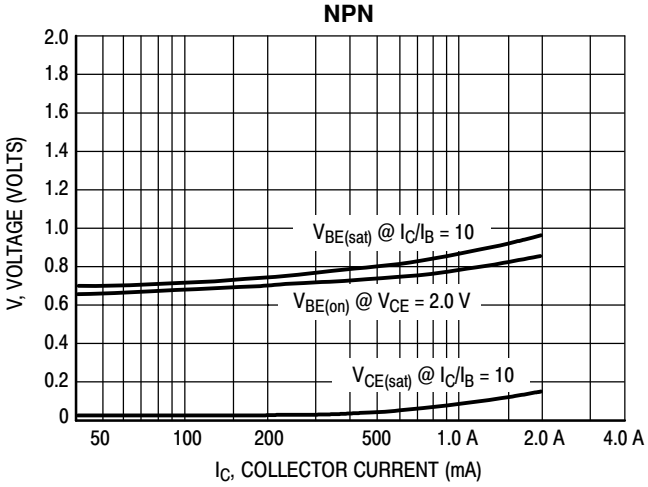


Figure 3. MPS650, MPS651 On Voltages

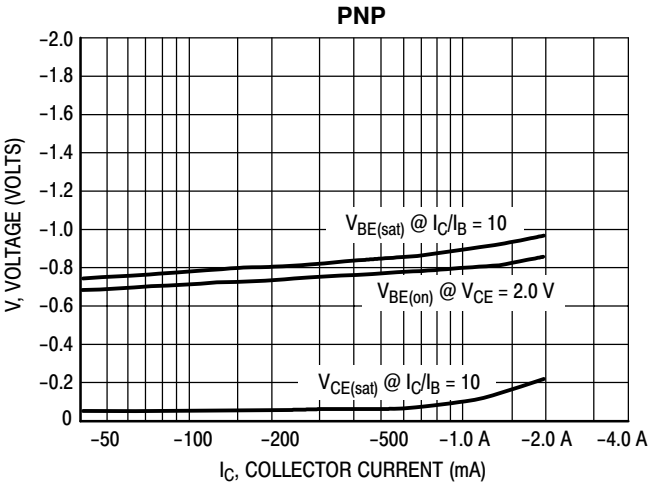


Figure 4. MPS750, MPS751 On Voltages

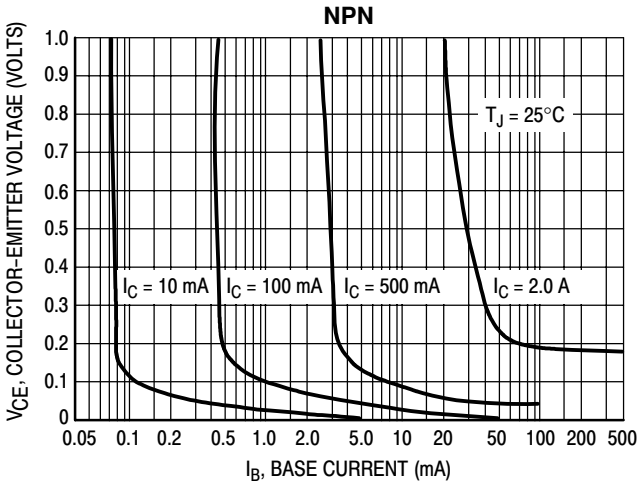


Figure 5. MPS650, MPS651 Collector Saturation Region

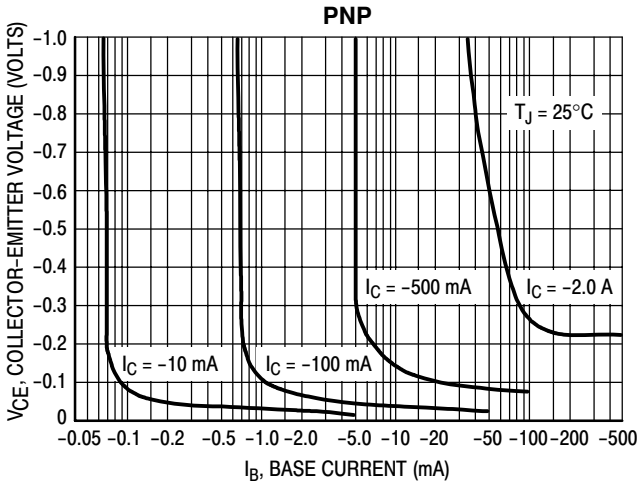


Figure 6. MPS750, MPS751 Collector Saturation Region

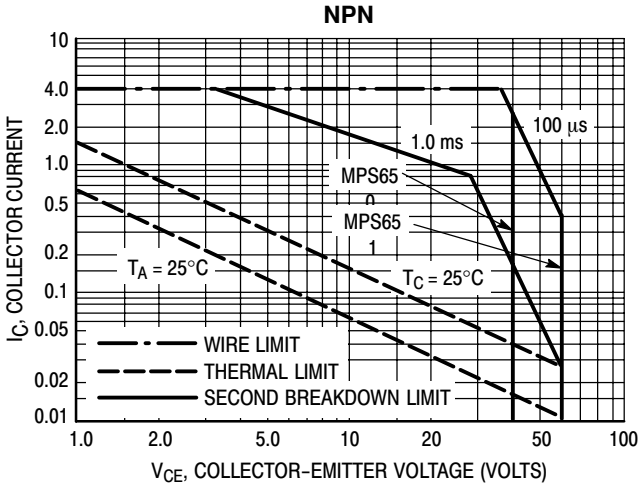


Figure 7. MPS650, MPS651 SOA, Safe Operating Area

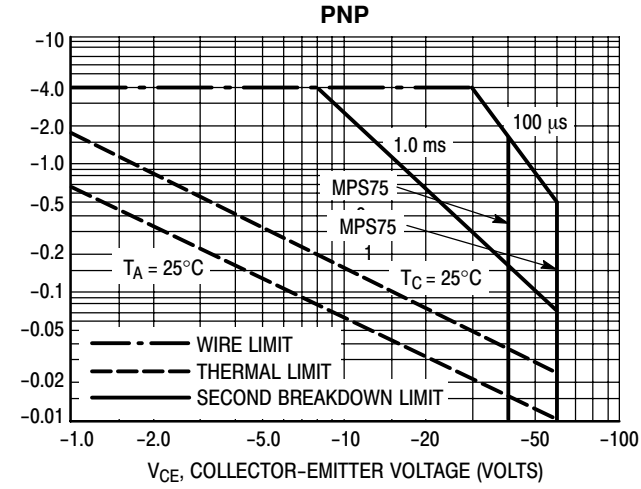


Figure 8. MPS750, MPS751 SOA, Safe Operating Area

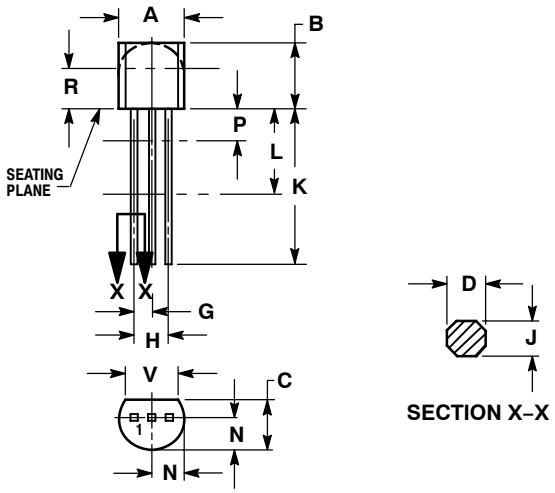
ORDERING INFORMATION

Device	Package	Shipping†
MPS650	TO−92	5000 Units / Bulk
MPS650G	TO−92 (Pb−Free)	5000 Units / Bulk
MPS650RLRA	TO−92	2000 / Tape & Reel
MPS650RLRAG	TO−92 (Pb−Free)	2000 / Tape & Reel
MPS650ZL1	TO−92	2000 / Tape & Ammunition
MPS650ZL1G	TO−92 (Pb−Free)	2000 / Tape & Ammunition
MPS651	TO−92	5000 Units / Bulk
MPS651G	TO−92 (Pb−Free)	5000 Units / Bulk
MPS651RLRA	TO−92	2000 / Tape & Reel
MPS651RLRAG	TO−92 (Pb−Free)	2000 / Tape & Reel
MPS651RLRBG	TO−92 (Pb−Free)	2000 / Tape & Reel
MPS651RLRM	TO−92	2000 / Tape & Ammunition
MPS651RLRMG	TO−92 (Pb−Free)	2000 / Tape & Ammunition
MPS750	TO−92	5000 Units / Bulk
MPS750G	TO−92 (Pb−Free)	5000 Units / Bulk
MPS750RLRA	TO−92	2000 / Tape & Reel
MPS750RLRAG	TO−92 (Pb−Free)	2000 / Tape & Reel
MPS750RLRP	TO−92	2000 / Tape & Ammunition
MPS750RLRPG	TO−92 (Pb−Free)	2000 / Tape & Ammunition
MPS751	TO−92	5000 Units / Bulk
MPS751G	TO−92 (Pb−Free)	5000 Units / Bulk
MPS751RLRA	TO−92	2000 / Tape & Reel
MPS751RLRAG	TO−92 (Pb−Free)	2000 / Tape & Reel
MPS751RLRP	TO−92	2000 / Tape & Ammunition
MPS751RLRPG	TO−92 (Pb−Free)	2000 / Tape & Ammunition
MPS751ZL1	TO−92	2000 / Tape & Ammunition
MPS751ZL1G	TO−92 (Pb−Free)	2000 / Tape & Ammunition

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

PACKAGE DIMENSIONS

TO−92 (TO−226)
CASE 29−11
ISSUE AL



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.

	INCHES		MILLIMETERS	
DIM	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	---

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
P.O. Box 61312, Phoenix, Arizona 85082−1312 USA
Phone: 480−829−7710 or 800−344−3860 Toll Free USA/Canada
Fax: 480−829−7709 or 800−344−3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800−282−9855 Toll Free USA/Canada

Japan: ON Semiconductor, Japan Customer Focus Center
2−9−1 Kamimeguro, Meguro−ku, Tokyo, Japan 153−0051
Phone: 81−3−5773−3850

ON Semiconductor Website: http://onsemi.com

Order Literature: http://www.onsemi.com/litorder

For additional information, please contact your local Sales Representative.

MPS650/D