MPS6602 and MPS6652 are Preferred Devices

Amplifier Transistors

Features

- Voltage and Current are Negative for PNP Transistors
- Pb-Free Packages are Available*

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector – Emitter Voltage MPS6601/6651 MPS6602/6652	V _{CEO}	25 40	Vdc
Collector – Base Voltage MPS6601/6651 MPS6602/6652	V _{CBO}	25 30	Vdc
Emitter – Base Voltage	V _{EBO}	4.0	Vdc
Collector Current – Continuous	I _C	1000	mAdc
Total Device Dissipation @ T _A = 25°C Derate above 25°C	P _D	625 5.0	W mW/°C
Total Device 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

THERMAL CHARACTERISTICS

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

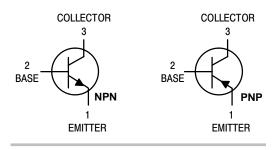
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. $R_{\theta JA}$ is measured with the device soldered into a typical printed circuit board.



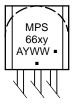
ON Semiconductor®

http://onsemi.com





MARKING DIAGRAM



MPS66xy = Device Code

x = 0 or 5

y = 1 or 2

A = Assembly Location

Y = Year
WW = Work Week
Pb-Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 7 of this data sheet.

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

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

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

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS			•	•	
Collector – Emitter Breakdown Voltage (I _C = 1.0 mAdc, I _B = 0)	MPS6601/6651 MPS6602/6652	V _{(BR)CEO}	25 40	_ _	Vdc
Collector – Base Breakdown Voltage ($I_C = 100 \mu Adc, I_E = 0$)	MPS6601/6651 MPS6602/6652	V _{(BR)CBO}	25 40	_ _	Vdc
Emitter – Base Breakdown Voltage ($I_E = 10 \mu Adc, I_C = 0$)		V _{(BR)EBO}	4.0	-	Vdc
Collector Cutoff Current $(V_{CE} = 25 \text{ Vdc}, I_B = 0)$ $(V_{CE} = 30 \text{ Vdc}, I_B = 0)$	MPS6601/6651 MPS6602/6652	I _{CES}	- -	0.1 0.1	μAdc
Collector Cutoff Current $(V_{CB} = 25 \text{ Vdc}, I_E = 0)$ $(V_{CB} = 30 \text{ Vdc}, I_E = 0)$	MPS6601/6651 MPS6602/6652	I _{CBO}	- -	0.1 0.1	μAdc
ON CHARACTERISTICS					
DC Current Gain ($I_C = 100 \text{ mAdc}$, $V_{CE} = 1.0 \text{ Vdc}$) ($I_C = 500 \text{ mAdc}$, $V_{CE} = 1.0 \text{ Vdc}$) ($I_C = 1000 \text{ mAdc}$, $V_{CE} = 1.0 \text{ Vdc}$)		h _{FE}	50 50 30	- - -	-
Collector – Emitter Saturation Voltage (I _C = 1000 mAdc, I _B = 100 mAdc)		V _{CE(sat)}	_	0.6	Vdc
Base-Emitter On Voltage (I _C = 500 mAdc, V _{CE} = 1.0 Vdc)		V _{BE(on)}	_	1.2	Vdc
SMALL-SIGNAL CHARACTERISTICS					
Current – Gain — Bandwidth Product $(I_C = 50 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}, f = 100 \text{ MHz})$	Hz)	f _T	100	-	MHz
Output Capacitance (V _{CB} = 10 Vdc, I _E = 0, f = 1.0 MHz)		C _{obo}	_	30	pF
SWITCHING CHARACTERISTICS				•	
Delay Time		t _d	-	25	ns
Rise Time	$(V_{CC} = 40 \text{ Vdc}, I_{C} = 500 \text{ mAdc}, I_{B1} = 50 \text{ mAdc},$	t _r	-	30	ns
Storage Time	$t_p \ge 300 \text{ ns Duty Cycle}$	t _s	-	250	ns
Fall Time		t _f	_	50	ns

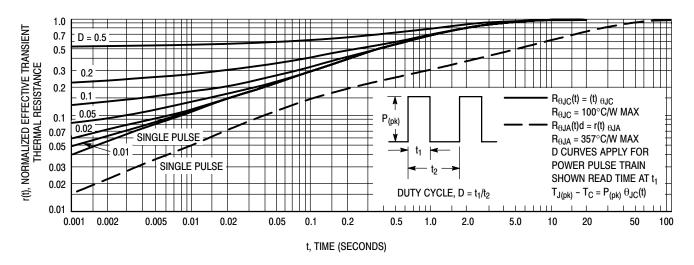
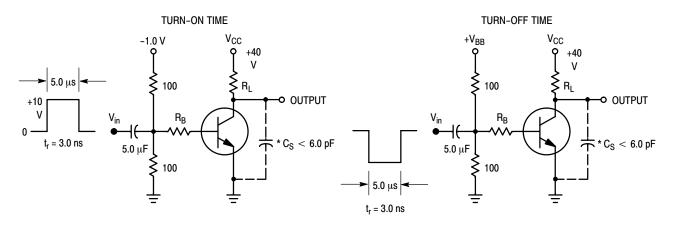


Figure 1. Thermal Response



*Total Shunt Capacitance of Test Jig and Connectors For PNP Test Circuits, Reverse All Voltage Polarities

Figure 2. Switching Time Test Circuits

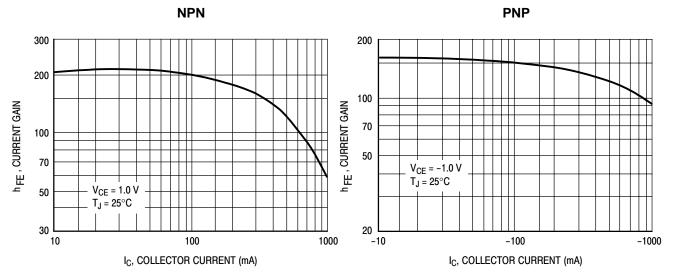


Figure 3. MPS6601/6602 DC Current Gain

Figure 4. MPS6651/6652 DC Current Gain

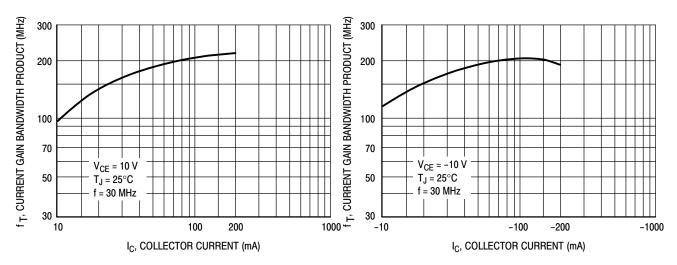


Figure 5. Current Gain Bandwidth Product

Figure 6. Current Gain Bandwidth Product

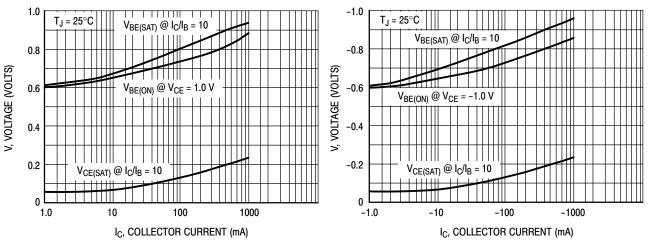


Figure 7. On Voltages

Figure 8. On Voltages

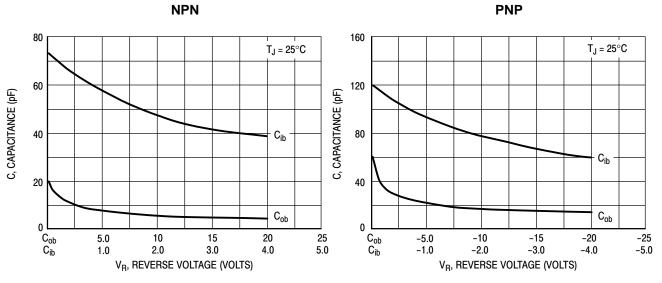


Figure 9. Capacitance

Figure 10. Capacitance

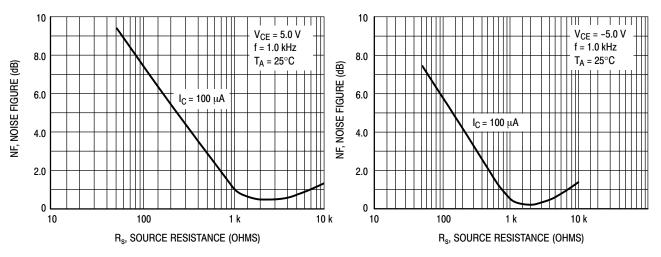


Figure 11. MPS6601/6602 Noise Figure

Figure 12. MPS6651/6652 Noise Figure

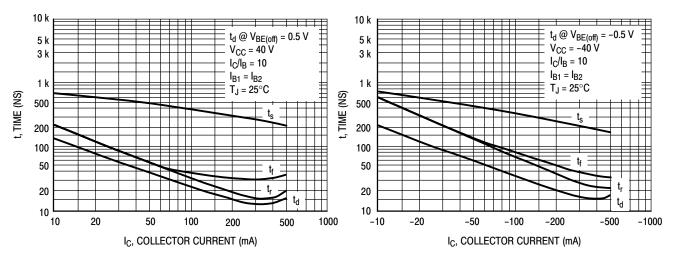


Figure 13. MPS6601/6602 Switching Times

Figure 14. MPS6651/6652 Switching Times

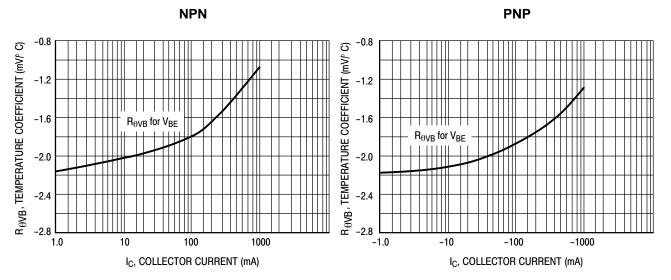


Figure 15. Base–Emitter Temperature Coefficient

Figure 16. Base–Emitter Temperature Coefficient

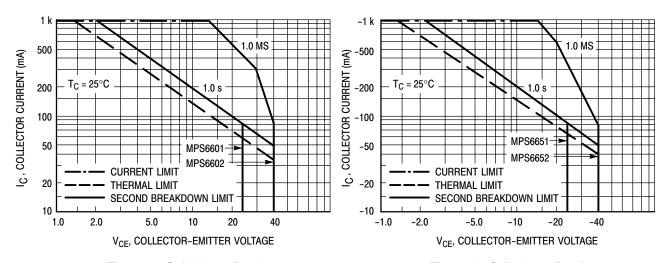


Figure 17. Safe Operating Area

Figure 18. Safe Operating Area

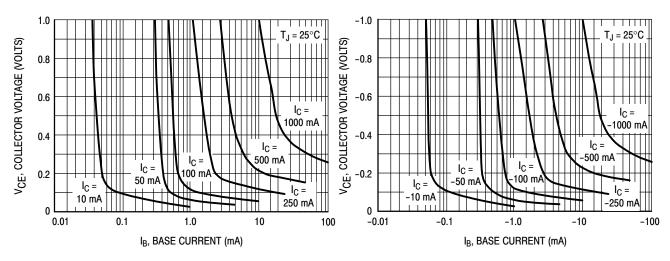


Figure 19. MPS6601/6602 Saturation Region

Figure 20. MPS6651/6652 Saturation Region

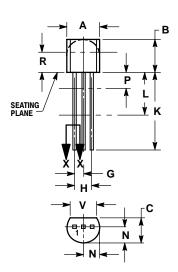
ORDERING INFORMATION

Device	Package	Shipping [†]	
MPS6601	TO-92 (TO-226)		
MPS6601G	TO-92 (TO-226) (Pb-Free)	5000 Units / Box	
MPS6601RLRA	TO-92 (TO-226)		
MPS6601RLRAG	TO-92 (TO-226) (Pb-Free)	2000 Units / Tape & Reel	
MPS6602	TO-92 (TO-226)		
MPS6602G	TO-92 (TO-226) (Pb-Free)	5000 Units / Box	
MPS6602RLRA	TO-92 (TO-226)		
MPS6602RLRAG	TO-92 (TO-226) (Pb-Free)	2000 Units / Tape & Reel	
MPS6651	TO-92 (TO-226)		
MPS6651G	TO-92 (TO-226) (Pb-Free)	5000 Units / Box	
MPS6652	TO-92 (TO-226)		
MPS6652G	TO-92 (TO-226) (Pb-Free)	5000 Units / Box	
MPS6652RLRA	TO-92 (TO-226)		
MPS6652RLRAG	TO-92 (TO-226) (Pb-Free)	2000 Units / Tape & Reel	
MPS6652RLRP	TO-92 (TO-226)	2000 Units / Tape & Ammo Box	
MPS6652RLRPG	TO-92 (TO-226) (Pb-Free)		

[†]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**





- DIMENSIONING AND TOLERANCING PER ANSI
- 114-3M, 1902.
 CONTROLLING DIMENSION: INCH.
 CONTOUR OF PACKAGE BEYOND DIMENSION R
 IS UNCONTROLLED.
 LEAD DIMENSION IS UNCONTROLLED IN P AND
- BEYOND DIMENSION K MINIMUM.

	INCHES		MILLIN	IETERS
DIM	MIN	MAX	MIN	MAX
Α	0.175	0.205	4.45	5.20
В	0.170	0.210	4.32	5.33
С	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
Н	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:

PIN 1. EMITTER

BASE

COLLECTOR

ON Semiconductor and un are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor P.O. Box 5163, Denver, Colorado 80217 USA

Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada

Email: orderlit@onsemi.com

N. American Technical Support: 800-282-9855 Toll Free

Europe, Middle East and Africa Technical Support: Phone: 421 33 790 2910

Japan Customer Focus Center

Phone: 81-3-5773-3850

ON Semiconductor Website: www.onsemi.com

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

For additional information, please contact your local Sales Representative