

NSBC114EPDXV6T1G, NSVBC114EPDXV6T1G Series

THERMAL CHARACTERISTICS

Characteristic (One Junction Heated)	Symbol	Max	Unit
Total Device Dissipation $T_A = 25^\circ\text{C}$ (Note 1) Derate above 25°C (Note 1)	P_D	357 2.9	mW mW/ $^\circ\text{C}$
Thermal Resistance (Note 1) Junction-to-Ambient	$R_{\theta JA}$	350	$^\circ\text{C/W}$
Characteristic (Both Junctions Heated)	Symbol	Max	Unit
Total Device Dissipation $T_A = 25^\circ\text{C}$ (Note 1) Derate above 25°C (Note 1)	P_D	500 4.0	mW mW/ $^\circ\text{C}$
Thermal Resistance (Note 1) Junction-to-Ambient	$R_{\theta JA}$	250	$^\circ\text{C/W}$
Junction and Storage Temperature	T_J, T_{stg}	-55 to +150	$^\circ\text{C}$

1. FR-4 @ Minimum Pad

DEVICE MARKING AND RESISTOR VALUES

Device	Package	Marking	R1 (k Ω)	R2 (k Ω)
NSBC114EPDXV6T1G	SOT-563	11	10	10
NSBC124EPDXV6T1G	SOT-563	12	22	22
NSBC144EPDXV6T1G	SOT-563	13	47	47
NSBC114YPDXV6T1G	SOT-563	14	10	47
NSVBC114YDXV6T1G	SOT-563	14	10	47
NSBC114TPDXV6T1G (Note 2)	SOT-563	15	10	∞
NSBC143TPDXV6T1G (Note 2)	SOT-563	16	4.7	∞
NSVB143TPDXV6T1G (Note 2)	SOT-563	16	4.7	∞
NSBC113EPDXV6T1G (Note 2)	SOT-563	30	1.0	1.0
NSBC123EPDXV6T1G (Note 2)	SOT-563	31	2.2	2.2
NSBC143EPDXV6T1G (Note 2)	SOT-563	32	4.7	4.7
NSBC143ZPDXV6T1G (Note 2)	SOT-563	33	4.7	47
NSBC124XPDXV6T1G (Note 2)	SOT-563	34	22	47
NSBC123JPDXV6T1G (Note 2)	SOT-563	35	2.2	47
NSVB123JPDXV6T1G (Note 2)	SOT-563	35	2.2	47

NSBC114EPDXV6T1G, NSVBC114EPDXV6T1G Series

ELECTRICAL CHARACTERISTICS

(T_A = 25°C unless otherwise noted, common for Q₁ and Q₂, – minus sign for Q₁ (PNP) omitted)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Base Cutoff Current (V _{CB} = 50 V, I _E = 0)	I _{CBO}	–	–	100	nAdc
Collector-Emitter Cutoff Current (V _{CE} = 50 V, I _B = 0)	I _{CEO}	–	–	500	nAdc
Emitter-Base Cutoff Current (V _{EB} = 6.0 V, I _C = 0)	I _{EBO}				mAdc
NSBC114EPDXV6T1G		–	–	0.5	
NSBC124EPDXV6T1G		–	–	0.2	
NSBC144EPDXV6T1G		–	–	0.1	
NSBC114YPDXV6T1G, NSVBC114YDXV6T1G		–	–	0.2	
NSBC114TPDXV6T1G		–	–	0.9	
NSBC143TPDXV6T1G, NSVB143TPDXV6T1G		–	–	1.9	
NSBC113EPDXV6T1G		–	–	4.3	
NSBC123EPDXV6T1G		–	–	2.3	
NSBC143EPDXV6T1G		–	–	1.5	
NSBC143ZPDXV6T1G		–	–	0.18	
NSBC124XPDXV6T1G		–	–	0.13	
NSBC123JPDXV6T1G, NSVB123JPDXV6T1G		–	–	0.2	
Collector-Base Breakdown Voltage (I _C = 10 μA, I _E = 0)	V _{(BR)CBO}	50	–	–	Vdc
Collector-Emitter Breakdown Voltage (Note 3) (I _C = 2.0 mA, I _B = 0)	V _{(BR)CEO}	50	–	–	Vdc

ON CHARACTERISTICS (Note 3)

DC Current Gain (V _{CE} = 10 V, I _C = 5.0 mA)	h _{FE}				
NSBC114EPDXV6T1G		35	60	–	
NSBC124EPDXV6T1G		60	100	–	
NSBC144EPDXV6T1G		80	140	–	
NSBC114YPDXV6T1G, NSVBC114YDXV6T1G		80	140	–	
NSBC114TPDXV6T1G		160	350	–	
NSBC143TPDXV6T1G, NSVB143TPDXV6T1G		160	350	–	
NSBC113EPDXV6T1G		3.0	5.0	–	
NSBC123EPDXV6T1G		8.0	15	–	
NSBC143EPDXV6T1G		15	30	–	
NSBC143ZPDXV6T1G		80	200	–	
NSBC124XPDXV6T1G		80	150	–	
NSBC123JPDXV6T1G, NSVB123JPDXV6T1G		80	140	–	
Collector-Emitter Saturation Voltage (I _C = 10 mA, I _B = 0.3 mA)	V _{CE(sat)}				Vdc
NSBC114EPDXV6T1G		–	–	0.25	
NSBC124EPDXV6T1G		–	–	0.25	
NSBC144EPDXV6T1G		–	–	0.25	
NSBC114YPDXV6T1G, NSVBC114YDXV6T1G		–	–	0.25	
NSBC143TPDXV6T1G, NSVB143TPDXV6T1G		–	–	0.25	
NSBC123JPDXV6T1G, NSVB123JPDXV6T1G		–	–	0.25	
(I _C = 10 mA, I _B = 5 mA)					
NSBC113EPDXV6T1G		–	–	0.25	
NSBC123EPDXV6T1G		–	–	0.25	
(I _C = 10 mA, I _B = 1 mA)					
NSBC114TPDXV6T1G		–	–	0.25	
NSBC143EPDXV6T1G		–	–	0.25	
NSBC143ZPDXV6T1G		–	–	0.25	
NSBC124XPDXV6T1G		–	–	0.25	

2. New resistor combinations. Updated curves to follow in subsequent data sheets.
3. Pulse Test: Pulse Width < 300 μs, Duty Cycle < 2.0%

ELECTRICAL CHARACTERISTICS

($T_A = 25^\circ\text{C}$ unless otherwise noted, common for Q_1 and Q_2 , – minus sign for Q_1 (PNP) omitted)

2. New resistor combinations. Updated curves to follow in subsequent data sheets.
3. Pulse Test: Pulse Width < 300 μ s, Duty Cycle < 2.0%

NSBC114EPDXV6T1G, NSVBC114EPDXV6T1G Series

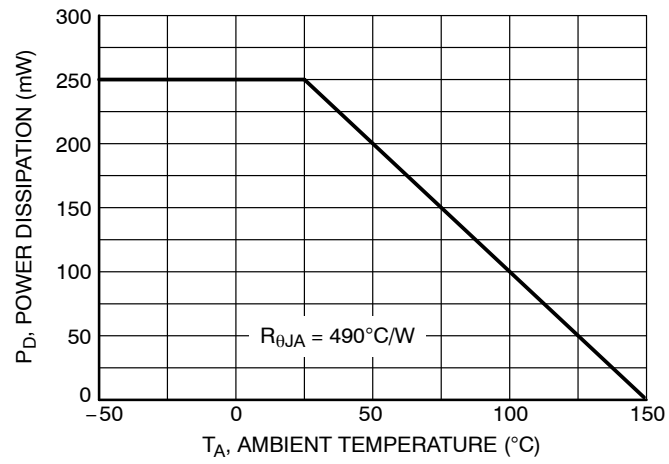


Figure 1. Derating Curve

NSBC114EPDXV6T1G, NSVBC114EPDXV6T1G Series

TYPICAL ELECTRICAL CHARACTERISTICS – NSBC114EPDXV6T1 NPN TRANSISTOR

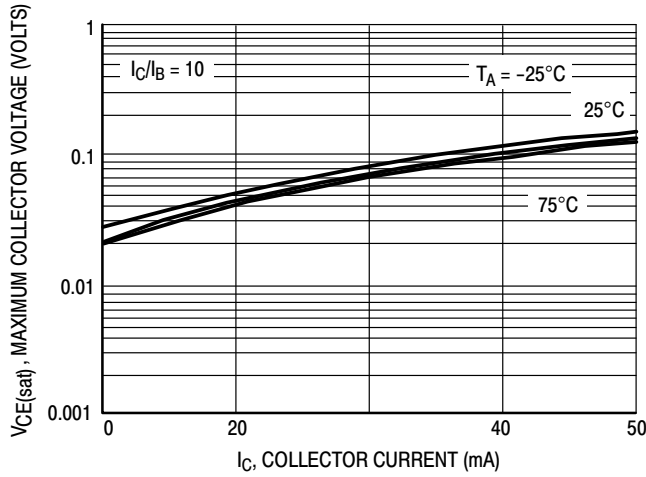


Figure 2. $V_{CE(sat)}$ versus I_C

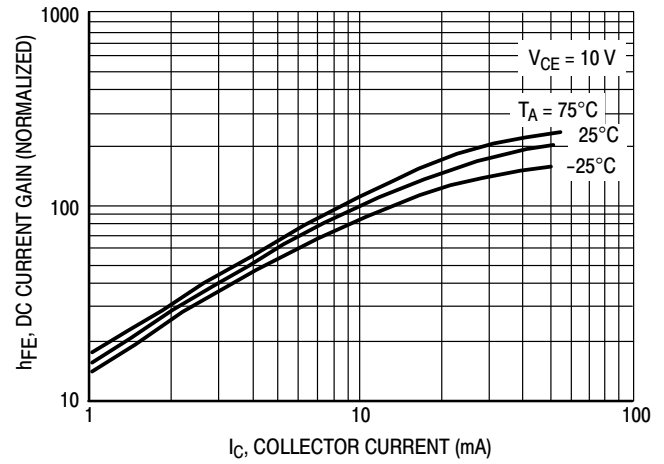


Figure 3. DC Current Gain

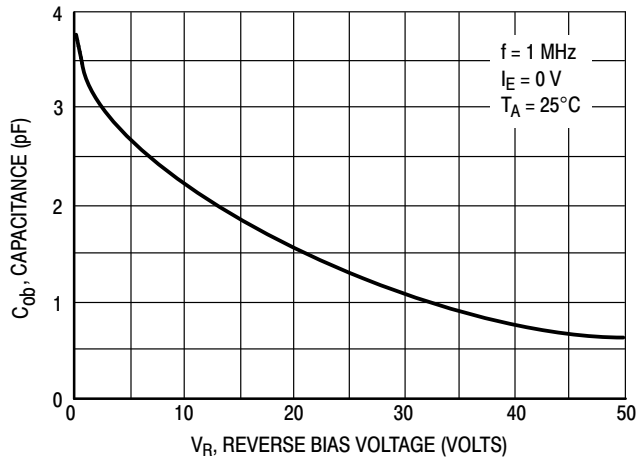


Figure 4. Output Capacitance

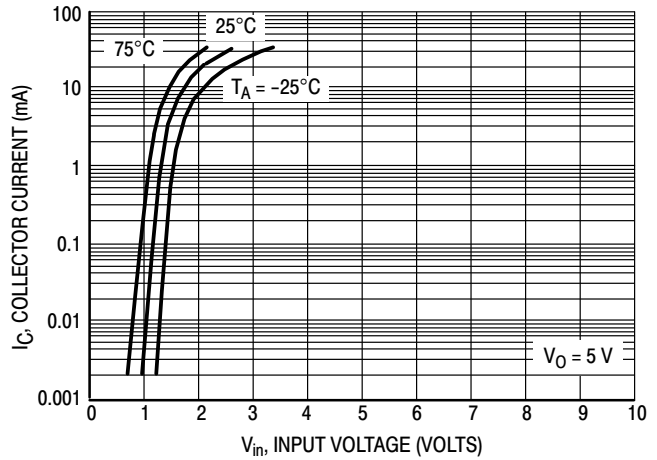


Figure 5. Output Current versus Input Voltage

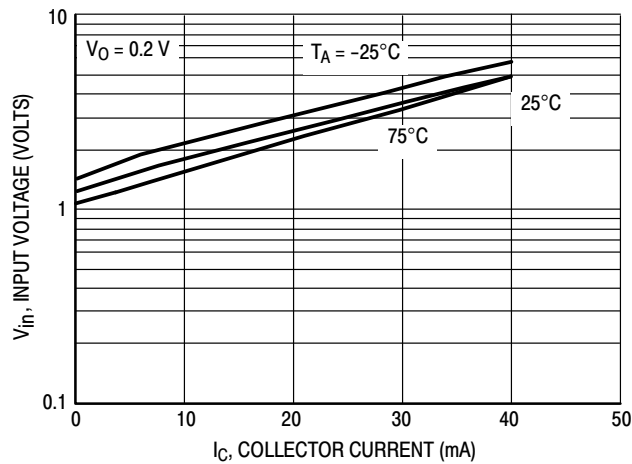


Figure 6. Input Voltage versus Output Current

NSBC114EPDXV6T1G, NSVBC114EPDXV6T1G Series

TYPICAL ELECTRICAL CHARACTERISTICS – NSBC114EPDXV6T1 PNP TRANSISTOR

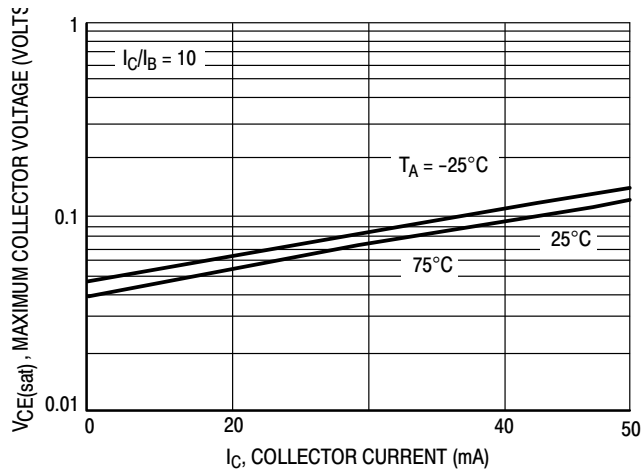


Figure 7. $V_{CE(sat)}$ versus I_C

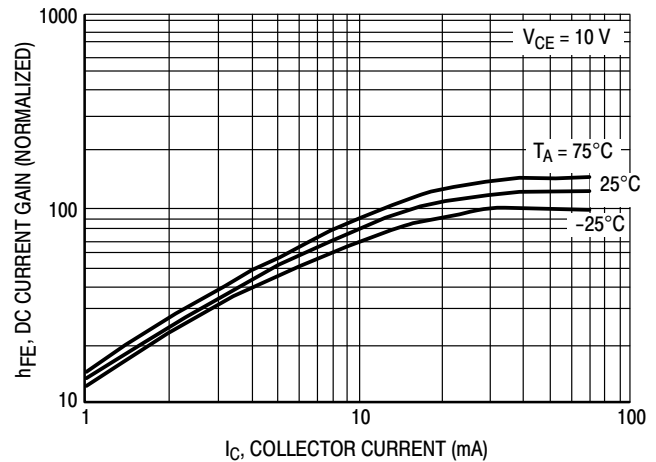


Figure 8. DC Current Gain

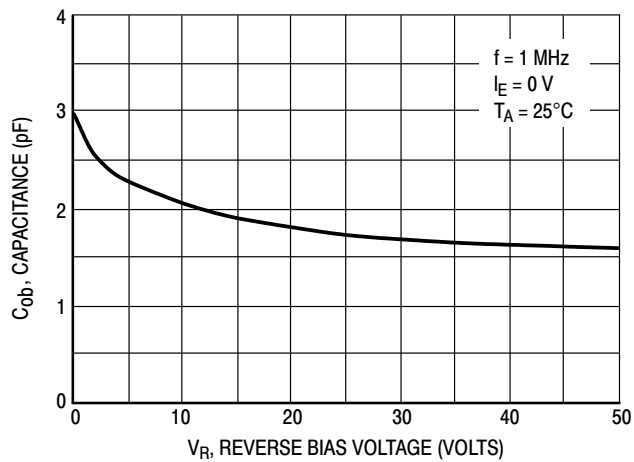


Figure 9. Output Capacitance

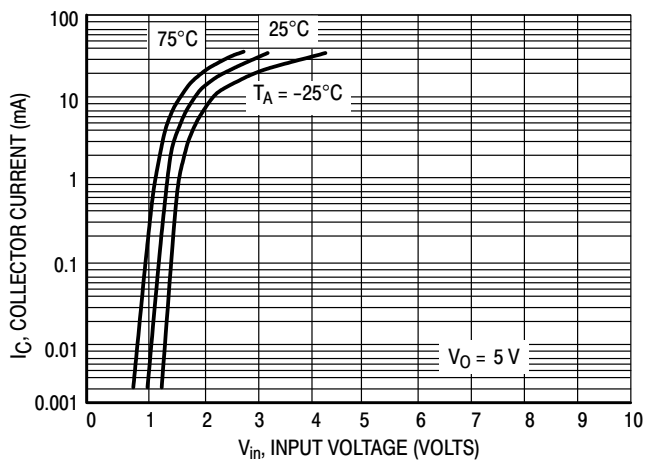


Figure 10. Output Current versus Input Voltage

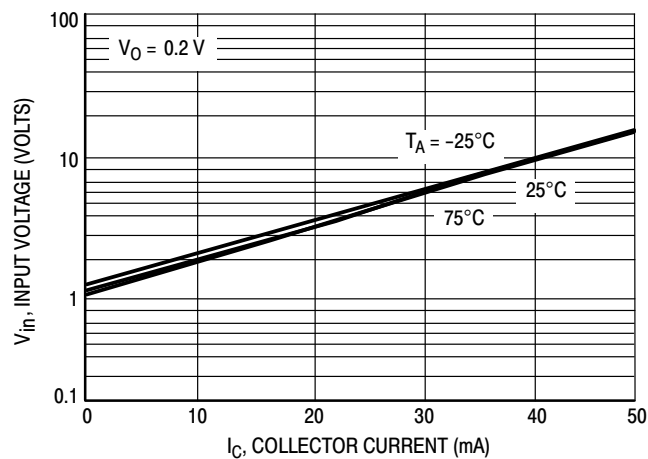


Figure 11. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS – NSBC124EPDXV6T1 NPN TRANSISTOR

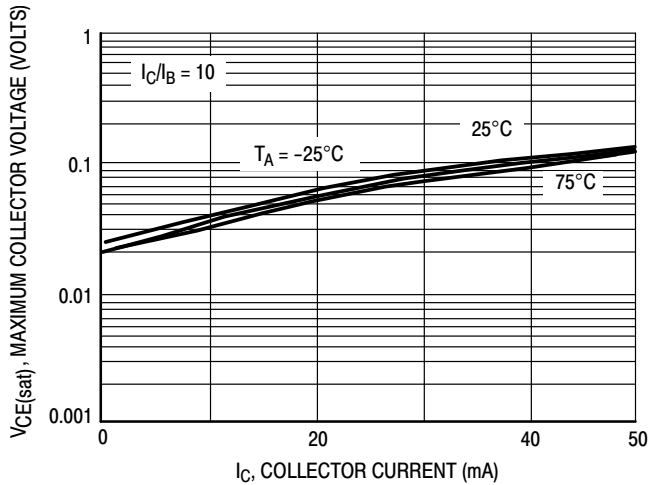


Figure 12. $V_{CE(sat)}$ versus I_C

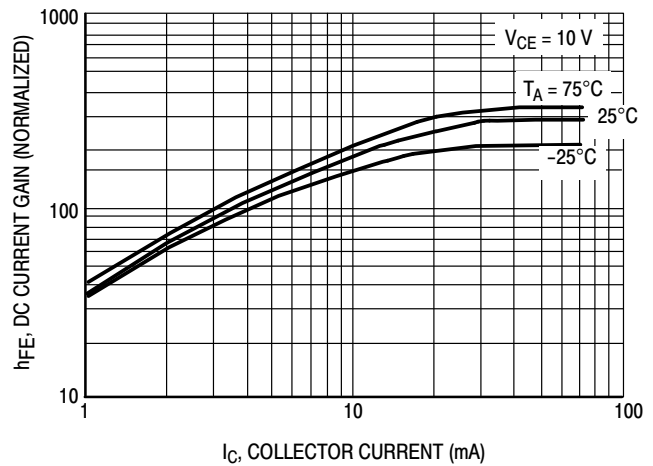


Figure 13. DC Current Gain

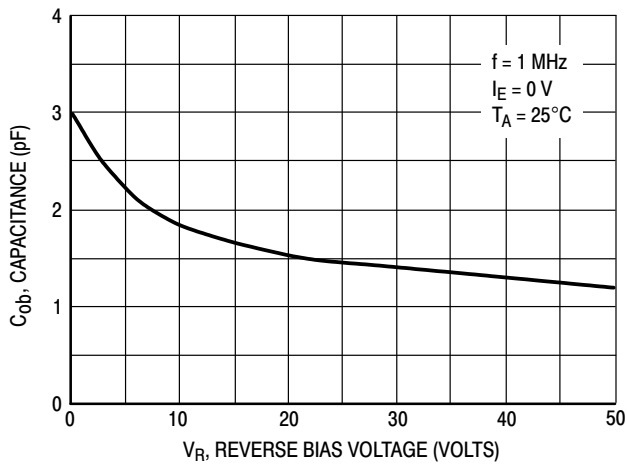


Figure 14. Output Capacitance

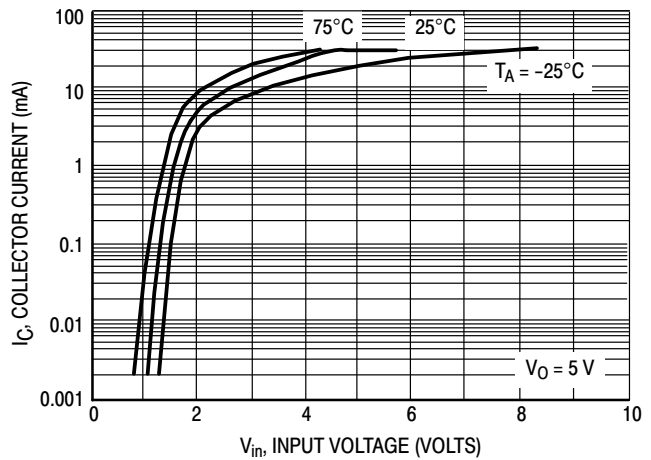


Figure 15. Output Current versus Input Voltage

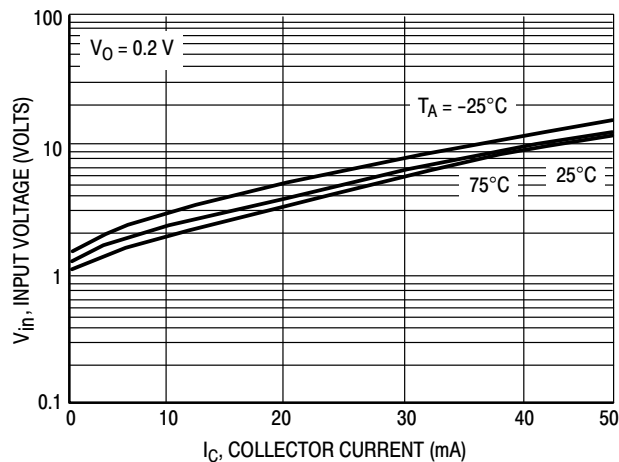


Figure 16. Input Voltage versus Output Current

NSBC114EPDXV6T1G, NSVBC114EPDXV6T1G Series

TYPICAL ELECTRICAL CHARACTERISTICS – NSBC124EPDXV6T1 PNP TRANSISTOR

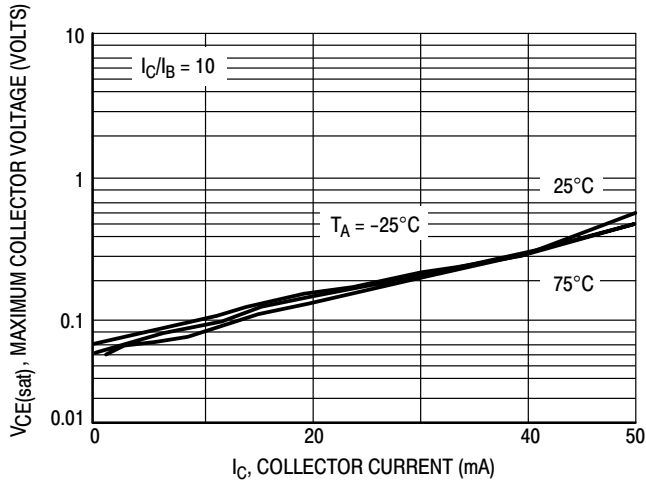


Figure 17. $V_{CE(sat)}$ versus I_C

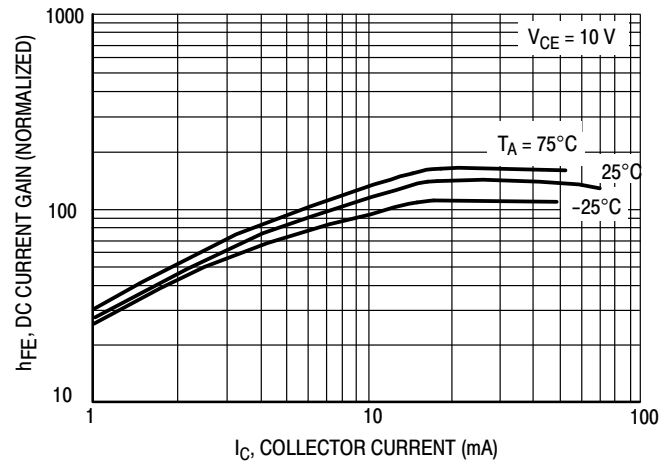


Figure 18. DC Current Gain

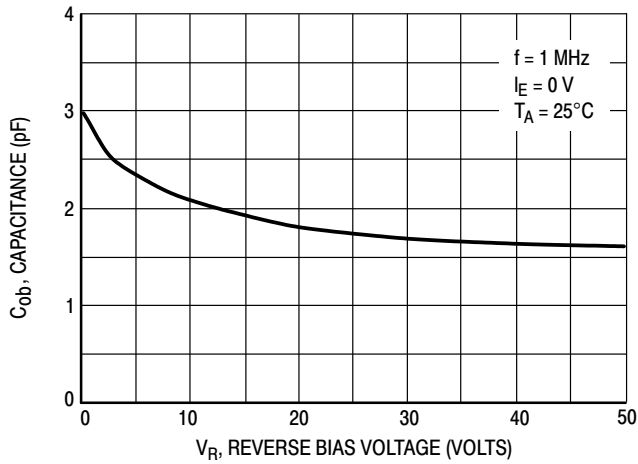


Figure 19. Output Capacitance

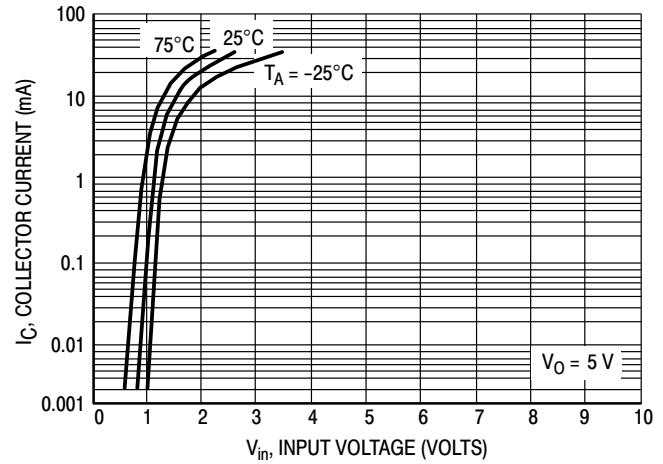


Figure 20. Output Current versus Input Voltage

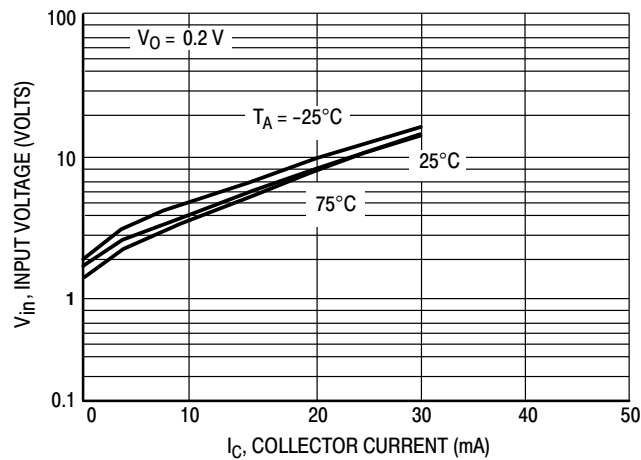


Figure 21. Input Voltage versus Output Current

NSBC114EPDXV6T1G, NSVBC114EPDXV6T1G Series

TYPICAL ELECTRICAL CHARACTERISTICS – NSBC144EPDXV6T1 NPN TRANSISTOR

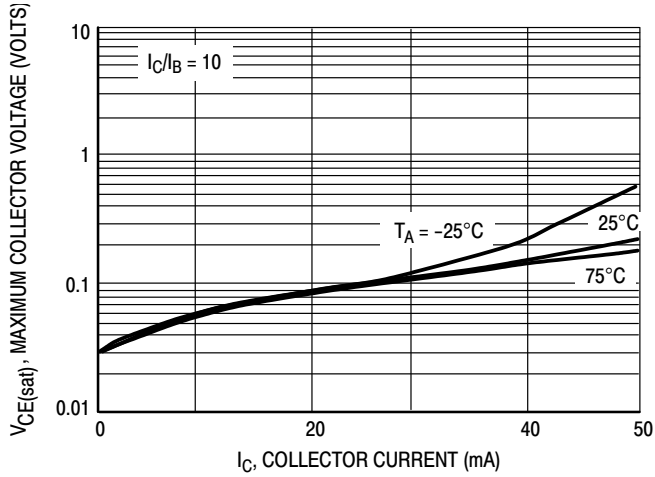


Figure 22. $V_{CE(sat)}$ versus I_C

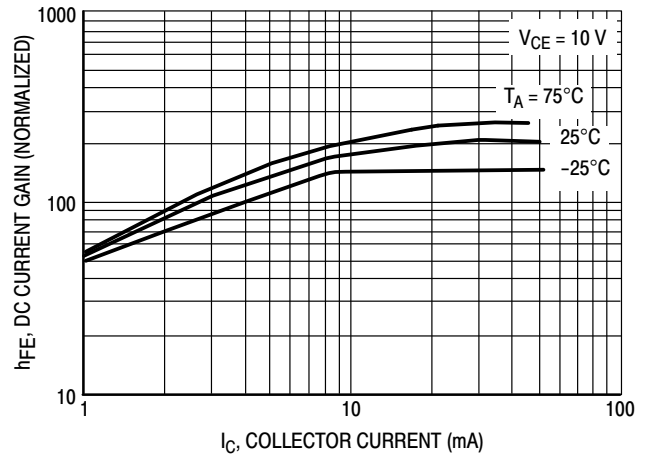


Figure 23. DC Current Gain

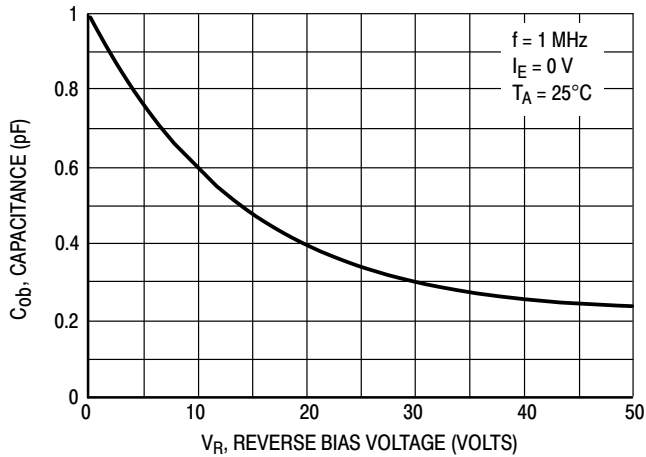


Figure 24. Output Capacitance

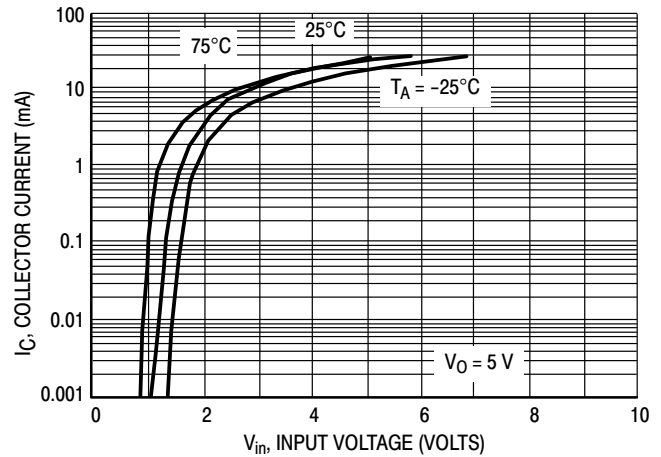


Figure 25. Output Current versus Input Voltage

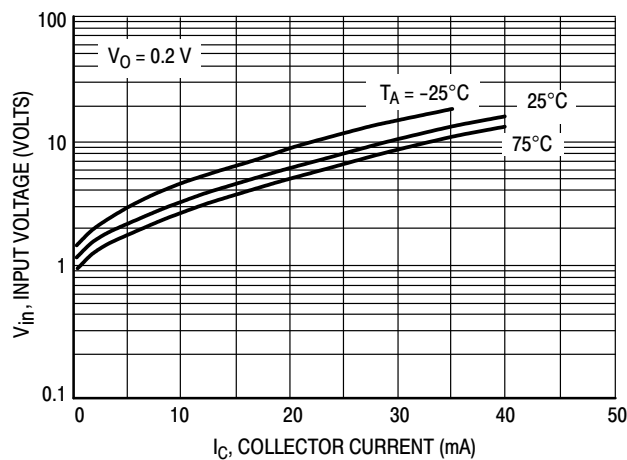


Figure 26. Input Voltage versus Output Current

NSBC114EPDXV6T1G, NSVBC114EPDXV6T1G Series

TYPICAL ELECTRICAL CHARACTERISTICS – NSBC144EPDXV6T1 PNP TRANSISTOR

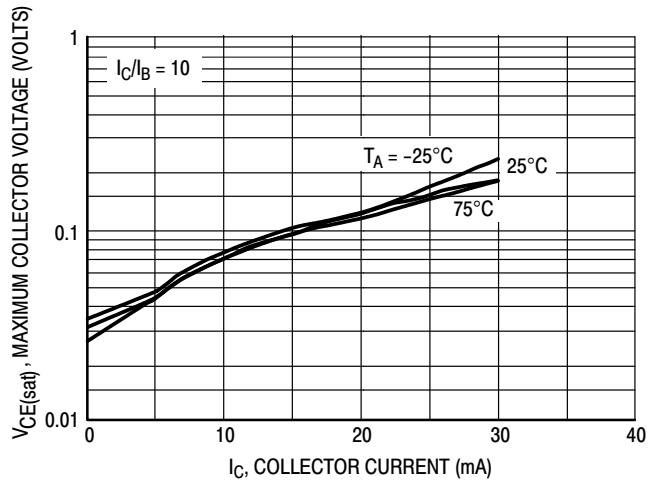


Figure 27. $V_{CE(sat)}$ versus I_C

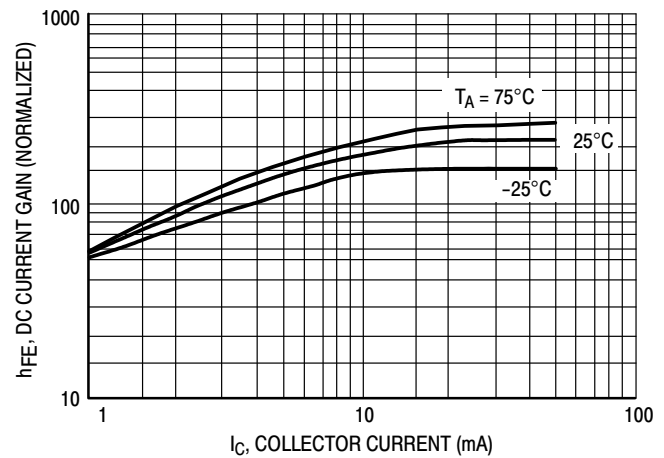


Figure 28. DC Current Gain

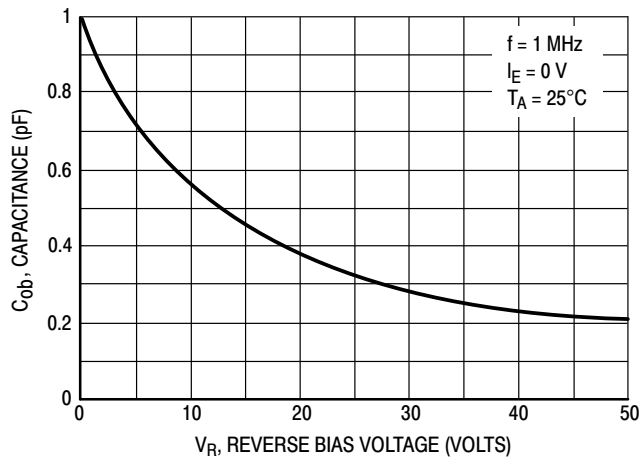


Figure 29. Output Capacitance

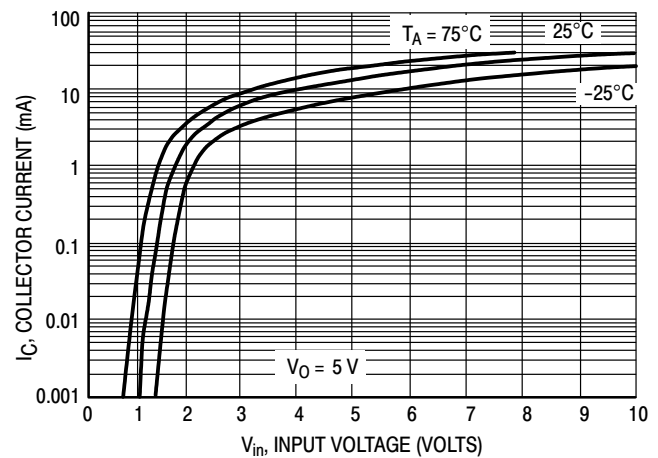


Figure 30. Output Current versus Input Voltage

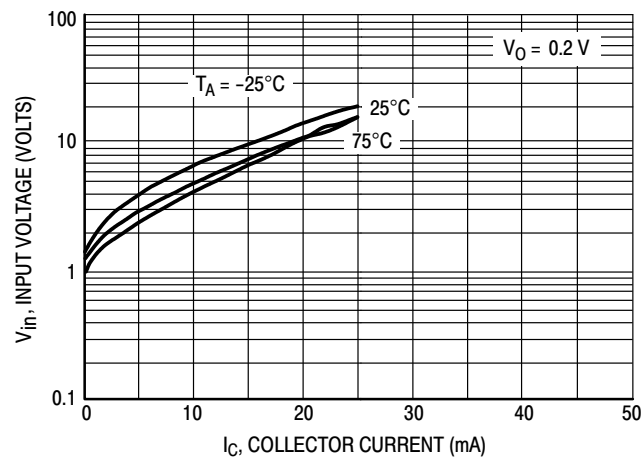


Figure 31. Input Voltage versus Output Current

NSBC114EPDXV6T1G, NSVBC114EPDXV6T1G Series

TYPICAL ELECTRICAL CHARACTERISTICS – NSBC114YPDXV6T1, NSVBC114YPDXV6T1 NPN TRANSISTOR

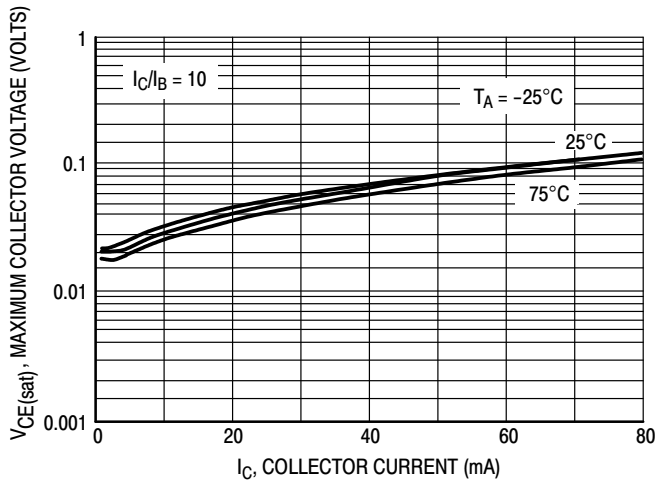


Figure 32. $V_{CE(sat)}$ versus I_C

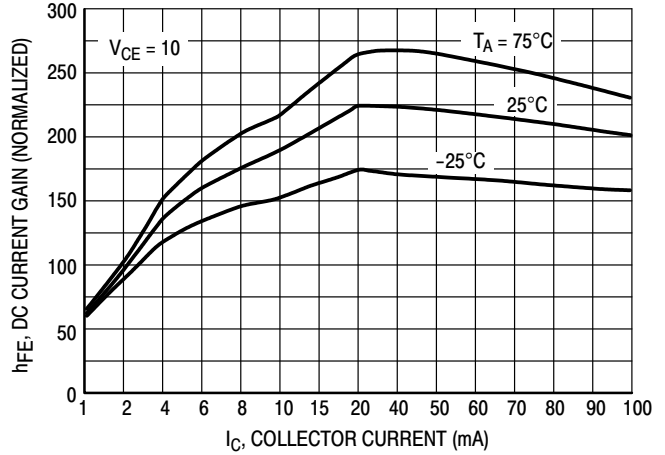


Figure 33. DC Current Gain

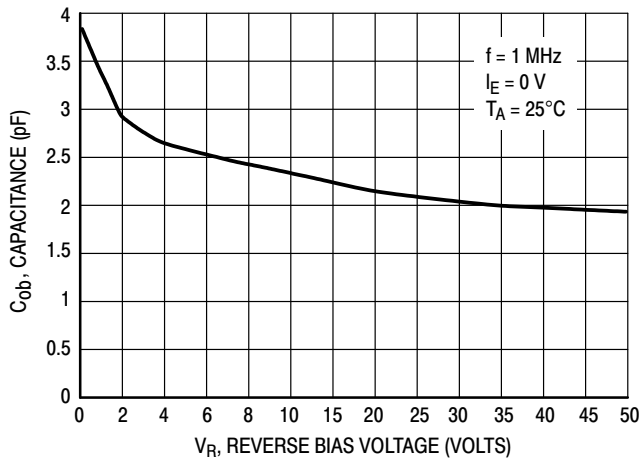


Figure 34. Output Capacitance

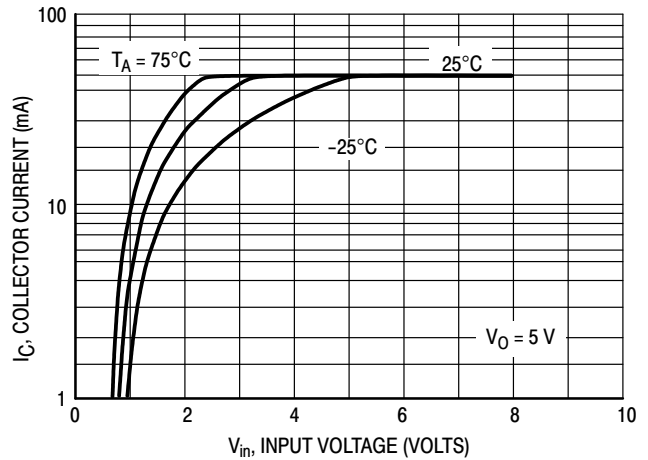


Figure 35. Output Current versus Input Voltage

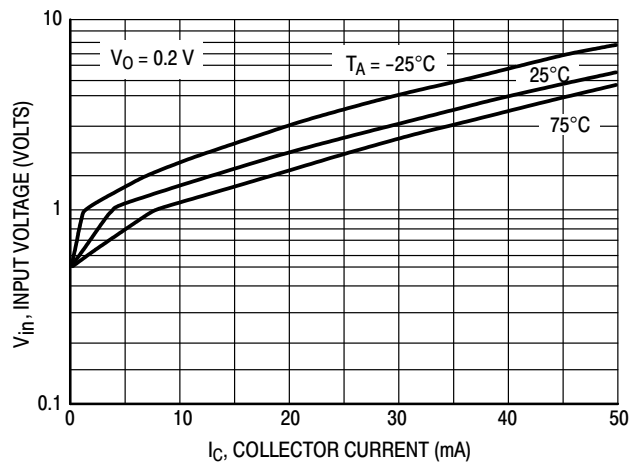


Figure 36. Input Voltage versus Output Current

NSBC114EPDXV6T1G, NSVBC114EPDXV6T1G Series

TYPICAL ELECTRICAL CHARACTERISTICS – NSBC114YPDXV6T1, NSVBC114YPDXV6T1 PNP TRANSISTOR

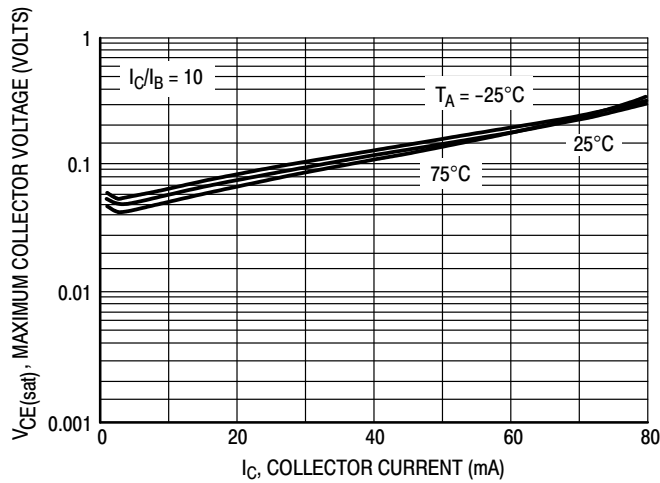


Figure 37. $V_{CE(sat)}$ versus I_C

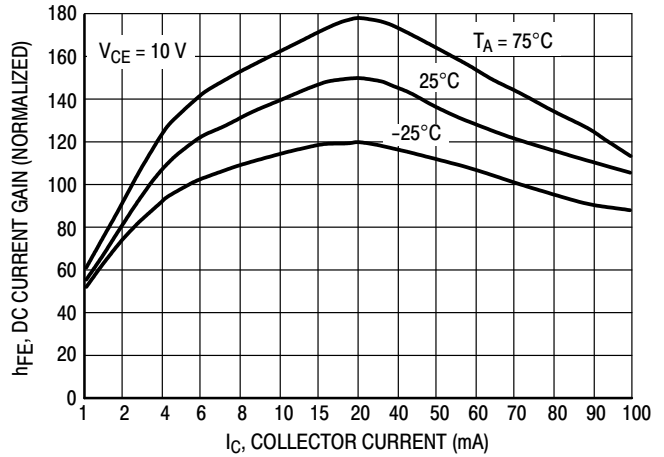


Figure 38. DC Current Gain

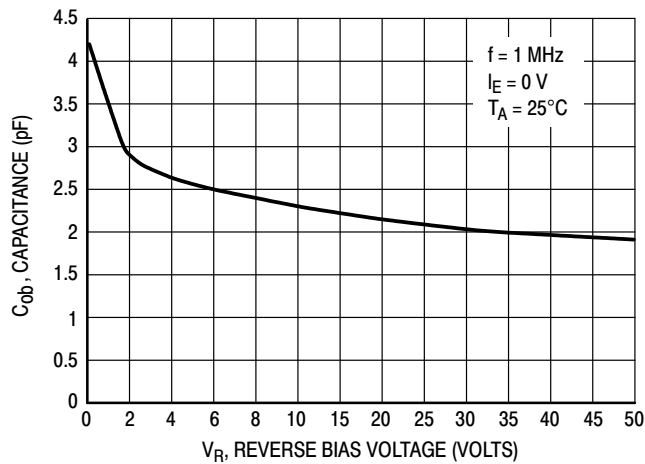


Figure 39. Output Capacitance

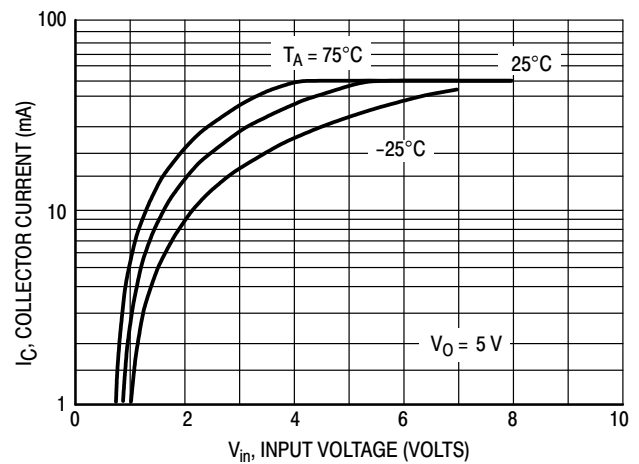


Figure 40. Output Current versus Input Voltage

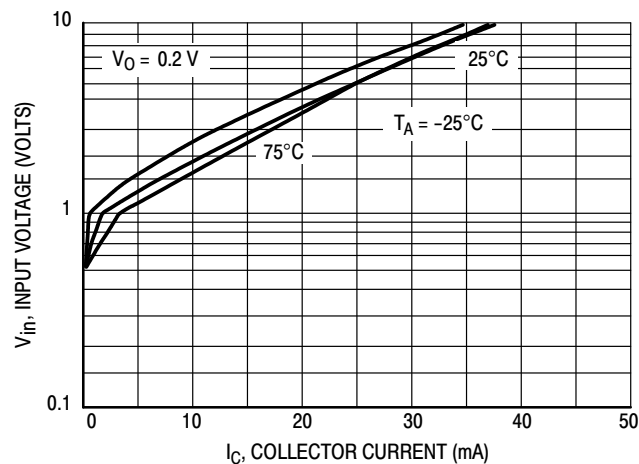


Figure 41. Input Voltage versus Output Current

NSBC114EPDXV6T1G, NSVBC114EPDXV6T1G Series

TYPICAL ELECTRICAL CHARACTERISTICS – NSBC114TPDXV6T1

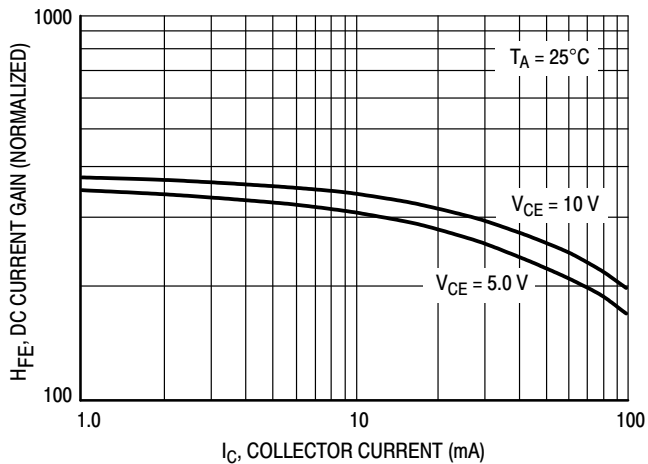


Figure 42. DC Current Gain – PNP

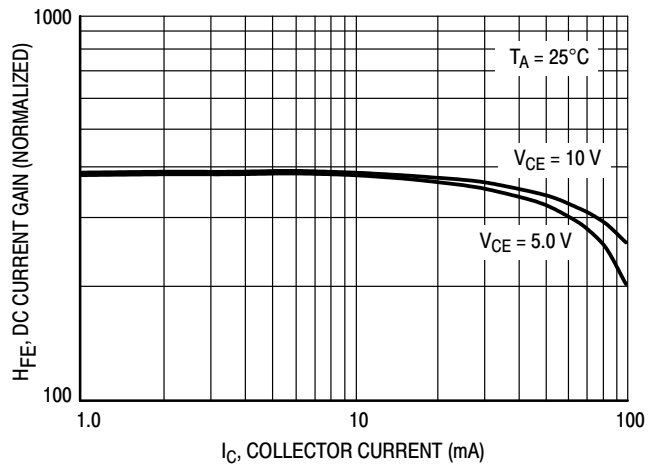


Figure 43. DC Current Gain – NPN

TYPICAL ELECTRICAL CHARACTERISTICS – NSBC143TPDXV6T1, NSVB143TPDXV6T1

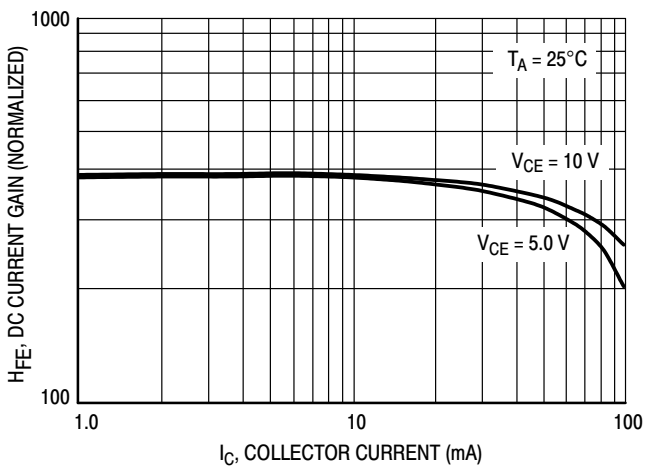


Figure 44. DC Current Gain – PNP

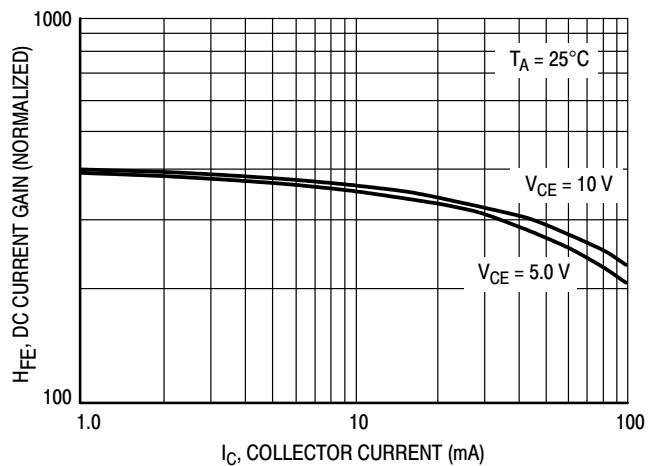
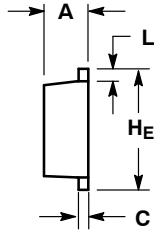
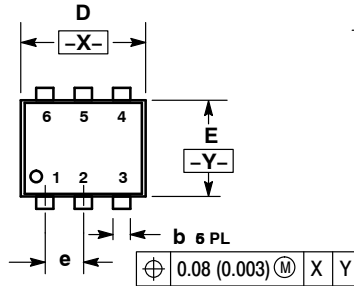


Figure 45. DC Current Gain – NPN

NSBC114EPDXV6T1G, NSVBC114EPDXV6T1G Series

PACKAGE DIMENSIONS

SOT-563, 6 LEAD
CASE 463A-01
ISSUE F

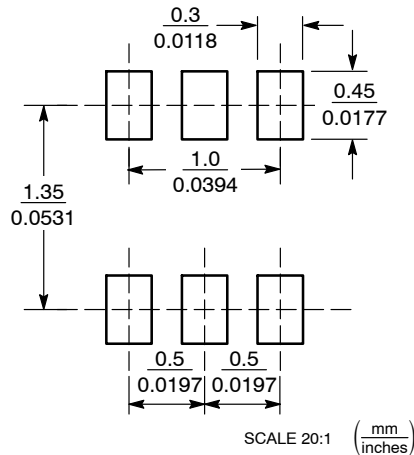


NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETERS
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.50	0.55	0.60	0.020	0.021	0.023
b	0.17	0.22	0.27	0.007	0.009	0.011
C	0.08	0.12	0.18	0.003	0.005	0.007
D	1.50	1.60	1.70	0.059	0.062	0.066
E	1.10	1.20	1.30	0.043	0.047	0.051
e	0.5 BSC			0.02 BSC		
L	0.10	0.20	0.30	0.004	0.008	0.012
HE	1.50	1.60	1.70	0.059	0.062	0.066

SOLDERING FOOTPRINT*



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

ON Semiconductor and 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
USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81-3-5817-1050

ON Semiconductor Website: www.onsemi.com
Order Literature: <http://www.onsemi.com/orderlit>
For additional information, please contact your local Sales Representative

NSBC114EPDXV6/D