Amplifier Transistors

PNP Silicon

Features

• Pb-Free Packages are Available*

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector - Emitter Voltage BC556 BC557 BC558	V _{CEO}	-65 -45 -30	Vdc
Collector - Base Voltage BC556 BC557 BC558	V _{CBO}	-80 -50 -30	Vdc
Emitter - Base Voltage	V _{EBO}	-5.0	Vdc
Collector Current – Continuous – Peak	I _C	-100 -200	mAdc
Base Current – Peak	I _{BM}	-200	mAdc
Total Device Dissipation @ T _A = 25°C Derate above 25°C	P _D	625 5.0	mW 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

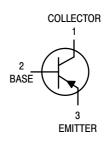
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction–to–Ambient	$R_{\theta JA}$	200	°C/W
Thermal Resistance, Junction–to–Case	$R_{\theta JC}$	83.3	°C/W

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.



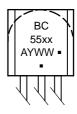
ON Semiconductor®

http://onsemi.com





MARKING DIAGRAM



BC55x = Device Code

x = 6, 7, or 8

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 6 of this data sheet.

^{*}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°C unless otherwise noted)

Characteristic		Symbol	Min	Тур	Max	Unit
OFF CHARACTERISTICS						
Collector - Emitter Breakdown Voltage		V _{(BR)CEO}				V
$(I_C = -2.0 \text{ mAdc}, I_B = 0)$	BC556	(511)020	-65	_	_	
, 5 ,	BC557		-45	_	_	
	BC558		-30	_	_	
Collector - Base Breakdown Voltage		V _{(BR)CBO}				V
$(I_C = -100 \mu\text{Adc})$	BC556	(BK)CBO	-80	_	_	•
(iC = 100 \mathred{\matrod}{\mathred{\mathred{\mathred{\mathred{\mathred{\mathred{\mathred{\mathred{\mathred{\mathred{\mathred{\mathred{\mathred{\matrod}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}} \ n \end{\ta}}} = 1000000000000000000000000000000000	BC557		-50	_	_	
	BC558		-30	_	_	
Fraitten Base Breekderen Voltage		\ /	+			V
Emitter – Base Breakdown Voltage	BC556	$V_{(BR)EBO}$	5.0			V
$(I_E = -100 \mu\text{Adc}, I_C = 0)$			-5.0 5.0	_	_	
	BC557		-5.0 -5.0	_	_	
	BC558		-5.0	_	-	
Collector–Emitter Leakage Current		I _{CES}				
$(V_{CES} = -40 \text{ V})$	BC556		_	-2.0	-100	nA
$(V_{CES} = -20 \text{ V})$	BC557		_	-2.0	-100	
	BC558		_	-2.0	-100	
$(V_{CES} = -20 \text{ V}, T_A = 125^{\circ}\text{C})$	BC556		_	_	-4.0	μΑ
	BC557		_	_	-4.0	
	BC558		_	_	-4.0	
ON CHARACTERISTICS						
DC Current Gain		h _{FE}				_
$(I_C = -10 \mu\text{Adc}, V_{CE} = -5.0 \text{V})$	A Series Device	''FE	_	90	_	
$(10 - 10 \mu \text{Adc}, \text{VCE} = -3.0 \text{V})$	B Series Devices			150		
	C Series Devices			270	_	
$(I_C = -2.0 \text{ mAdc}, V_{CE} = -5.0 \text{ V})$	BC557		120	_	800	
(10 - 2.0 m/de, VCE = -3.0 V)	A Series Device		120	170	220	
	B Series Devices		180	290	460	
	C Series Devices		420	500	800	
$(I_C = -100 \text{ mAdc}, V_{CE} = -5.0 \text{ V})$	A Series Device		420	120	-	
(IC = -100 MAde, VCE = -3.0 V)	B Series Devices			180	_	
	C Series Devices		_	300	_	
Collector Emitter Seturation Valtage	C CONICC DOVICOS	\/				V
Collector – Emitter Saturation Voltage		$V_{CE(sat)}$		-0.075	0.3	V
$(I_C = -10 \text{ mAdc}, I_B = -0.5 \text{ mAdc})$			_		-0.3	
$(I_C = -10 \text{ mAdc}, I_B = \text{see Note 1})$			_	-0.3	-0.6	
$(I_C = -100 \text{ mAdc}, I_B = -5.0 \text{ mAdc})$				-0.25	-0.65	
Base - Emitter Saturation Voltage		$V_{BE(sat)}$				V
$(I_C = -10 \text{ mAdc}, I_B = -0.5 \text{ mAdc})$			_	-0.7	_	
$(I_C = -100 \text{ mAdc}, I_B = -5.0 \text{ mAdc})$			_	-1.0	_	
Base-Emitter On Voltage		V _{BE(on)}				V
$(I_C = -2.0 \text{ mAdc}, V_{CE} = -5.0 \text{ Vdc})$		(,	-0.55	-0.62	-0.7	
$(I_C = -10 \text{ mAdc}, V_{CE} = -5.0 \text{ Vdc})$			_	-0.7	-0.82	
SMALL-SIGNAL CHARACTERISTICS	L		1	1		1
			1			NAL I-
Current – Gain – Bandwidth Product	DOCCO	f _T		200		MHz
$(I_C = -10 \text{ mA}, V_{CE} = -5.0 \text{ V}, f = 100 \text{ MHz})$	BC556		_	280	_	
	BC557 BC558		_	320	_	
	DC336		_	360		
Output Capacitance		C_{ob}	_	3.0	6.0	pF
$(V_{CB} = -10 \text{ V}, I_{C} = 0, f = 1.0 \text{ MHz})$						
Noise Figure		NF				dB
$(I_C = -0.2 \text{ mAdc}, V_{CE} = -5.0 \text{ V},$	BC556		-	2.0	10	
$R_S = 2.0 \text{ k}\Omega, f = 1.0 \text{ kHz}, \Delta f = 200 \text{ Hz})$	BC557		-	2.0	10	
	BC558		_	2.0	10	
Small-Signal Current Gain		h _{fe}				_
$(I_C = -2.0 \text{ mAdc}, V_{CE} = 5.0 \text{ V}, f = 1.0 \text{ kHz})$	BC557	··ie	125	_	900	
(O === 125, 10E 510 11 = 110 11 12)	A Series Device		125	_	260	
	B Series Devices		240	_	500	
	C Series Devices		450	_	900	
	2 3000 2011000			4.0.1/		<u> </u>

^{1.} $I_C = -10$ mAdc on the constant base current characteristics, which yields the point $I_C = -11$ mAdc, $V_{CE} = -1.0$ V.

BC557/BC558

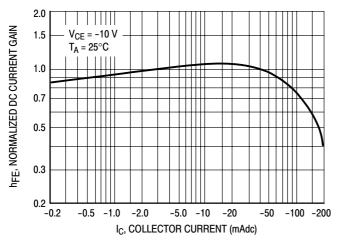


Figure 1. Normalized DC Current Gain

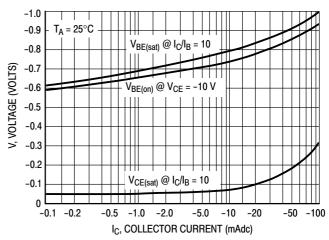


Figure 2. "Saturation" and "On" Voltages

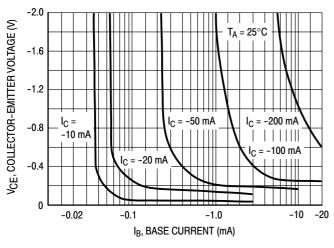


Figure 3. Collector Saturation Region

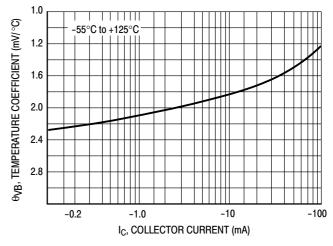


Figure 4. Base-Emitter Temperature Coefficient

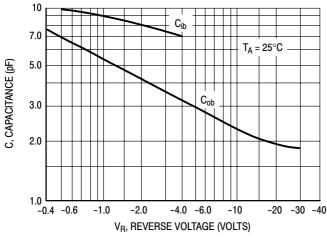


Figure 5. Capacitances

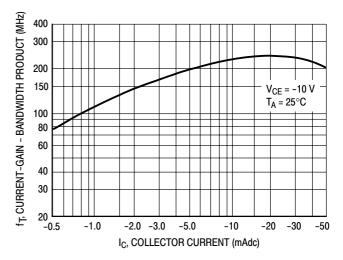


Figure 6. Current-Gain - Bandwidth Product

BC556

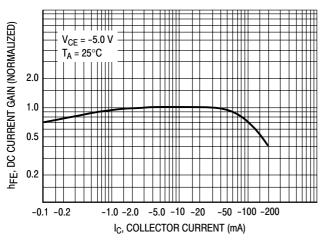


Figure 7. DC Current Gain

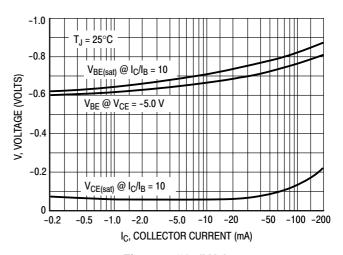


Figure 8. "On" Voltage

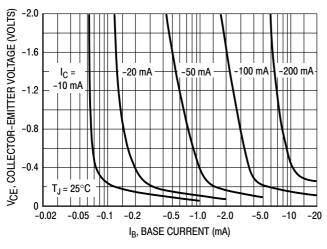


Figure 9. Collector Saturation Region

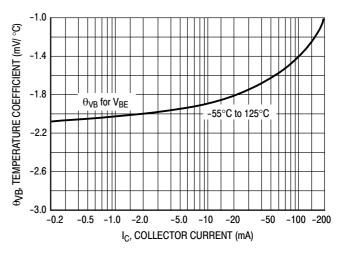


Figure 10. Base-Emitter Temperature Coefficient

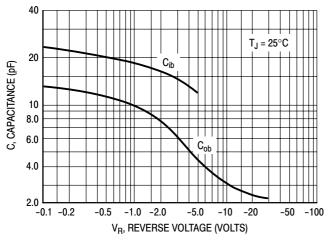


Figure 11. Capacitance

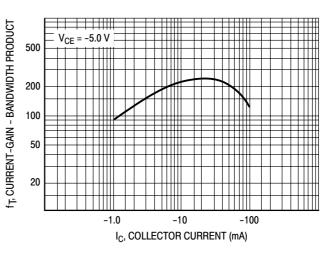


Figure 12. Current-Gain - Bandwidth Product

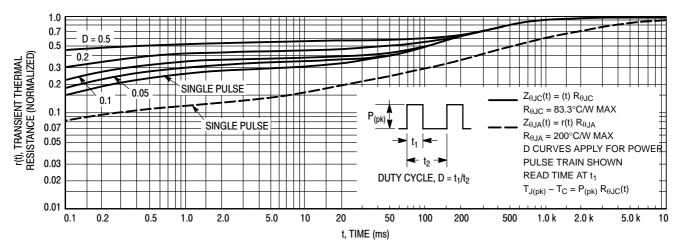


Figure 13. Thermal Response

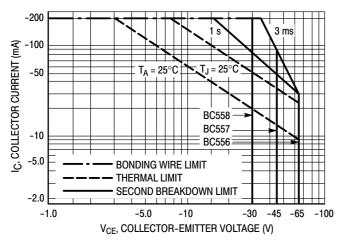


Figure 14. Active Region - Safe Operating Area

The safe operating area curves indicate I_C-V_{CE} limits of the transistor that must be observed for reliable operation. Collector load lines for specific circuits must fall below the limits indicated by the applicable curve.

The data of Figure 14 is based upon $T_{J(pk)} = 150^{\circ}C$; T_{C} or T_{A} is variable depending upon conditions. Pulse curves are valid for duty cycles to 10% provided $T_{J(pk)} \leq 150^{\circ}C$. $T_{J(pk)}$ may be calculated from the data in Figure 13. At high case or ambient temperatures, thermal limitations will reduce the power than can be handled to values less than the limitations imposed by second breakdown.

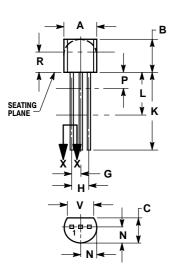
DEVICE ORDERING INFORMATION

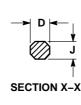
Device	Package	Shipping [†]
BC556B	TO-92	5000 Units / Bulk
BC556BG	TO-92 (Pb-Free)	5000 Units / Bulk
BC556BZL1	TO-92	2000 / Ammo Box
BC556BZL1G	TO-92 (Pb-Free)	2000 / Ammo Box
BC557AZL1	TO-92	2000 / Ammo Box
BC557AZL1G	TO-92 (Pb-Free)	2000 / Ammo Box
BC557B	TO-92	5000 Units / Bulk
BC557BG	TO-92 (Pb-Free)	5000 Units / Bulk
BC557BRL1	TO-92	2000 / Tape & Reel
BC557BRL1G	TO-92 (Pb-Free)	2000 / Tape & Reel
BC557BZL1	TO-92	2000 / Ammo Box
BC557BZL1G	TO-92 (Pb-Free)	2000 / Ammo Box
BC557C	TO-92	5000 Units / Bulk
BC557CG	TO-92 (Pb-Free)	5000 Units / Bulk
BC557CZL1	TO-92	2000 / Ammo Box
BC557CZL1G	TO-92 (Pb-Free)	2000 / Ammo Box
BC558BRL	TO-92	2000 / Tape & Reel
BC558BRLG	TO-92 (Pb-Free)	2000 / Tape & Reel
BC558BRL1	TO-92	2000 / Tape & Reel
BC558BRL1G	TO-92 (Pb-Free)	2000 / Tape & Reel
BC558BZL1	TO-92	2000 / Ammo Box
BC558BZL1G	TO-92 (Pb-Free)	2000 / Ammo Box
BC558CZL1	TO-92	2000 / Ammo Box
BC558CZL1G	TO-92 (Pb-Free)	2000 / Ammo Box

[†]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 Y14.5M, 1982. CONTROLLING DIMENSION: INCH.
- CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
- LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

	INCHES		MILLIMETERS	
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
Р		0.100		2.54
R	0.115		2.93	
v	0.125		2 //2	

STYLE 17

PIN 1. COLLECTOR 2. BASE 3 EMITTER

ON Semiconductor and un are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice on semiconductor and are registered readerlands of semiconductor Components industries, Ltc (SCILLC). Solitude services the inject that changes without further holice 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 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

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.