

BC556B, BC557A, B, C, BC558B

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 I_{CM}	-100 -200	mAdc
Base Current – Peak	I_{BM}	-200	mAdc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	625 5.0	mW mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	1.5 12	W mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-55 to +150	$^\circ\text{C}$

THERMAL CHARACTERISTICS

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

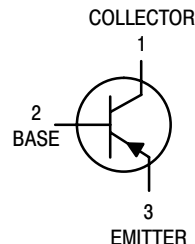
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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

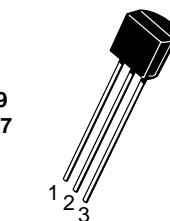


ON Semiconductor®

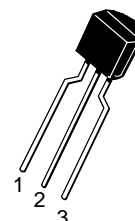
<http://onsemi.com>



TO-92
CASE 29
STYLE 17

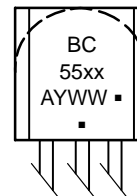


STRAIGHT LEAD
BULK PACK



BENT LEAD
TAPE & REEL
AMMO PACK

MARKING DIAGRAM



xx = 6B, 7A, 7B, 7C, or 8B
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.

BC556B, BC557A, B, C, BC558B

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

Characteristic	Symbol	Min	Typ	Max	Unit	
OFF CHARACTERISTICS						
Collector–Emitter Breakdown Voltage (I _C = –2.0 mA _{dc} , I _B = 0)	BC556 BC557 BC558	V _{(BR)CEO}	–65 –45 –30	– – –	– – –	V
Collector–Base Breakdown Voltage (I _C = –100 μA _{dc})	BC556 BC557 BC558	V _{(BR)CBO}	–80 –50 –30	– – –	– – –	V
Emitter–Base Breakdown Voltage (I _E = –100 μA _{dc} , I _C = 0)	BC556 BC557 BC558	V _{(BR)EBO}	–5.0 –5.0 –5.0	– – –	– – –	V
Collector–Emitter Leakage Current (V _{CES} = –40 V) (V _{CES} = –20 V) (V _{CES} = –20 V, T _A = 125°C)	BC556 BC557 BC558 BC556 BC557 BC558	I _{CES}	– – – – – –	–2.0 –2.0 –2.0 – – –	–100 –100 –100 –4.0 –4.0 –4.0	nA μA

ON CHARACTERISTICS

DC Current Gain (I _C = –10 μA _{dc} , V _{CE} = –5.0 V) (I _C = –2.0 mA _{dc} , V _{CE} = –5.0 V) (I _C = –100 mA _{dc} , V _{CE} = –5.0 V)	A Series Device B Series Devices C Series Devices BC557 A Series Device B Series Devices C Series Devices A Series Device B Series Devices C Series Devices	h _{FE}	– – – 120 120 180 420 – – –	90 150 270 – 170 290 500 120 180 300	– – – 800 220 460 800 – – –	–
Collector–Emitter Saturation Voltage (I _C = –10 mA _{dc} , I _B = –0.5 mA _{dc}) (I _C = –10 mA _{dc} , I _B = see Note 1) (I _C = –100 mA _{dc} , I _B = –5.0 mA _{dc})		V _{CE(sat)}	– – –	–0.075 –0.3 –0.25	–0.3 –0.6 –0.65	V
Base–Emitter Saturation Voltage (I _C = –10 mA _{dc} , I _B = –0.5 mA _{dc}) (I _C = –100 mA _{dc} , I _B = –5.0 mA _{dc})		V _{BE(sat)}	– –	–0.7 –1.0	– –	V
Base–Emitter On Voltage (I _C = –2.0 mA _{dc} , V _{CE} = –5.0 V _{dc}) (I _C = –10 mA _{dc} , V _{CE} = –5.0 V _{dc})		V _{BE(on)}	–0.55 –	–0.62 –0.7	–0.7 –0.82	V

SMALL–SIGNAL CHARACTERISTICS

Current–Gain – Bandwidth Product (I _C = –10 mA, V _{CE} = –5.0 V, f = 100 MHz)	BC556 BC557 BC558	f _T	– – –	280 320 360	– – –	MHz
Output Capacitance (V _{CB} = –10 V, I _C = 0, f = 1.0 MHz)		C _{ob}	–	3.0	6.0	pF
Noise Figure (I _C = –0.2 mA _{dc} , V _{CE} = –5.0 V, R _S = 2.0 kΩ, f = 1.0 kHz, Δf = 200 Hz)	BC556 BC557 BC558	NF	– – –	2.0 2.0 2.0	10 10 10	dB
Small–Signal Current Gain (I _C = –2.0 mA _{dc} , V _{CE} = 5.0 V, f = 1.0 kHz)	BC557 A Series Device B Series Devices C Series Devices	h _{fe}	125 125 240 450	– – – –	900 260 500 900	–

1. I_C = –10 mA_{dc} on the constant base current characteristics, which yields the point I_C = –11 mA_{dc}, V_{CE} = –1.0 V.

BC556B, BC557A, B, C, BC558B

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

BC556B, BC557A, B, C, BC558B

BC556

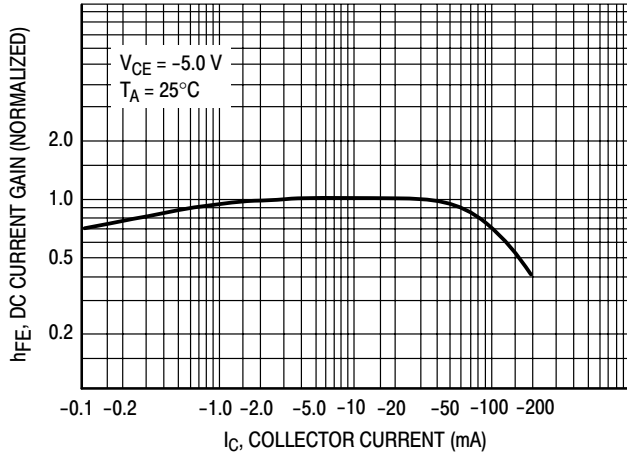


Figure 7. DC Current Gain

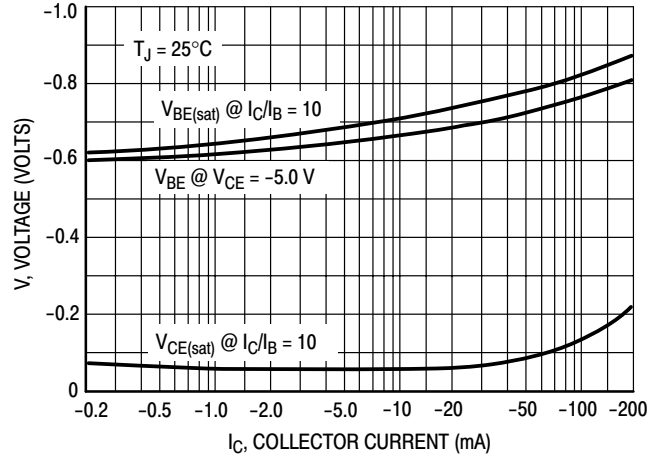


Figure 8. "On" Voltage

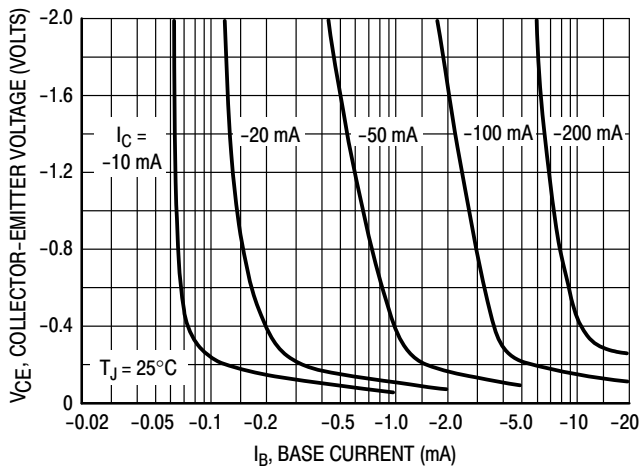


Figure 9. Collector Saturation Region

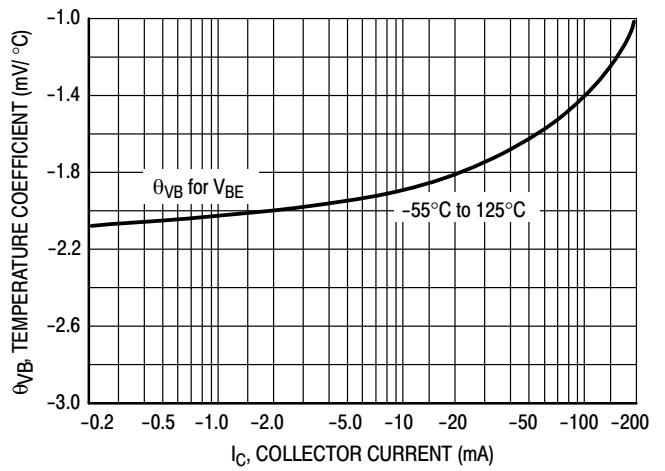


Figure 10. Base-Emitter Temperature Coefficient

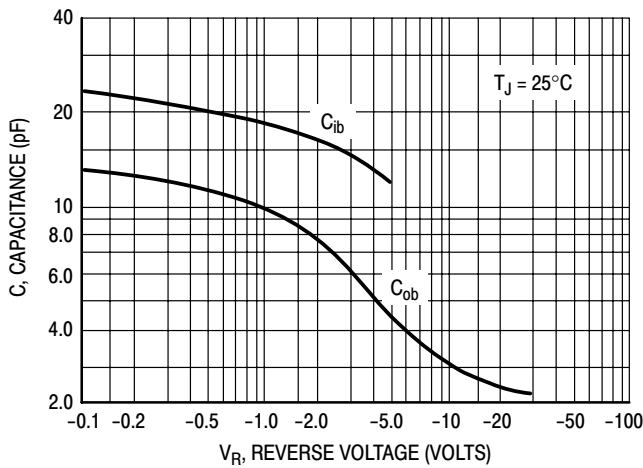


Figure 11. Capacitance

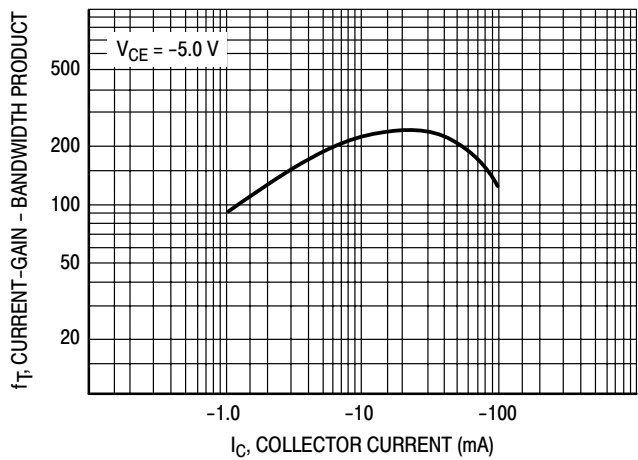


Figure 12. Current-Gain - Bandwidth Product

BC556B, BC557A, B, C, BC558B

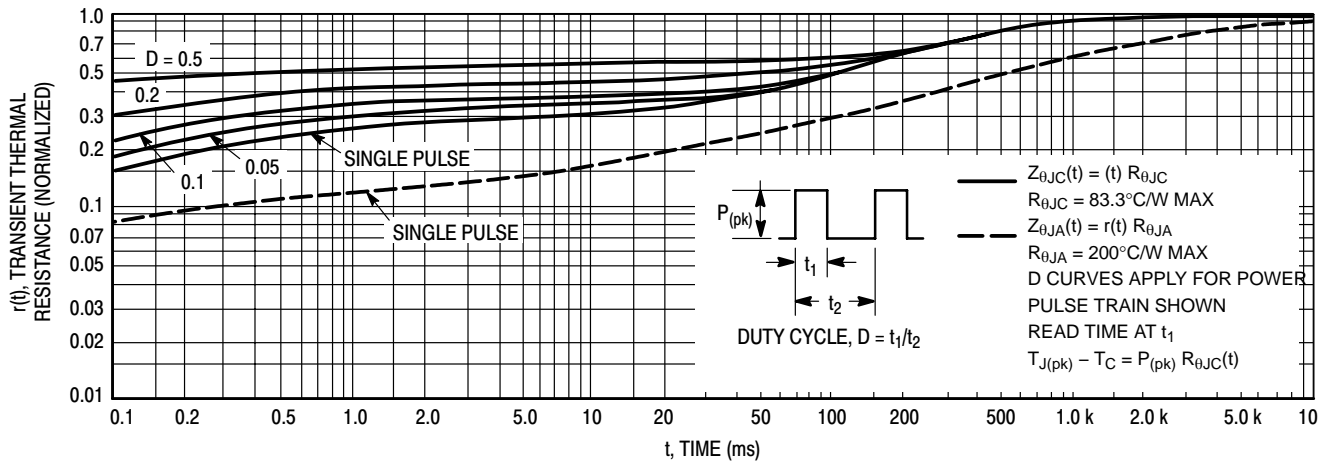


Figure 13. Thermal Response

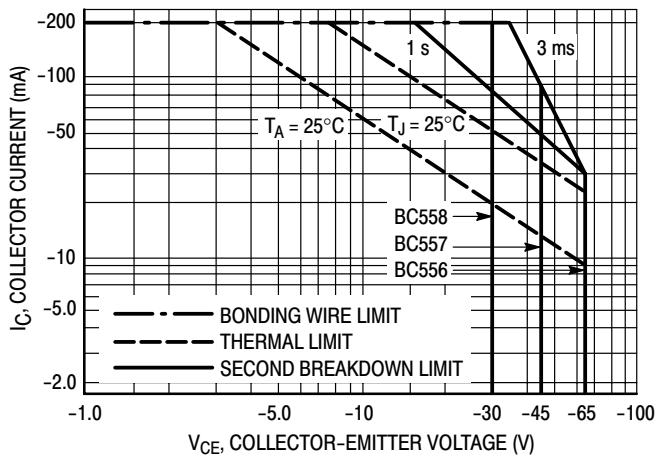


Figure 14. Active Region - Safe Operating Area

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 $T_{J(pk)} = 150^\circ\text{C}$; T_C or T_A is variable depending upon conditions. Pulse curves are valid for duty cycles to 10% provided $T_{J(pk)} \leq 150^\circ\text{C}$. $T_{J(pk)}$ 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.

BC556B, BC557A, B, C, BC558B

ORDERING INFORMATION

Device	Package	Shipping†
BC556BG	TO-92 (Pb-Free)	5000 Units / Bulk
BC556BZL1G	TO-92 (Pb-Free)	2000 / Ammo Box
BC557AZL1G	TO-92 (Pb-Free)	2000 / Ammo Box
BC557BG	TO-92 (Pb-Free)	5000 Units / Bulk
BC557BRL1	TO-92	2000 / Tape & Reel
BC557BRL1G	TO-92 (Pb-Free)	2000 / Tape & Reel
BC557BZL1G	TO-92 (Pb-Free)	2000 / Ammo Box
BC557CG	TO-92 (Pb-Free)	5000 Units / Bulk
BC557CZL1G	TO-92 (Pb-Free)	2000 / Ammo Box
BC558BRLG	TO-92 (Pb-Free)	2000 / Tape & Reel
BC558BRL1G	TO-92 (Pb-Free)	2000 / Tape & Reel
BC558BZL1G	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.

MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS

ON Semiconductor®



SCALE 1:1



TO-92 (TO-226)
CASE 29-11
ISSUE AM

DATE 09 MAR 2007



STRAIGHT LEAD
BULK PACK



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.

DIM	INCHES		MILLIMETERS	
	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	---



BENT LEAD
TAPE & REEL
AMMO PACK



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

DIM	MILLIMETERS	
	MIN	MAX
A	4.45	5.20
B	4.32	5.33
C	3.18	4.19
D	0.40	0.54
G	2.40	2.80
J	0.39	0.50
K	12.70	---
N	2.04	2.66
P	1.50	4.00
R	2.93	---
V	3.43	---

STYLES ON PAGE 2

DOCUMENT NUMBER:	98ASB42022B	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
STATUS:	ON SEMICONDUCTOR STANDARD	
NEW STANDARD:		
DESCRIPTION:	TO-92 (TO-226)	PAGE 1 OF 3

TO-92 (TO-226)
CASE 29-11
ISSUE AM

DATE 09 MAR 2007

STYLE 1:
 PIN 1. EMITTER
 2. BASE
 3. COLLECTOR

STYLE 2:
 PIN 1. BASE
 2. EMITTER
 3. COLLECTOR

STYLE 3:
 PIN 1. ANODE
 2. ANODE
 3. CATHODE

STYLE 4:
 PIN 1. CATHODE
 2. CATHODE
 3. ANODE

STYLE 5:
 PIN 1. DRAIN
 2. SOURCE
 3. GATE

STYLE 6:
 PIN 1. GATE
 2. SOURCE & SUBSTRATE
 3. DRAIN

STYLE 7:
 PIN 1. SOURCE
 2. DRAIN
 3. GATE

STYLE 8:
 PIN 1. DRAIN
 2. GATE
 3. SOURCE & SUBSTRATE

STYLE 9:
 PIN 1. BASE 1
 2. EMITTER
 3. BASE 2

STYLE 10:
 PIN 1. CATHODE
 2. GATE
 3. ANODE

STYLE 11:
 PIN 1. ANODE
 2. CATHODE & ANODE
 3. CATHODE

STYLE 12:
 PIN 1. MAIN TERMINAL 1
 2. GATE
 3. MAIN TERMINAL 2

STYLE 13:
 PIN 1. ANODE 1
 2. GATE
 3. CATHODE 2

STYLE 14:
 PIN 1. EMITTER
 2. COLLECTOR
 3. BASE

STYLE 15:
 PIN 1. ANODE 1
 2. CATHODE
 3. ANODE 2

STYLE 16:
 PIN 1. ANODE
 2. GATE
 3. CATHODE

STYLE 17:
 PIN 1. COLLECTOR
 2. BASE
 3. EMITTER

STYLE 18:
 PIN 1. ANODE
 2. CATHODE
 3. NOT CONNECTED

STYLE 19:
 PIN 1. GATE
 2. ANODE
 3. CATHODE

STYLE 20:
 PIN 1. NOT CONNECTED
 2. CATHODE
 3. ANODE

STYLE 21:
 PIN 1. COLLECTOR
 2. EMITTER
 3. BASE

STYLE 22:
 PIN 1. SOURCE
 2. GATE
 3. DRAIN

STYLE 23:
 PIN 1. GATE
 2. SOURCE
 3. DRAIN

STYLE 24:
 PIN 1. EMITTER
 2. COLLECTOR/ANODE
 3. CATHODE

STYLE 25:
 PIN 1. MT 1
 2. GATE
 3. MT 2

STYLE 26:
 PIN 1. V_{CC}
 2. GROUND 2
 3. OUTPUT

STYLE 27:
 PIN 1. MT
 2. SUBSTRATE
 3. MT

STYLE 28:
 PIN 1. CATHODE
 2. ANODE
 3. GATE

STYLE 29:
 PIN 1. NOT CONNECTED
 2. ANODE
 3. CATHODE

STYLE 30:
 PIN 1. DRAIN
 2. GATE
 3. SOURCE

STYLE 31:
 PIN 1. GATE
 2. DRAIN
 3. SOURCE

STYLE 32:
 PIN 1. BASE
 2. COLLECTOR
 3. EMITTER

STYLE 33:
 PIN 1. RETURN
 2. INPUT
 3. OUTPUT


STYLE 34:
 PIN 1. INPUT
 2. GROUND
 3. LOGIC

STYLE 35:
 PIN 1. GATE
 2. COLLECTOR
 3. EMITTER

DOCUMENT NUMBER:	98ASB42022B	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
STATUS:	ON SEMICONDUCTOR STANDARD	
NEW STANDARD:		
DESCRIPTION:	TO-92 (TO-226)	PAGE 2 OF 3



ISSUE	REVISION	DATE
AM	ADDED BENT-LEAD TAPE & REEL VERSION. REQ. BY J. SUPINA.	09 MAR 2007

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.

onsemi, **Onsemi**, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** 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. Buyer is responsible for its products and applications using **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** 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. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** 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 **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** 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:

Email Requests to: orderlit@onsemi.com

onsemi Website: www.onsemi.com

TECHNICAL SUPPORT

North American Technical Support:

Voice Mail: 1 800-282-9855 Toll Free USA/Canada

Phone: 011 421 33 790 2910

Europe, Middle East and Africa Technical Support:

Phone: 00421 33 790 2910

For additional information, please contact your local Sales Representative