

PNP 2N5883, 2N5884*, NPN 2N5885, 2N5886*

Preferred Device

Complementary Silicon High-Power Transistors

... designed for general-purpose power amplifier and switching applications.

- Low Collector-Emitter Saturation Voltage –
 $V_{CE(sat)} = 1.0 \text{ Vdc}$, (max) at $I_C = 15 \text{ Adc}$
- Low Leakage Current
 $I_{CEX} = 1.0 \text{ mAdc}$ (max) at Rated Voltage
- Excellent DC Current Gain –
 $h_{FE} = 20$ (min) at $I_C = 10 \text{ Adc}$
- High Current Gain Bandwidth Product –
 $f_T = 4.0 \text{ MHz}$ (min) at $I_C = 1.0 \text{ Adc}$

MAXIMUM RATINGS (No

Rating	Symbol	2N5883 2N5885	2N5884 2N5886	Unit
Collector-Emitter Voltage	V_{CEO}	60	80	Vdc
Collector-Base Voltage	V_{CB}	60	80	Vdc
Emitter-Base Voltage	V_{EB}	5.0		Vdc
Collector Current – Continuous Peak	I_C	25 50		Adc
Base Current	I_B	7.5		Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	200 1.15		Watts W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-65 to +200		$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	θ_{JC}	0.875	$^\circ\text{C}/\text{W}$

1. Indicates JEDEC registered data. Units and conditions differ on some parameters and re-registration reflecting these changes has been requested. All above values most or exceed present JEDEC registered data.

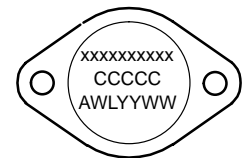
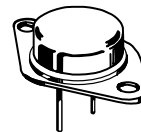


ON Semiconductor®

<http://onsemi.com>

25 AMPERE COMPLEMENTARY SILICON POWER TRANSISTORS 60 – 80 V 200 W

MARKING DIAGRAM



CASE 1-07
TO-204AA
(TO-3)

xx = Specific Device Code
A = Assembly Location
WL = Wafer Lot
YY = Year
WW = Work Week
CCCCC = Non USA Country Code

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

PNP 2N5883, 2N5884*, NPN 2N5885, 2N5886*

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

Characteristic		Symbol	Min	Max	Unit
Collector–Emitter Sustaining Voltage (Note 2) ($I_C = 200\text{ mAdc}$, $I_B = 0$)	2N5883, 2N5885 2N5884, 2N5886	$V_{CEO(sus)}$	60 80	– –	Vdc
Collector Cutoff Current ($V_{CE} = 30\text{ Vdc}$, $I_B = 0$) ($V_{CE} = 40\text{ Vdc}$, $I_B = 0$)	2N5883, 2N5885 2N5984, 2N5886	I_{CEO}	– –	2.0 2.0	mAdc
Collector Cutoff Current ($V_{CE} = 60\text{ Vdc}$, $V_{BE(off)} = 1.5\text{ Vdc}$) ($V_{CE} = 80\text{ Vdc}$, $V_{BE(off)} = 1.5\text{ Vdc}$) ($V_{CE} = 60\text{ Vdc}$, $V_{BE(off)} = 1.5\text{ Vdc}$, $T_C = 150^\circ\text{C}$) ($V_{CE} = 80\text{ Vdc}$, $V_{BE(off)} = 1.5\text{ Vdc}$, $T_C = 150^\circ\text{C}$)	2N5883, 2N5885 2N5884, 2N5886 2N5883, 2N5885 2N5884, 2N5886	I_{CEX}	– – –	1.0 1.0 10 10	mAdc
Collector Cutoff Current ($V_{CB} = 60\text{ Vdc}$, $I_E = 0$) ($V_{CB} = 80\text{ Vdc}$, $I_E = 0$)	2N5883, 2N5885 2N5884, 2N5886	I_{CBO}	– –	1.0 1.0	mAdc
Emitter Cutoff Current ($V_{EB} = 5.0\text{ Vdc}$, $I_C = 0$)		I_{EBO}	–	1.0	mAdc

ON CHARACTERISTICS

DC Current Gain (Note 2)	($I_C = 3.0\text{ Adc}$, $V_{CE} = 4.0\text{ Vdc}$) ($I_C = 10\text{ Adc}$, $V_{CE} = 4.0\text{ Vdc}$) ($I_C = 25\text{ Adc}$, $V_{CE} = 4.0\text{ Vdc}$)	h_{FE}	35 20 4.0	– 100	–
Collector–Emitter Saturation Voltage (Note 2)	($I_C = 15\text{ Adc}$, $I_B = 1.5\text{ Adc}$) ($I_C = 25\text{ Adc}$, $I_B = 6.25\text{ Adc}$)	$V_{CE(sat)}$	– –	1.0 4.0	Vdc
Base–Emitter Saturation Voltage (Note 2)	($I_C = 25\text{ Adc}$, $I_B = 6.25\text{ Adc}$)	$V_{BE(sat)}$	–	2.5	Vdc
Base–Emitter On Voltage (Note 2)	($I_C = 10\text{ Adc}$, $V_{CE} = 4.0\text{ Vdc}$)	$V_{BE(on)}$	–	1.5	Vdc

DYNAMIC CHARACTERISTICS

Current–Gain – Bandwidth Product (Note 3)	($I_C = 1.0\text{ Adc}$, $V_{CE} = 10\text{ Vdc}$, $f_{test} = 1.0\text{ MHz}$)	f_T	4.0	–	MHz
Output Capacitance ($V_{CB} = 10\text{ Vdc}$, $I_E = 0$, $f = 1.0\text{ MHz}$)	2N5883, 2N5884 2N5885, 2N5886	C_{ob}	– –	1000 500	pF
Small–Signal Current Gain	($I_C = 3.0\text{ Adc}$, $V_{CE} = 4.0\text{ Vdc}$, $f_{test} = 1.0\text{ kHz}$)	h_{fe}	20	–	–

SWITCHING CHARACTERISTICS

Rise Time	$(V_{CC} = 30\text{ Vdc}$, $I_C = 10\text{ Adc}$, $I_{B1} = I_{B2} = 1.0\text{ Adc}$)	t_r	–	0.7	μs
Storage Time		t_s	–	1.0	μs
Fall Time		t_f	–	0.8	μs

*Indicates JEDEC Registered Data.

2. Pulse Test: Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 2.0\%$.

3. $f_T = |h_{fe}| \cdot f_{test}$.

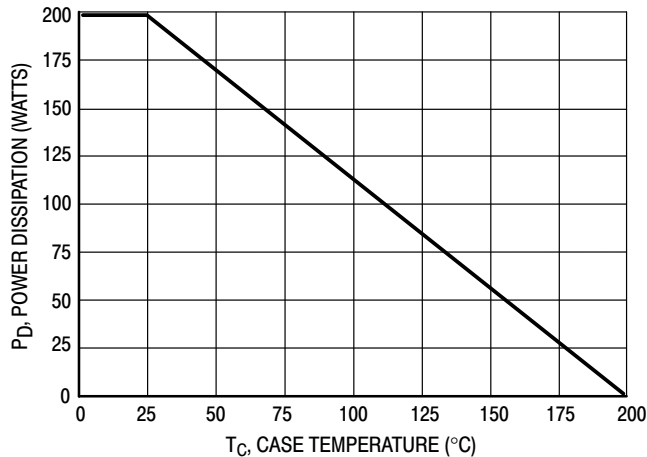
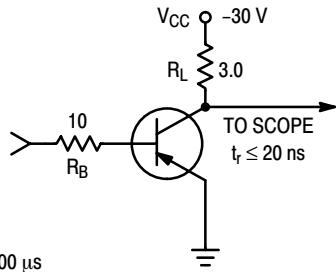
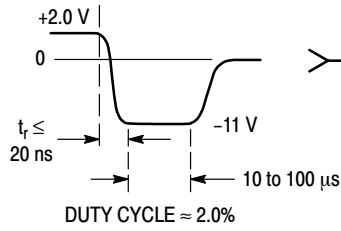


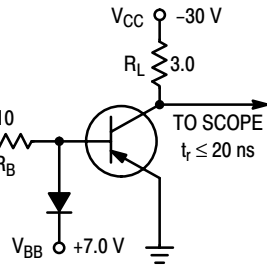
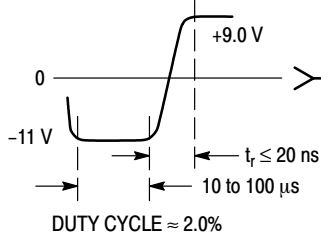
Figure 1. Power Derating

PNP 2N5883, 2N5884*, NPN 2N5885, 2N5886*

TURN-ON TIME



TURN-OFF TIME



FOR CURVES OF FIGURES 3 & 6, R_B & R_L ARE VARIED.
 INPUT LEVELS ARE APPROXIMATELY AS SHOWN.
 FOR NPN, REVERSE ALL POLARITIES.

Figure 2. Switching Time Equivalent Test Circuits

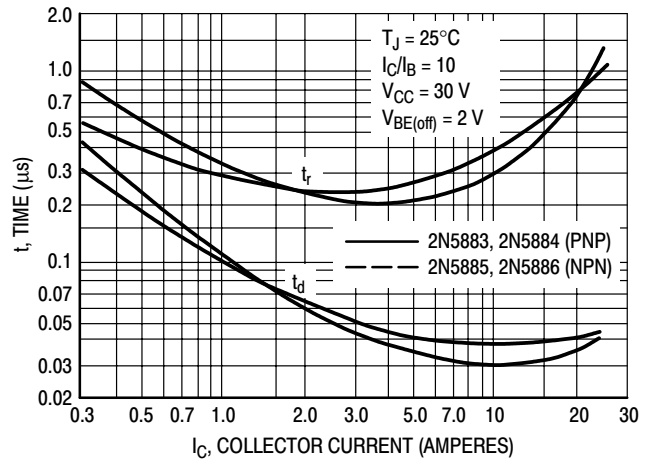


Figure 3. Turn-On Time

PNP 2N5883, 2N5884*, NPN 2N5885, 2N5886*

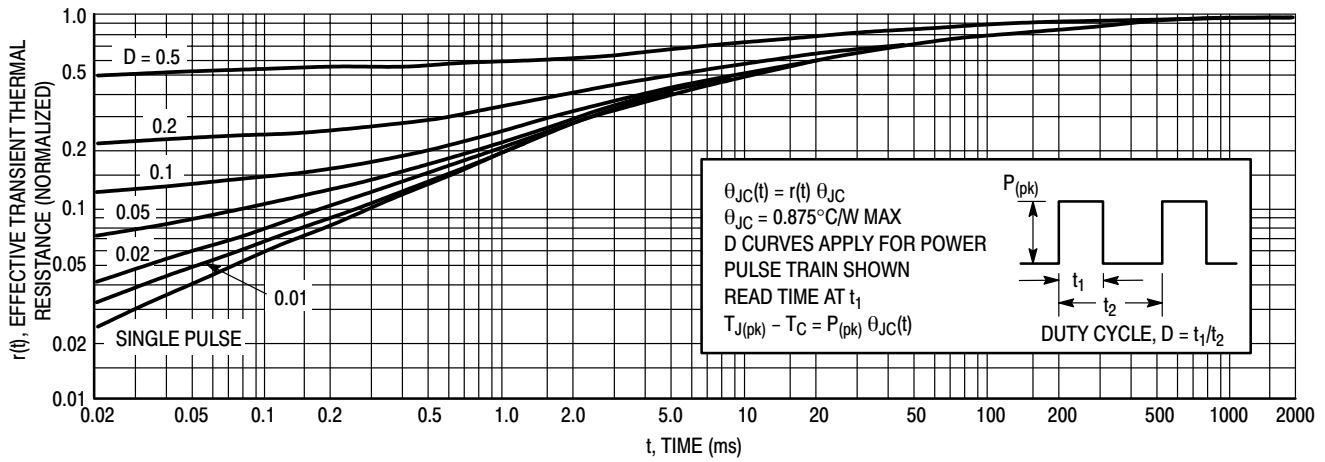


Figure 4. Thermal Response

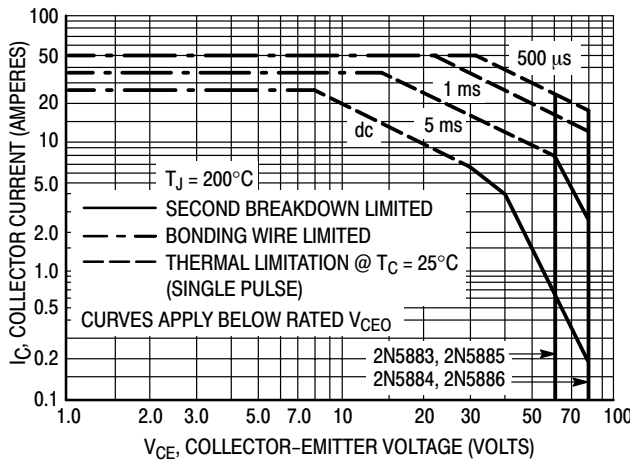


Figure 5. Active-Region Safe Operating Area

There are two limitations on the power handling ability of a transistor: average junction temperature and second breakdown. Safe operating area curves indicate $I_C - V_{CE}$ limits of the transistor that must be observed for reliable operation; i.e., the transistor must not be subjected to greater dissipation than the curves indicate.

The data of Figure 5 is based on $T_{J(pk)} = 200^\circ\text{C}$; T_C is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(pk)} \leq 200^\circ\text{C}$. $T_{J(pk)}$ may be calculated from the data in Figure 4. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

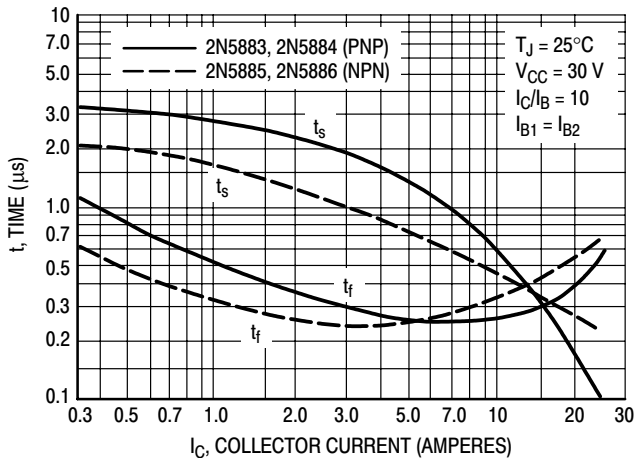


Figure 6. Turn-Off Time

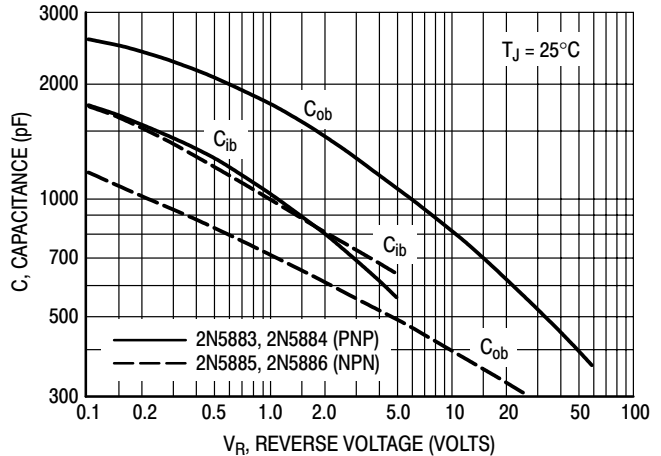


Figure 7. Capacitance

PNP 2N5883, 2N5884*, NPN 2N5885, 2N5886*

PNP DEVICES
2N5883 and 2N5884

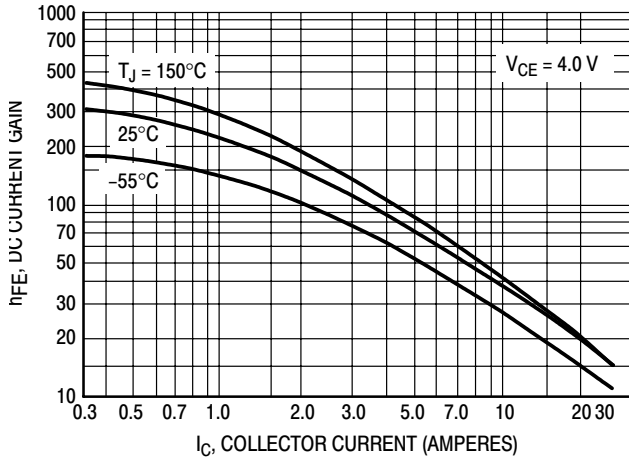


Figure 8. DC Current Gain

NPN DEVICES
2N5885 and 2N5886

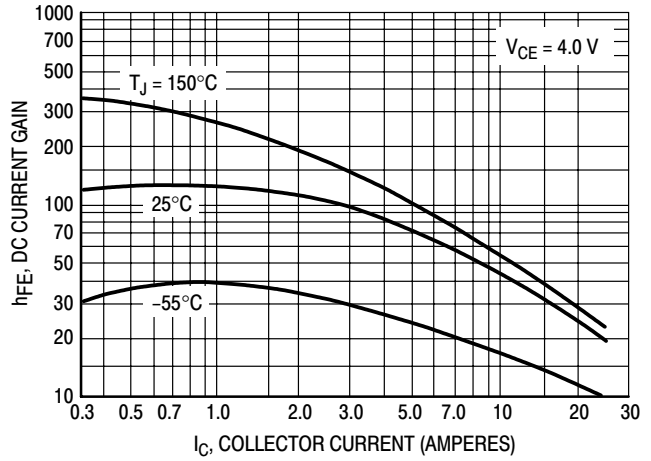


Figure 9. DC Current Gain

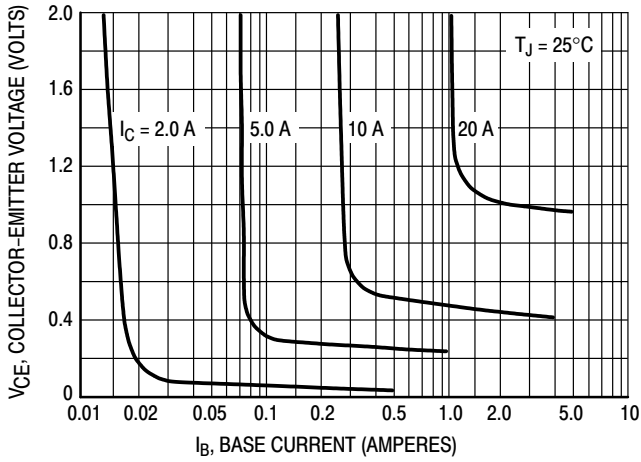


Figure 10. Collector Saturation Region

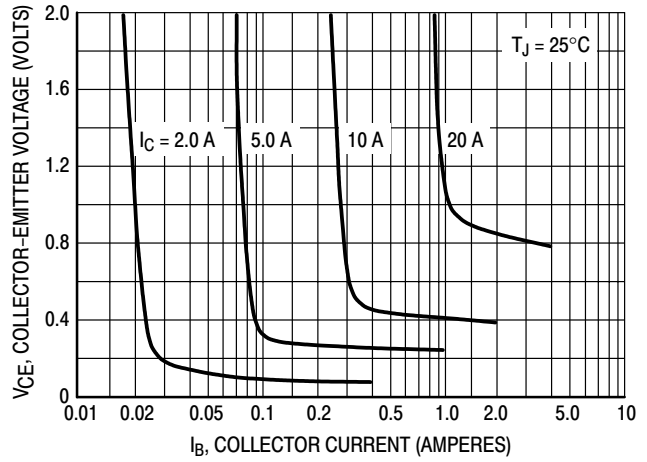


Figure 11. Collector Saturation Region

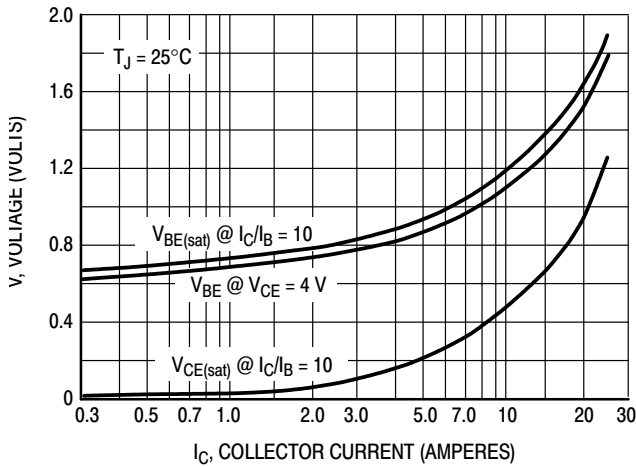


Figure 12. "On" Voltages

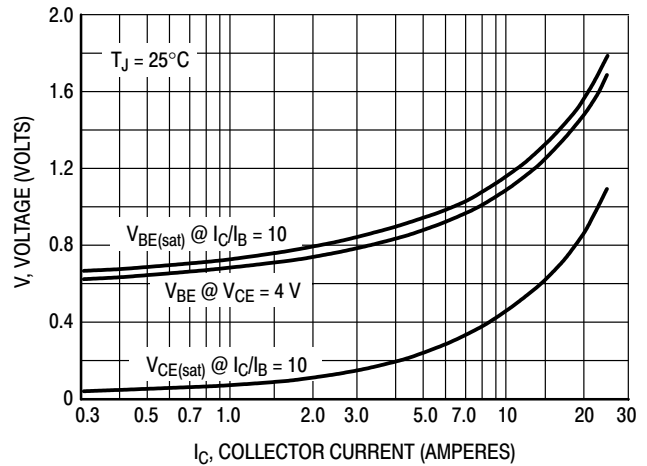
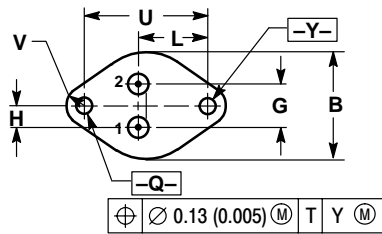
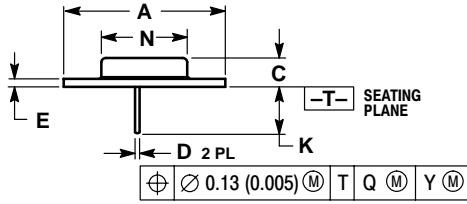


Figure 13. "On" Voltages

PNP 2N5883, 2N5884*, NPN 2N5885, 2N5886*

PACKAGE DIMENSIONS

CASE 1-07
TO-204AA (TO-3)
ISSUE Z




- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. ALL RULES AND NOTES ASSOCIATED WITH REFERENCED TO-204AA OUTLINE SHALL APPLY.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	1.550 REF		39.37 REF	
B	---	1.050	---	26.67
C	0.250	0.335	6.35	8.51
D	0.038	0.043	0.97	1.09
E	0.055	0.070	1.40	1.77
G	0.430 BSC		10.92 BSC	
H	0.215 BSC		5.46 BSC	
K	0.440	0.480	11.18	12.19
L	0.665 BSC		16.89 BSC	
N	---	0.830	---	21.08
Q	0.151	0.165	3.84	4.19
U	1.187 BSC		30.15 BSC	
V	0.131	0.188	3.33	4.77

- STYLE 1:
- PIN 1. BASE
 - EMITTER
- CASE: COLLECTOR

Notes

PNP 2N5883, 2N5884*, NPN 2N5885, 2N5886*

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.

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: ONlit@hibbertco.com

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

JAPAN: ON Semiconductor, Japan Customer Focus Center
4-32-1 Nishi-Gotanda, Shinagawa-ku, Tokyo, Japan 141-0031
Phone: 81-3-5740-2700
Email: r14525@onsemi.com

ON Semiconductor Website: <http://onsemi.com>

For additional information, please contact your local Sales Representative.



LittleDiode supplies new, hard to find or obsolete electronic components and semiconductors all over the world.

With over two million different components listed you are sure to find the part you need.

Feel free to visit us today at our online store:

LittleDiode.com

Looking forward to providing you with the best possible service.