

Complementary Silicon High-Power Transistors

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

- 10 A Collector Current
- Low Leakage Current —
 $I_{CEO} = 0.7 \text{ mA @ } 60 \text{ V}$
- Excellent dc Gain —
 $h_{FE} = 40 \text{ Typ @ } 3.0 \text{ A}$
- High Current Gain Bandwidth Product —
 $h_{fe} = 3.0 \text{ min @ } I_C$
 $= 0.5 \text{ A,}$
 $f = 1.0 \text{ MHz}$

MAXIMUM RATINGS

Rating	Symbol	TIP33C TIP34C	Unit
Collector–Emitter Voltage	V_{CEO}	100 V	Vdc
Collector–Base Voltage	V_{CB}	100 V	Vdc
Emitter–Base Voltage	V_{EB}	5.0	Vdc
Collector Current — Continuous Peak (1)	I_C	10 15	Adc
Base Current — Continuous	I_B	3.0	Adc
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	80 0.64	Watts W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	–65 to +150	$^\circ\text{C}$

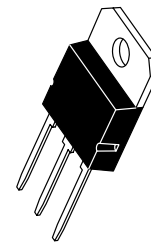
THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.56	$^\circ\text{C/W}$
Junction–To–Free–Air Thermal Resistance	$R_{\theta JA}$	35.7	$^\circ\text{C/W}$

(1) Pulse Test: Pulse Width = 10 ms, Duty Cycle \leq 10%.

**NPN
TIP33C
PNP
TIP34C**

**10 AMPERE
COMPLEMENTARY
SILICON
POWER TRANSISTORS
100 VOLTS
80 WATTS**



**CASE 340D–02
TO–218AC**

TIP33C TIP34C

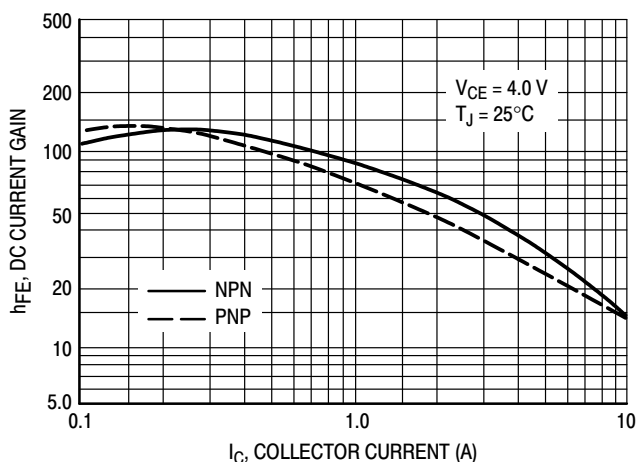


Figure 1. DC Current Gain

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector–Emitter Sustaining Voltage (1) ($I_C = 30$ mA, $I_B = 0$)	$V_{CEO(sus)}$	100	—	Vdc
Collector–Emitter Cutoff Current ($V_{CE} = 60$ V, $I_B = 0$)	I_{CEO}	—	0.7	mA
Collector–Emitter Cutoff Current ($V_{CE} = \text{Rated } V_{CEO}$, $V_{EB} = 0$)	I_{CES}	—	0.4	mA
Emitter–Base Cutoff Current ($V_{EB} = 5.0$ V, $I_C = 0$)	I_{EBO}	—	1.0	mA
ON CHARACTERISTICS (1)				
DC Current Gain ($I_C = 1.0$ A, $V_{CE} = 4.0$ V) ($I_C = 3.0$ A, $V_{CE} = 4.0$ V)	h_{FE}	40 20	— 100	—
Collector–Emitter Saturation Voltage ($I_C = 3.0$ A, $I_B = 0.3$ A) ($I_C = 10$ A, $I_B = 2.5$ A)	$V_{CE(sat)}$	— —	1.0 4.0	Vdc
Base–Emitter On Voltage ($I_C = 3.0$ A, $V_{CE} = 4.0$ V) ($I_C = 10$ A, $V_{CE} = 4.0$ V)	$V_{BE(on)}$	— —	1.6 3.0	Vdc
DYNAMIC CHARACTERISTICS				
Small–Signal Current Gain ($I_C = 0.5$ A, $V_{CE} = 10$ V, $f = 1.0$ kHz)	h_{fe}	20	—	—
Current–Gain — Bandwidth Product ($I_C = 0.5$ A, $V_{CE} = 10$ V, $f = 1.0$ MHz)	f_T	3.0	—	MHz

(1) Pulse Test: Pulse Width = 300 μs , Duty Cycle $\leq 2.0\%$.

TIP33C TIP34C

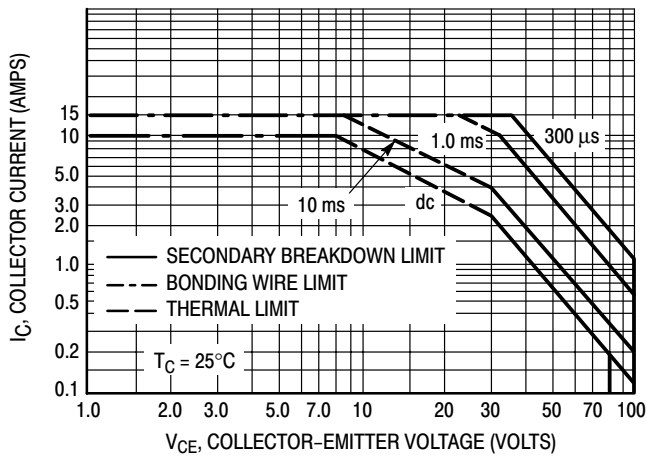


Figure 2. Maximum Rated Forward Bias Safe Operating Area

FORWARD BIAS

The Forward Bias Safe Operating Area represents the voltage and current conditions these devices can withstand during forward bias. The data is based on $T_C = 25^\circ\text{C}$; $T_{J(pk)}$ is variable depending on power level. Second breakdown pulse limits are valid for duty cycles to 10%, and must be derated thermally for $T_C > 25^\circ\text{C}$.

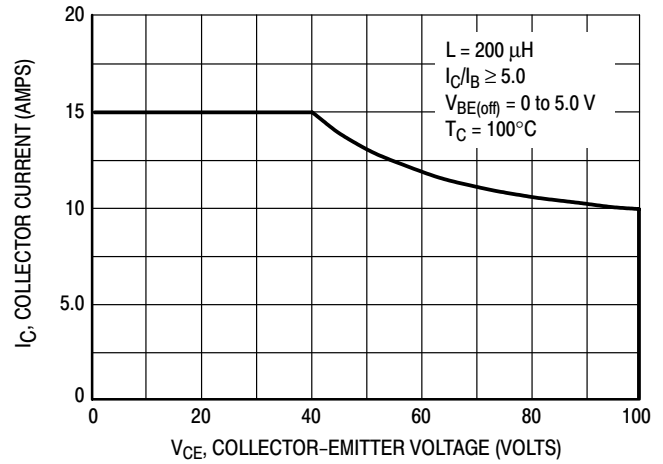


Figure 3. Maximum Rated Forward Bias Safe Operating Area

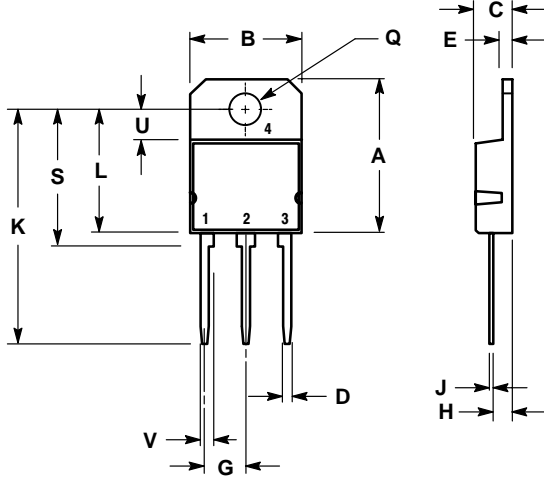
REVERSE BIAS

The Reverse Bias Safe Operating Area represents the voltage and current conditions these devices can withstand during reverse biased turn-off. This rating is verified under clamped conditions so the device is never subjected to an avalanche mode.

TIP33C TIP34C

PACKAGE DIMENSIONS


CASE 340D-02 ISSUE E



- NOTES:
 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: MILLIMETER.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	---	20.35	---	0.801
B	14.70	15.20	0.579	0.598
C	4.70	4.90	0.185	0.193
D	1.10	1.30	0.043	0.051
E	1.17	1.37	0.046	0.054
G	5.40	5.55	0.213	0.219
H	2.00	3.00	0.079	0.118
J	0.50	0.78	0.020	0.031
K	31.00 REF		1.220 REF	
L	---	16.20	---	0.638
Q	4.00	4.10	0.158	0.161
S	17.80	18.20	0.701	0.717
U	4.00 REF		0.157 REF	
V	1.75 REF		0.069	

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

ON Semiconductor and  are 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.