

# Plastic Medium Power Silicon NPN Transistor

... designed for use in 5.0 to 10 Watt audio amplifiers and drivers utilizing complementary or quasi complementary circuits.

- DC Current Gain —  
 $h_{FE} = 40$  (Min) @  $I_C = 0.15$  Adc

## MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	$V_{CEO}$	80	Vdc
Collector–Base Voltage	$V_{CBO}$	100	Vdc
Emitter–Base Voltage	$V_{EBO}$	5.0	Vdc
Collector Current	$I_C$	2.0	Adc
Base Current	$I_B$	1.0	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$	$P_D$	25	Watts
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 Case	$\theta_{JC}$	5.0	$^\circ\text{C/W}$

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

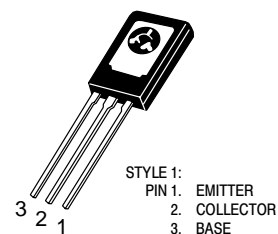
Characteristic	Symbol	Min	Max	Unit
Collector–Emitter Sustaining Voltage* ( $I_C = 0.1$ Adc, $I_B = 0$ )	$V_{(BR)CEO}$	80	—	Vdc
Collector Cutoff Current ( $V_{CB} = 100$ Vdc, $I_E = 0$ )	$I_{CBO}$	—	0.1	mAdc
Emitter Cutoff Current ( $V_{BE} = 5.0$ Vdc, $I_C = 0$ )	$I_{EBO}$	—	1.0	mAdc
DC Current Gain ( $I_C = 0.15$ A, $V_{CE} = 2.0$ V) ( $I_C = 1.0$ A, $V_{CE} = 2.0$ V)	$h_{FE1}$ $h_{FE2}$	40 25	— —	
Collector–Emitter Saturation Voltage* ( $I_C = 1.0$ Adc, $I_B = 0.1$ Adc)	$V_{CE(sat)}$	—	0.6	Vdc
Base–Emitter On Voltage* ( $I_C = 1.0$ Adc, $V_{CE} = 2.0$ Vdc)	$V_{BE(on)}$	—	1.3	Vdc
Current–Gain — Bandwidth Product ( $I_C = 250$ mAdc, $V_{CE} = 10$ Vdc, $f = 1.0$ MHz)	$f_T$	3.0	—	MHz

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

**NPN  
BD237  
PNP  
BD238**

\*ON Semiconductor Preferred Device

**2.0 AMPERES  
POWER TRANSISTORS  
NPN SILICON  
80 VOLTS  
25 WATTS**



**CASE 77–09  
TO–225AA TYPE**

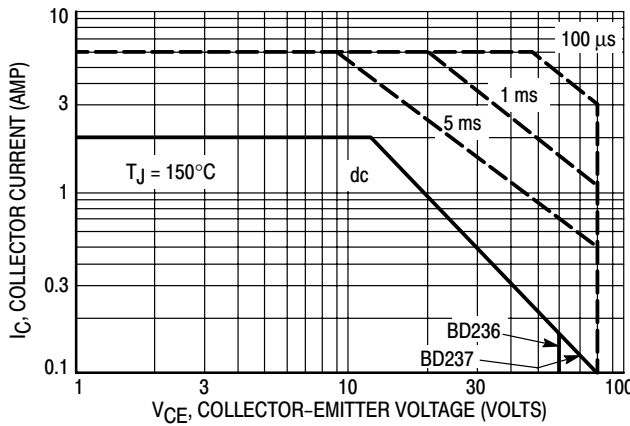


Figure 1. Active Region Safe Operating Area

The Safe Operating Area Curves indicate  $I_C - V_{CE}$  limits below which the device will not enter secondary breakdown. Collector load lines for specific circuits must fall within the applicable Safe Area to avoid causing a catastrophic failure. To insure operation below the maximum  $T_J$ , power-temperature derating must be observed for both steady state and pulse power conditions.

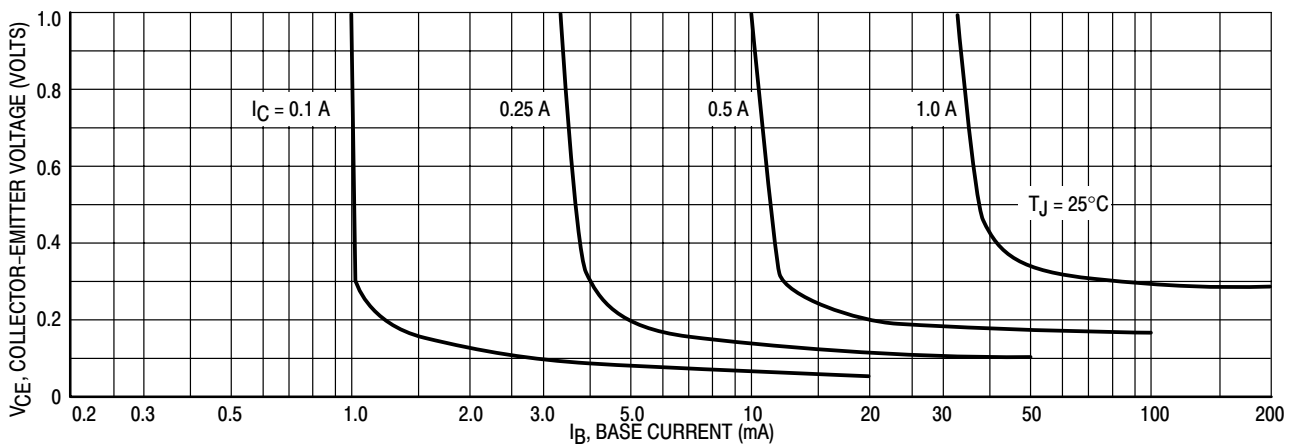


Figure 2. Collector Saturation Region

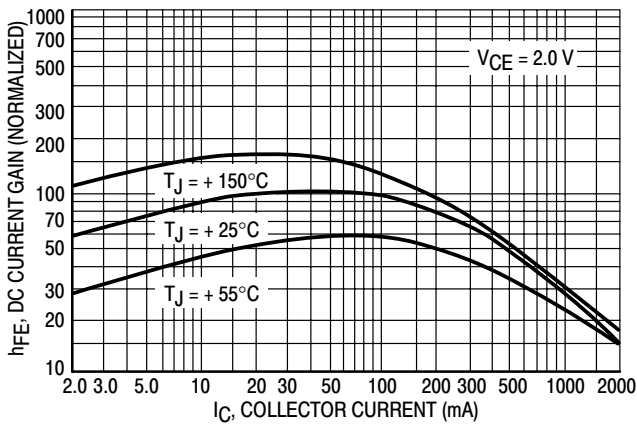


Figure 3. Current Gain

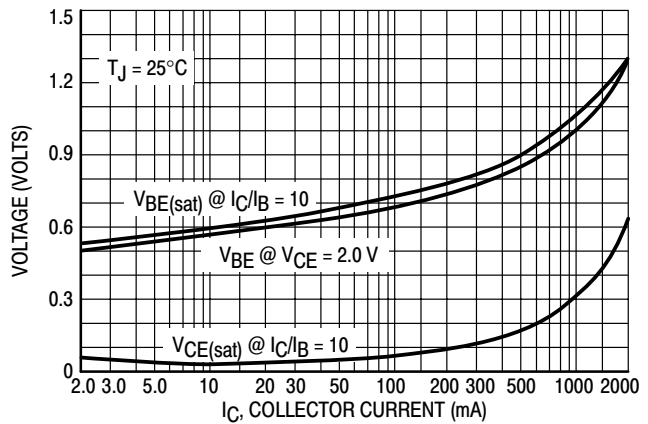
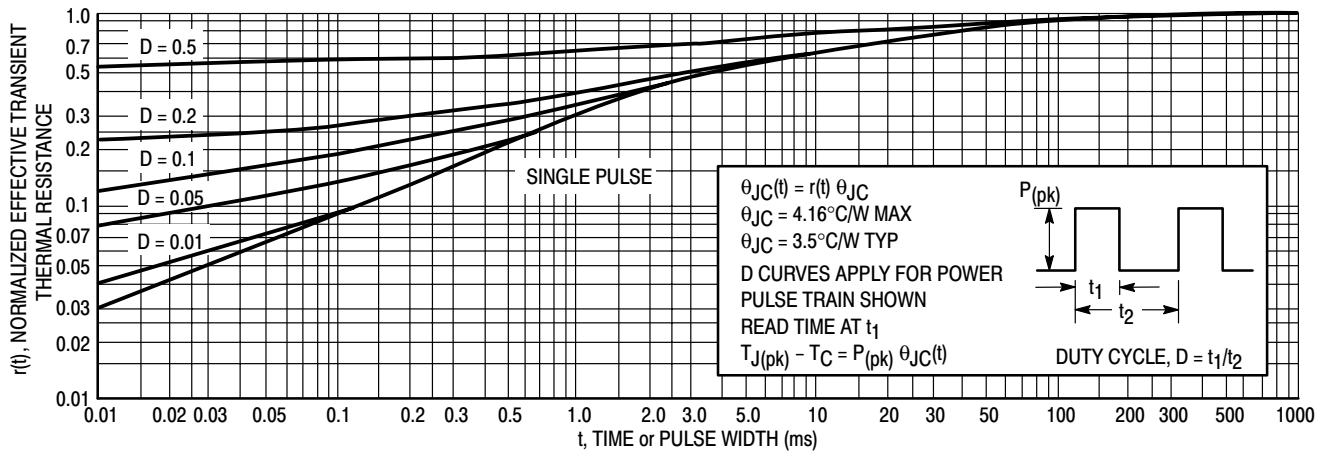


Figure 4. "On" Voltages

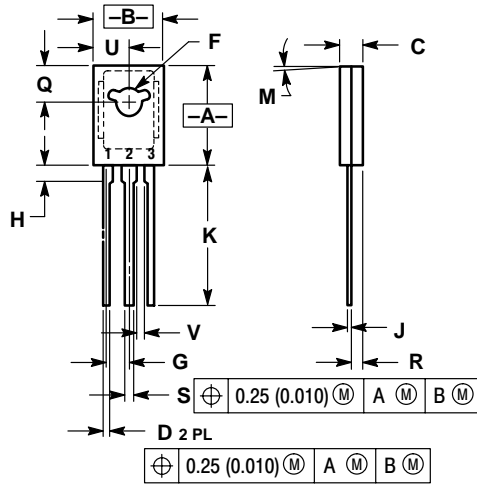
# BD238



# BD238

## PACKAGE DIMENSIONS


### TO-225AA CASE 77-09 ISSUE W



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

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.425	0.435	10.80	11.04
B	0.295	0.305	7.50	7.74
C	0.095	0.105	2.42	2.66
D	0.020	0.026	0.51	0.66
F	0.115	0.130	2.93	3.30
G	0.094 BSC		2.39 BSC	
H	0.050	0.095	1.27	2.41
J	0.015	0.025	0.39	0.63
K	0.575	0.655	14.61	16.63
M	5° TYP		5° TYP	
Q	0.148	0.158	3.76	4.01
R	0.045	0.065	1.15	1.65
S	0.025	0.035	0.64	0.88
U	0.145	0.155	3.69	3.93
V	0.040	---	1.02	---

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

**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.