

TD 54-661 Page 1

Westinghouse



**Silicon Power Transistors  
 JEDEC Types 2N1015,  
 2N1016**

7.5 Amperes, 150 Watts  
 Collector-to-Emitter Voltage 30 to 300  
 Volts

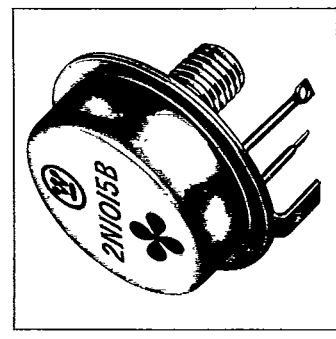
**Application**

The Westinghouse 2N1015 and 2N1016 series are NPN fused silicon power transistors. These transistors are rated at a maximum collector current of 7.5 amperes, the 2N1015 series having a minimum d-c gain of 10 at 2 amperes and the 2N1016 having a minimum d-c gain of 10 at 5 amperes. Exhibiting extremely low saturation resistance and characterized by excellent operating capabilities at True Voltage Ratings and high temperatures, these transistors provide a new degree of flexibility for circuit design. The silicon power transistor is hermetically sealed in a welded case and features an all-welded internal construction, thus assuring maximum reliability and long life. The mounting stud of the single-ended case style is designed for good thermal contact to an external heat sink as well as ease of installation. Specifically designed for high-power switching, voltage and current regulators, and amplifier application in industrial and military equipments, each transistor is 100

percent tested for electrical characteristics, and in addition, each production lot is further subjected to rigid environmental testing. All of these transistors carry the Westinghouse Lifetime Guarantee.

**Guarantee**

Westinghouse warrants to the original purchaser that it will correct any defect or defects in workmanship, by repair or replacement f.o.b. factory, for any silicon power semiconductor bearing this symbol  $\oplus$ ™ during the life of the equipment in which it is originally installed, provided said device is used within manufacturer's published ratings and applied in accordance with good engineering practice. This warranty shall constitute a fulfillment of all Westinghouse liabilities in respect to said products. This warranty is exclusive and in lieu of all other warranties of quality, whether written, oral, or implied (including any warranty of merchantability or fitness for purpose). Westinghouse shall not be liable for any consequential damages.



**Thermal Characteristics**

- \*Thermal resistance,  $\theta_{JC}$ , °C/watt, max. .07
- Derating factor, Watts/°C . . . . . 1.43
- \*Typical thermal drop, case to heat sink, °C/watt. . . . . 0.3

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**Maximum Ratings**

① The maximum collector to emitter voltage rating is based on the maximum rated forward bias-base-emitter junction temperature. The maximum collector to emitter voltage rating is below the various "break-down" voltages,  $V_{CE(sat)}$ ,  $V_{CE(su)}$  and the  $\alpha_{min}=1$  curve in the safe operating region,  $V_{CE(su)}$ . Each parameter is power limited within its maximum limits of  $V_{CE}$ ,  $P_D$  and  $I_C$ . (see figures 3 and 4).

**Voltage**

*Collector to emitter, $V_{CE}$ , $V_{CE(su)}$	2N1015	2N1016	30
*Collector to base, $V_{CB}$ , $V_{CB(su)}$	2N1015A	2N1016A	60
*Base current, $I_B$ , A dc	2N1015B	2N1016B	100
*Emitter current, $I_E$ , A dc	2N1015C	2N1016C	150
*Power dissipation, $P_T$ at $T_C=45^\circ\text{C}$ , watts, max.	2N1015D	2N1016D	200
*Junction temperature, $T_J$ , $^\circ\text{C}$	2N1015E	2N1016E	250
*Storage temperature, $T_{stg}$ , $^\circ\text{C}$ min. to max.	2N1015F	2N1016F	300
*Power dissipation, $P_T$ at $T_C=45^\circ\text{C}$ , watts, max.			25

**Current**

*Collector current, $I_C$ , A dc			7.5
*Base current, $I_B$ , A dc			5.0
*Emitter current, $I_E$ , A dc			7.5

**Power**

*Power dissipation, $P_T$ at $T_C=45^\circ\text{C}$ , watts, max.			150
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**Temperature**

*Junction temperature, $T_J$ , $^\circ\text{C}$			+150
*Storage temperature, $T_{stg}$ , $^\circ\text{C}$ min. to max.			-65 to +150

**Electrical Characteristics**  $T_C=25^\circ\text{C}$  unless otherwise specified

	Symbol	Minimum	Typical	Max.	Units
<b>2N1015/2N1016</b>					
Collector current at $V_{CE}=V_{CE(sat)}$ (from max. ratings), $T_J=150^\circ\text{C}$ , $V_{BE}=-1.5\text{ Vdc}$ .	$I_{CX}$	..	2	*20	mA dc
Emitter current at $V_{BE}=25\text{ Vdc}$ , $I_C=0$ , $T_J=150^\circ\text{C}$ .	$I_{EO}$	..	3	*20	mA dc
Switching time, delay plus rise time.	$t_d+t_r$	..	3	..	$\mu\text{sec}$
Storage plus fall time.	$t_s+t_f$	..	7	..	$\mu\text{sec}$
<b>2N1015</b>					
Saturation resistance at $I_C=2\text{ A dc}$ , $I_B=300\text{ mA dc}$ .	$r_{CE(sat)}$	..	0.25	* 0.75	ohms
Dc current gain at $V_{CE}=4\text{ Vdc}$ , $I_C=2\text{ A dc}$ .	$\beta_{FE}$	*10	14	..	..
Base voltage, at $I_C=2\text{ A dc}$ , $I_B=300\text{ mA dc}$ .	$V_{BE(sat)}$	..	1.15	..	Vdc
Beta cut-off frequency.	$f_{\beta o}$	..	25	..	kHz
<b>2N1016</b>					
Saturation resistance at $I_C=5\text{ A dc}$ , $I_B=750\text{ mA dc}$ .	$r_{CE(sat)}$	..	0.12	* 0.5	ohms
Dc current gain at $V_{CE}=4\text{ Vdc}$ , $I_C=5\text{ A dc}$ .	$\beta_{FE}$	*10	18	..	..
Base voltage, at $I_C=5\text{ A dc}$ , $I_B=750\text{ mA dc}$ .	$V_{BE(sat)}$	..	1.25	..	Vdc
Beta cut-off frequency.	$f_{\beta o}$	..	30	..	kHz

\*JEDEC registered parameters.

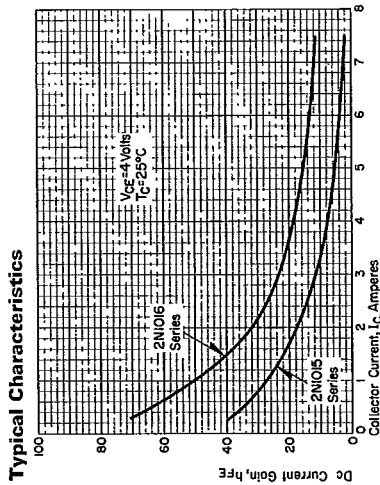


Figure 1. Dc gain versus collector current.

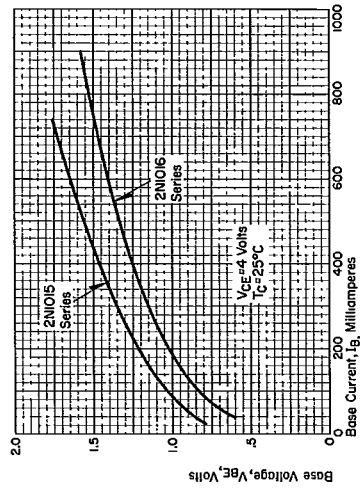


Figure 2. Input characteristics.

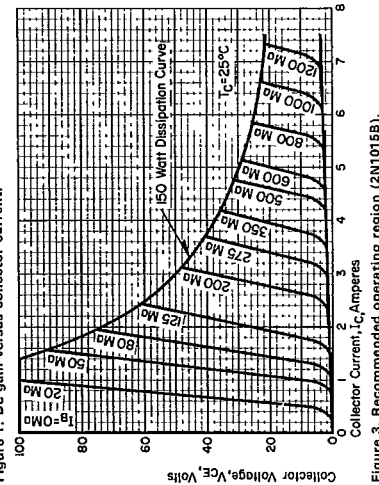


Figure 3. Recommended operating region (2N1015B).

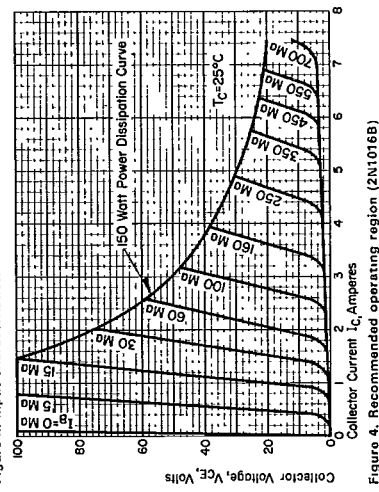
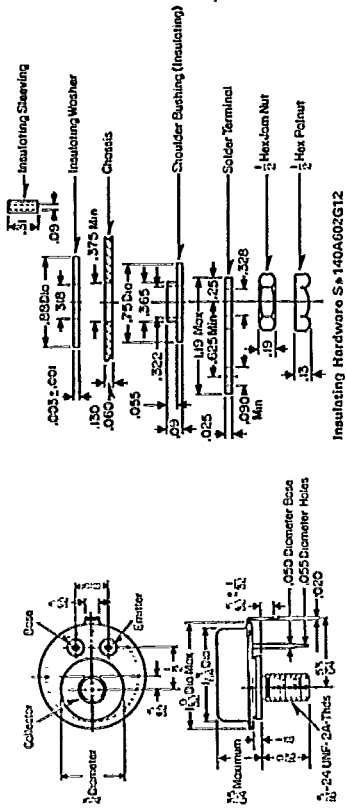


Figure 4. Recommended operating region (2N1016B).



Dimensions in Inches



February, 1967  
Supersedes TD 54-661, pages 1 and 2, dated  
August, 1963  
E. D. C/2116/DB; E. D. C/2117

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