



# BD439/BD440 BD441/BD442

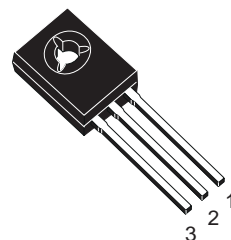
## COMPLEMENTARY SILICON POWER TRANSISTORS

- STMicroelectronics PREFERRED SALESTYPES
- COMPLEMENTARY PNP - NPN DEVICES

### DESCRIPTION

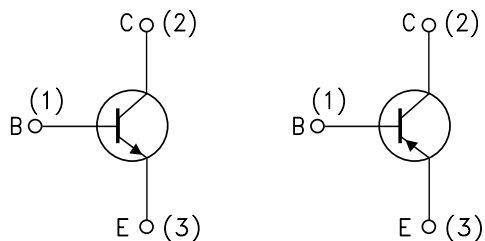
The BD439 and BD441 are silicon epitaxial-base NPN power transistors in Jedec SOT-32 plastic package, intended for use in power linear and switching applications.

The complementary PNP types are BD440, and BD442 respectively.



SOT-32

### INTERNAL SCHEMATIC DIAGRAM



SC06960

SC08810

### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value		Unit
		NPN	PNP	
$V_{CBO}$	Collector-Base Voltage ( $I_E = 0$ )	BD439	BD440	
$V_{CES}$	Collector-Emitter Voltage ( $V_{BE} = 0$ )	BD441	BD442	
$V_{CEO}$	Collector-Emitter Voltage ( $I_B = 0$ )	60	80	V
$V_{EBO}$	Emitter-Base Voltage ( $I_C = 0$ )	5		V
$I_C$	Collector Current	4		A
$I_{CM}$	Collector Peak Current ( $t \leq 10$ ms)	7		A
$I_B$	Base Current	1		A
$P_{tot}$	Total Dissipation at $T_c \leq 25$ °C	36		W
$T_{stg}$	Storage Temperature	-65 to 150		°C
$T_j$	Max. Operating Junction Temperature	150		°C

For PNP types voltage and current values are negative.

**BD439/BD440/BD441/BD442****THERMAL DATA**

R <sub>thj-case</sub>	Thermal Resistance Junction-case	Max	3.5	°C/W
R <sub>thj-amb</sub>	Thermal Resistance Junction-ambient	Max	100	°C/W

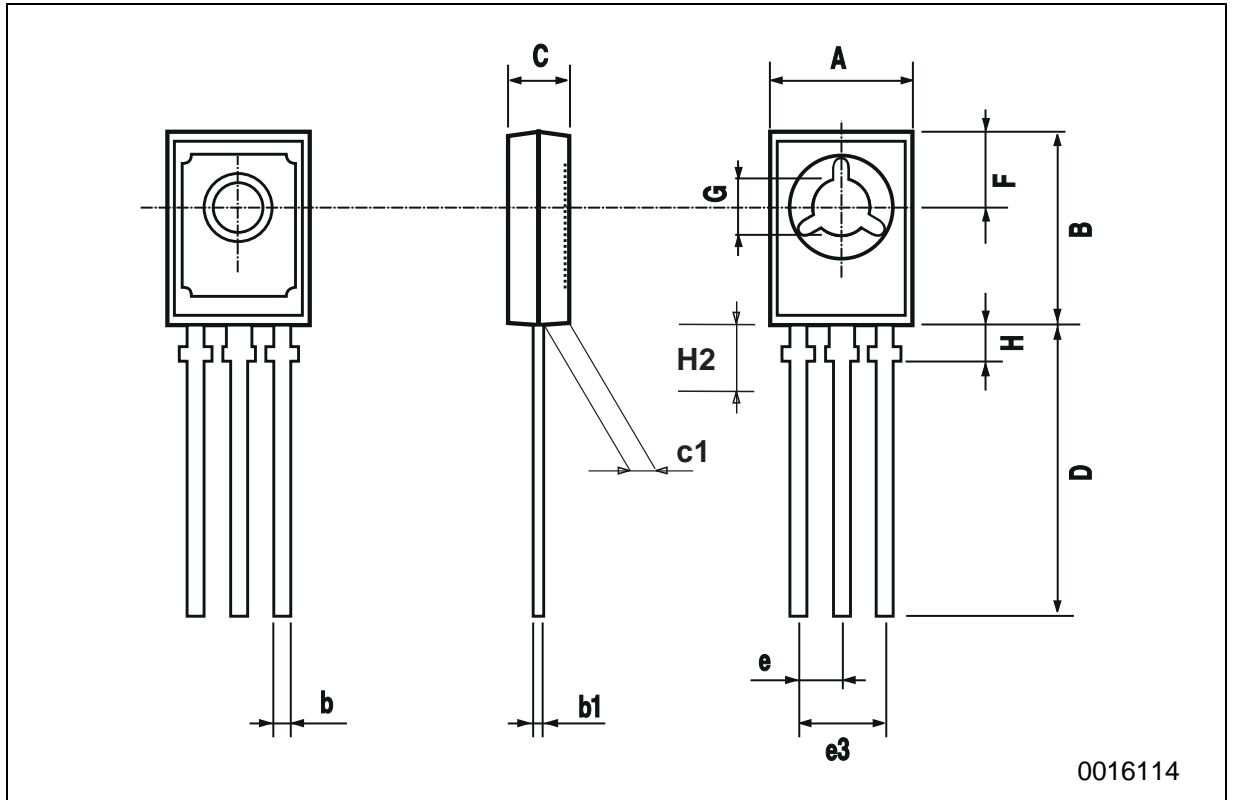
**ELECTRICAL CHARACTERISTICS** (T<sub>case</sub> = 25 °C unless otherwise specified)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
I <sub>CBO</sub>	Collector Cut-off Current (I <sub>E</sub> = 0)	for <b>BD439/440</b> for <b>BD441/442</b>	V <sub>CB</sub> = 60 V V <sub>CB</sub> = 80 V			100 100	μA μA
I <sub>CES</sub>	Collector Cut-off Current (V <sub>BE</sub> = 0)	for <b>BD439/440</b> for <b>BD441/442</b>	V <sub>CB</sub> = 60 V V <sub>CB</sub> = 80 V			100 100	μA μA
I <sub>EBO</sub>	Emitter Cut-off Current (I <sub>C</sub> = 0)	V <sub>EB</sub> = 5 V				1	mA
V <sub>CEO(sus)*</sub>	Collector-Emitter Sustaining Voltage (I <sub>B</sub> = 0)	I <sub>C</sub> = 100 mA	for <b>BD439/440</b> for <b>BD441/442</b>	60 80			V V
V <sub>CE(sat)*</sub>	Collector-Emitter Saturation Voltage	I <sub>C</sub> = 2 A	I <sub>B</sub> = 0.2 A			0.8	V
V <sub>BE*</sub>	Base-Emitter Voltage	I <sub>C</sub> = 10 mA I <sub>C</sub> = 2 A	V <sub>CE</sub> = 5 V V <sub>CE</sub> = 1 V		0.58	1.5	V V
h <sub>FE*</sub>	DC Current Gain	I <sub>C</sub> = 10 mA  I <sub>C</sub> = 500 mA  I <sub>C</sub> = 2 A	V <sub>CE</sub> = 5 V for <b>BD439/440</b> for <b>BD441/442</b> V <sub>CE</sub> = 1 V for <b>BD439/440</b> for <b>BD441/442</b> V <sub>CE</sub> = 1 V for <b>BD439/440</b> for <b>BD441/442</b>	20 15  40 40  25 15	130 130  140 140		
h <sub>FE1</sub> /h <sub>FE2*</sub>	Matched Pair	I <sub>C</sub> = 500 mA	V <sub>CE</sub> = 1 V			1.4	
f <sub>T</sub>	Transition frequency	I <sub>C</sub> = 250 mA	V <sub>CE</sub> = 1 V	3			MHz

\* Pulsed: Pulse duration = 300 ms, duty cycle 1.5 %

## SOT-32 (TO-126) MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	7.4		7.8	0.291		0.307
B	10.5		10.8	0.413		0.445
b	0.7		0.9	0.028		0.035
b1	0.49		0.75	0.019		0.030
C	2.4		2.7	0.040		0.106
c1	1.0		1.3	0.039		0.050
D	15.4		16.0	0.606		0.629
e		2.2			0.087	
e3	4.15		4.65	0.163		0.183
F		3.8			0.150	
G	3		3.2	0.118		0.126
H			2.54			0.100



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