



# 2SD1060

## Bipolar Transistor 50V, 5A, Low $V_{CE(sat)}$ NPN TO-220-3L

ON Semiconductor®

<http://onsemi.com>

### Applications

- Suitable for relay drivers, high-speed inverters, converters, and other general large-current switching

### Features

- Low collector-to-emitter saturation voltage :  $V_{CE(sat)}=0.3V$  max /  $I_C=3A$ ,  $I_B=0.3A$

### Specifications

Absolute Maximum Ratings at  $T_a=25^\circ C$

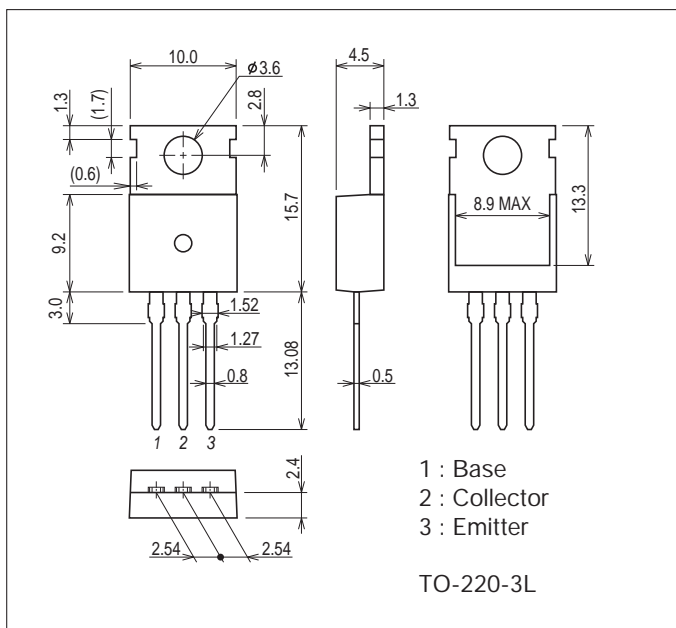
Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	$V_{CBO}$		60	V
Collector-to-Emitter Voltage	$V_{CEO}$		50	V
Emitter-to-Base Voltage	$V_{EBO}$		6	V
Collector Current	$I_C$		5	A
Collector Current (Pulse)	$I_{CP}$		9	A
Collector Dissipation	$P_C$		1.75	W
		$T_c=25^\circ C$	30	W
Junction Temperature	$T_j$		150	$^\circ C$
Storage Temperature	$T_{stg}$		-55 to +150	$^\circ C$

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

### Package Dimensions

unit : mm (typ)

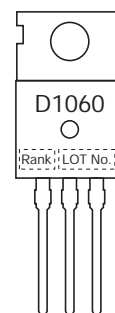
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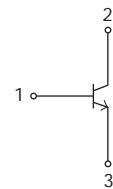
### Product & Package Information

- Package : TO-220-3L
- JEITA, JEDEC : SC-46, TO-220AB
- Minimum Packing Quantity : 50 pcs./magazine

### Marking



### Electrical Connection



# 2SD1060

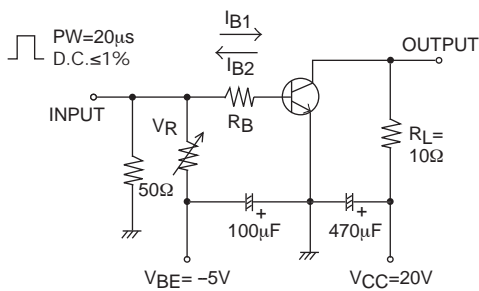
## Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	ICBO	V <sub>CB</sub> =40V, I <sub>E</sub> =0A			0.1	mA
Emitter Cutoff Current	IEBO	V <sub>EB</sub> =4V, I <sub>C</sub> =0A			0.1	mA
DC Current Gain	h <sub>FE1</sub>	V <sub>CE</sub> =2V, I <sub>C</sub> =1A	100*		280*	
	h <sub>FE2</sub>	V <sub>CE</sub> =2V, I <sub>C</sub> =2A	80			
Gain-Bandwidth Product	f <sub>T</sub>	V <sub>CE</sub> =5V, I <sub>C</sub> =1A		30		MHz
Output Capacitance	C <sub>ob</sub>	V <sub>CB</sub> =10V, f=1MHz		100		pF
Collector-to-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	I <sub>C</sub> =3A, I <sub>B</sub> =0.3A			0.3	V
Collector-to-Base Breakdown Voltage	V <sub>(BR)CBO</sub>	I <sub>C</sub> =1mA, I <sub>E</sub> =0A	60			V
Collector-to-Emitter Breakdown Voltage	V <sub>(BR)CEO</sub>	I <sub>C</sub> =1mA, R <sub>BE</sub> =∞	50			V
Emitter-to-Base Breakdown Voltage	V <sub>(BR)EBO</sub>	I <sub>E</sub> =1mA, I <sub>C</sub> =0A	6			V
Turn-On Time	t <sub>on</sub>	See specified Test Circuit		0.1		μs
Storage Time	t <sub>stg</sub>			1.4		μs
Fall Time	t <sub>f</sub>			0.2		μs

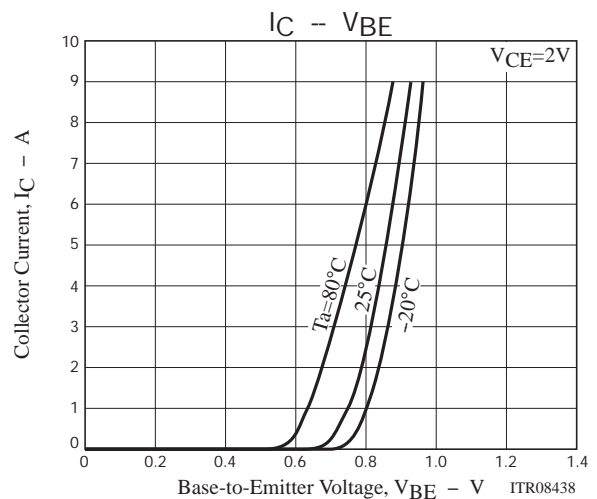
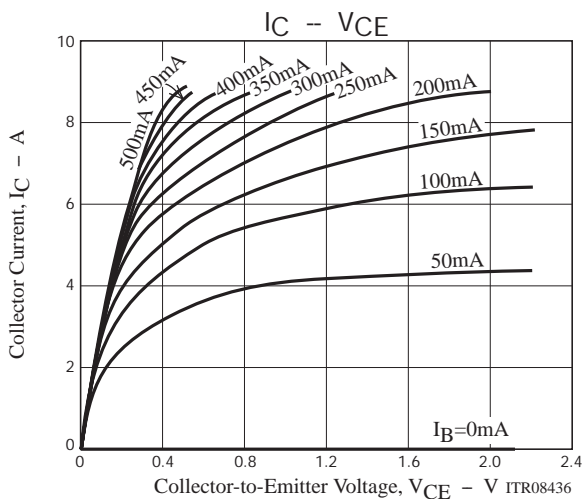
\* : The 2SD1060 is classified by 1A h<sub>FE</sub> as follows

Rank	R	S
h <sub>FE</sub>	100 to 200	140 to 280

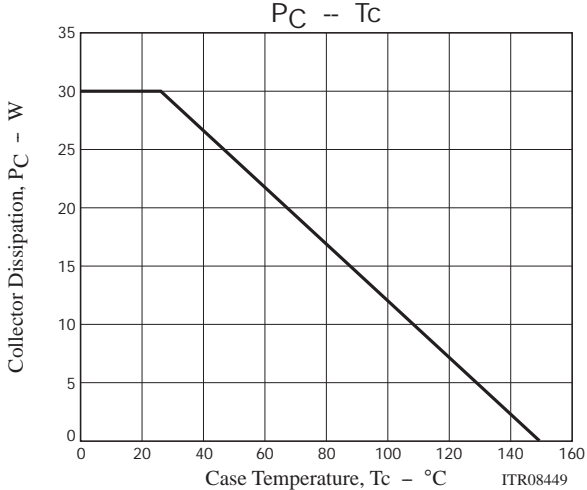
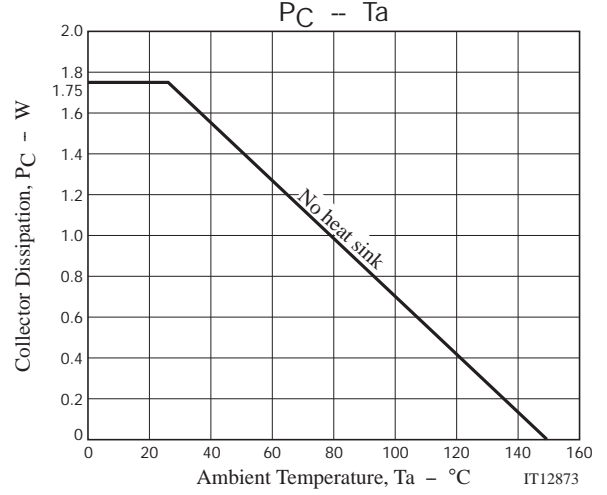
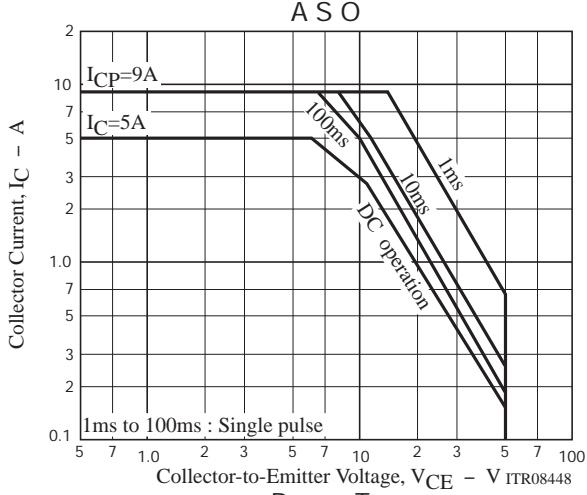
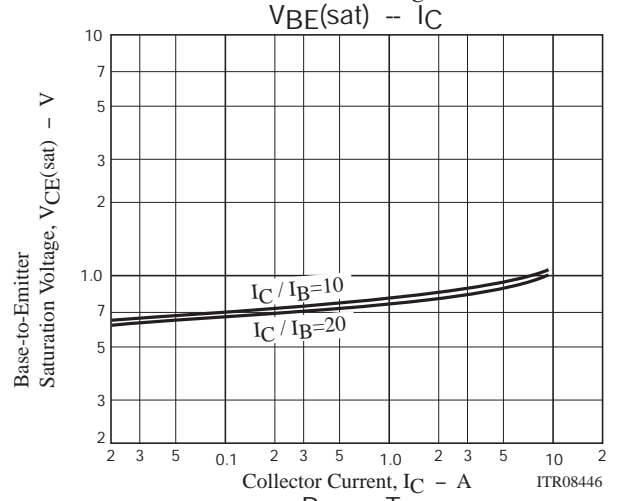
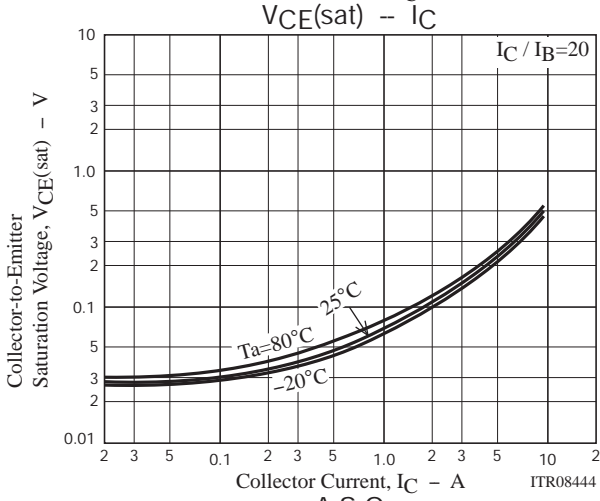
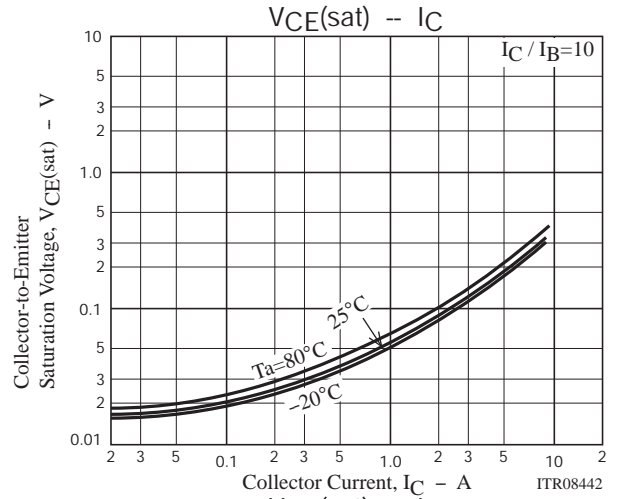
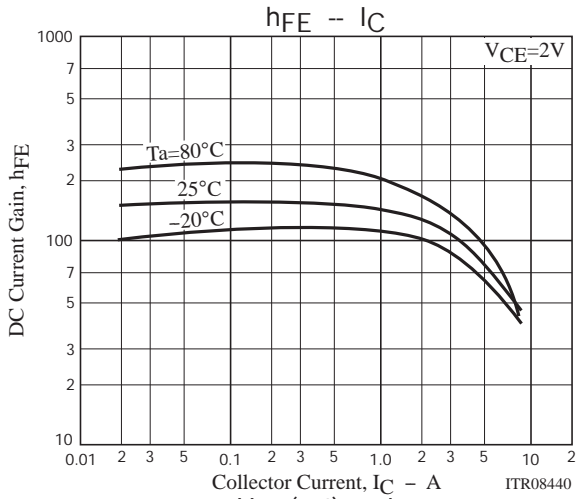
## Switching Time Test Circuit



$$I_C = 10I_{B1} = -10I_{B2} = 2A$$



# 2SD1060



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