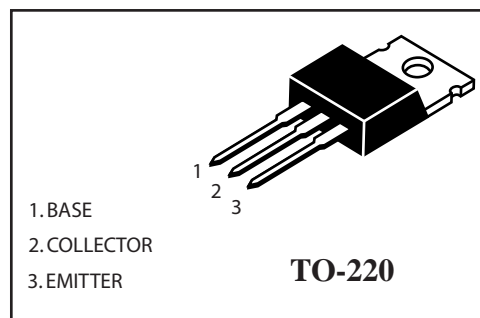


### Plastic-Encapsulate Power Transistors

 Lead(Pb)-Free



### ABSOLUTE MAXIMUM RATINGS (Ta=25 °C)

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V <sub>CEO</sub>	60	V <sub>dc</sub>
Collector-Base Voltage	V <sub>CBO</sub>	70	V <sub>dc</sub>
Emitter-Base Voltage	V <sub>EBO</sub>	5.0	V <sub>dc</sub>
Collector Current (DC)	I <sub>C(DC)</sub>	10	A <sub>dc</sub>
Total Device Dissipation T <sub>C</sub> =25 °C Derate above 25 °C	P <sub>D</sub>	75 0.6	W W/°C
Operating and Storage Junction Temperature Range	T <sub>j</sub> , T <sub>stg</sub>	-55 to +150	°C

### ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Min	Max	Unit
Collector-Emitter Breakdown Voltage (I <sub>C</sub> = 200 mA <sub>dc</sub> , I <sub>B</sub> =0)	V <sub>(BR)CEO</sub>	60	-	V <sub>dc</sub>
Collector-Base Breakdown Voltage (I <sub>C</sub> = 1.0 mA <sub>dc</sub> , I <sub>E</sub> =0)	V <sub>(BR)CBO</sub>	70	-	V <sub>dc</sub>
Emitter-Base Breakdown Voltage (I <sub>E</sub> = 1.0 mA <sub>dc</sub> , I <sub>C</sub> =0)	V <sub>(BR)EBO</sub>	5.0	-	V <sub>dc</sub>
Collector Cutoff Current (V <sub>CB</sub> = 70 V <sub>dc</sub> , I <sub>E</sub> =0)	I <sub>CBO</sub>	-	1.0	nA <sub>dc</sub>
Emitter Cutoff Current (V <sub>EB</sub> = 5.0V <sub>dc</sub> , I <sub>C</sub> =0)	I <sub>EBO</sub>	-	5.0	nA <sub>dc</sub>

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

Characteristics	Symbol	Min	TYP	Max	Unit
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**ON CHARACTERISTICS**

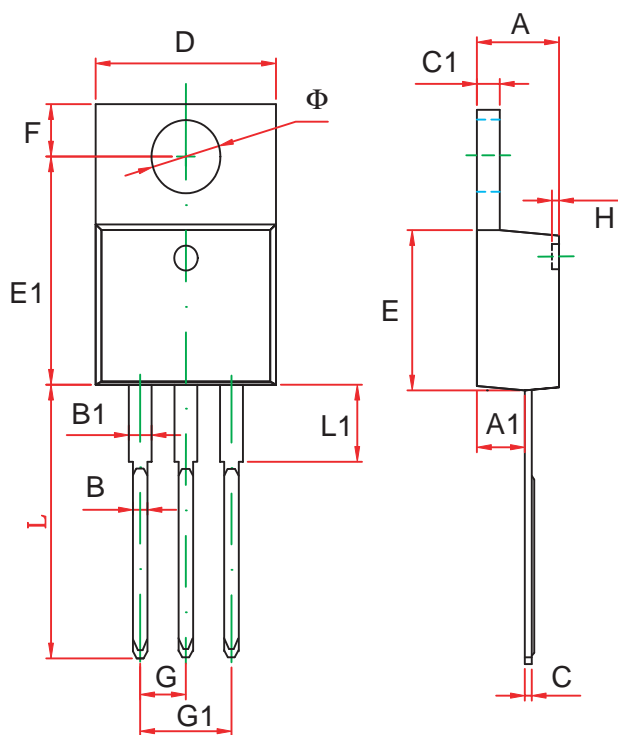
DC Current Gain (1) ( $I_C=4\text{ Adc}, V_{CE}=4\text{ Vdc}$ ) ( $I_C=10\text{ Adc}, V_{CE}=4\text{ Vdc}$ )	$h_{FE}(1)$	20	-	100	-
	$h_{FE}(2)$	5	-	-	-
Collector-Emitter Saturation Voltage (1) ( $I_C=4\text{ Adc}, I_B=400\text{ mAdc}$ ) ( $I_C=10\text{ Adc}, I_B=3.3\text{ Adc}$ )	$V_{CE(sat)}$	- -	- -	1.1 8	Vdc
Base-Emitter On Voltage (1) ( $I_C=4\text{ Adc}, V_{CE}=4\text{ Vdc}$ )	$V_{BE(ON)}$	-	-	1.8	Vdc
Current-Gain-Bandwidth Product ( $I_C=500\text{ mAdc}, V_{CE}=10\text{ Vdc}$ )	$f_T$	-	2	-	MHz

Note:

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

## TO-220 Outline Dimensions

unit:mm



TO-220		
Dim	Min	Max
A	4.47	4.67
A1	2.52	2.82
B	0.71	0.91
B1	1.17	1.37
C	0.31	0.53
C1	1.17	1.37
D	10.01	10.31
E	8.50	8.90
E1	12.06	12.446
G	2.54 TYP	
G1	4.98	5.18
F	2.59	2.89
H	0.00	0.30
L	13.4	13.8
L1	3.56	3.96
Φ	3.73	3.93