

# isc Silicon NPN Darlington Power Transistor

# TIP151

## DESCRIPTION

- Collector-Emitter Breakdown Voltage-  
:  $V_{(BR)CEO} = 350V(\text{Min.})$
- Collector-Emitter Saturation Voltage-  
:  $V_{CE(sat)} = 2.0V(\text{Max.}) @ I_C = 5A$
- Minimum Lot-to-Lot variations for robust device performance and reliable operation

## APPLICATIONS

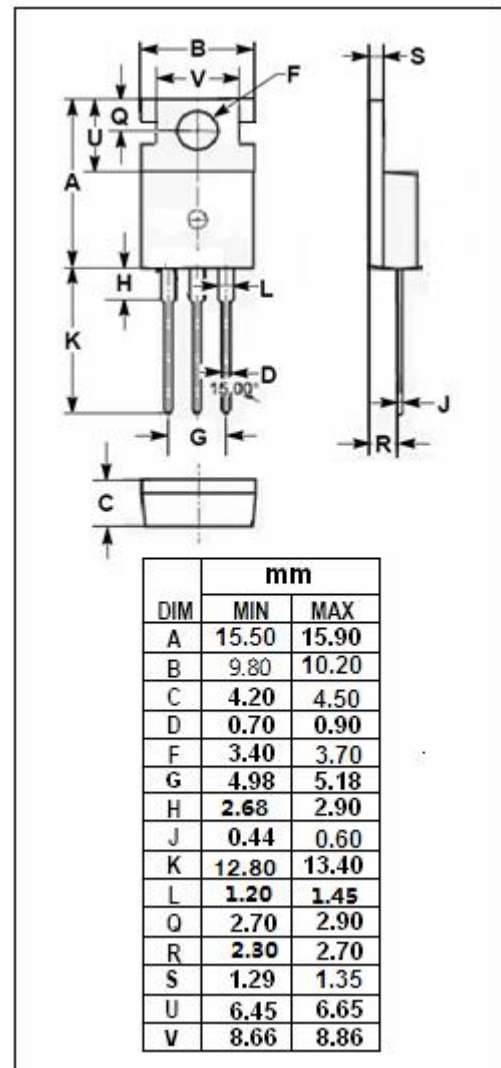
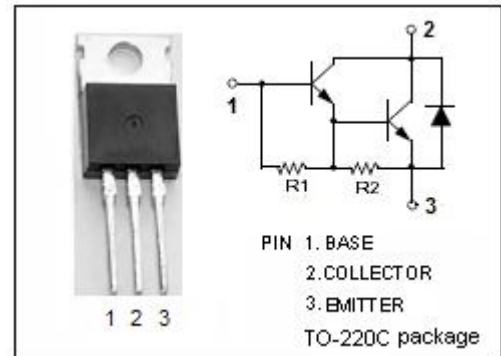
- Designed for use in automotive ignition, switching and motor control applications.

## ABSOLUTE MAXIMUM RATINGS( $T_a = 25^\circ\text{C}$ )

SYMBOL	PARAMETER	VALUE	UNIT
$V_{CBO}$	Collector-Base Voltage	350	V
$V_{CEO}$	Collector-Emitter Voltage	350	V
$V_{EBO}$	Emitter-Base Voltage	8	V
$I_C$	Collector Current-Continuous	7	A
$I_{CM}$	Collector Current-Peak	10	A
$I_B$	Base Current- Continuous	1.5	A
$P_C$	Collector Power Dissipation @ $T_C = 25^\circ\text{C}$	80	W
$T_j$	Junction Temperature	150	$^\circ\text{C}$
$T_{stg}$	Storage Temperature Range	-65~150	$^\circ\text{C}$

## THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	MAX	UNIT
$R_{th\ j-c}$	Thermal Resistance, Junction to Case	1.56	$^\circ\text{C/W}$



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## ELECTRICAL CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP.	MAX	UNIT
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	$I_C=10\text{mA}$ , $I_B=0$	350			V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	$I_C=1.0\text{mA}$ , $I_E=0$	350			V
$V_{CE(sat)-1}$	Collector-Emitter Saturation Voltage	$I_C=1\text{A}$ , $I_B=10\text{mA}$			1.5	V
$V_{CE(sat)-2}$	Collector-Emitter Saturation Voltage	$I_C=2\text{A}$ , $I_B=100\text{mA}$			1.5	V
$V_{CE(sat)-3}$	Collector-Emitter Saturation Voltage	$I_C=5\text{A}$ , $I_B=250\text{mA}$			2.0	V
$V_{BE(sat)-1}$	Base-Emitter Saturation Voltage	$I_C=2\text{A}$ , $I_B=100\text{mA}$			2.2	V
$V_{BE(sat)-2}$	Base-Emitter Saturation Voltage	$I_C=5\text{A}$ , $I_B=250\text{mA}$			2.3	V
$V_F$	C-E Diode Forward Voltage	$I_F=7\text{A}$			3.5	V
$I_{CEO}$	Collector Cutoff current	$V_{CE}=350\text{V}$ , $I_B=0$			0.25	mA
$I_{EBO}$	Emitter Cutoff Current	$V_{EB}=8\text{V}$ ; $I_C=0$			15	mA
$h_{FE-1}$	DC Current Gain	$I_C=2.5\text{A}$ ; $V_{CE}=5\text{V}$	150			
$h_{FE-2}$	DC Current Gain	$I_C=5\text{A}$ ; $V_{CE}=5\text{V}$	50			
$h_{FE-3}$	DC Current Gain	$I_C=7\text{A}$ ; $V_{CE}=5\text{V}$	15			
$C_{OB}$	Collector Output Capacitance	$I_E=0$ ; $V_{CB}=10\text{V}$ ; $f=1\text{MHz}$			150	pF

## Switching Times

$t_d$	Delay Time	$V_{CC}=250\text{V}$ , $I_C=5.0\text{A}$ , $I_{B1}=-I_{B2}=250\text{mA}$ ; $t_p=20\mu\text{s}$ Duty Cycle $\leq 2\%$		0.03		$\mu\text{s}$
$t_r$	Rise Time			0.18		$\mu\text{s}$
$t_{stg}$	Storage Time			3.5		$\mu\text{s}$
$t_f$	Fall Time			1.6		$\mu\text{s}$

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