



# TUL1102

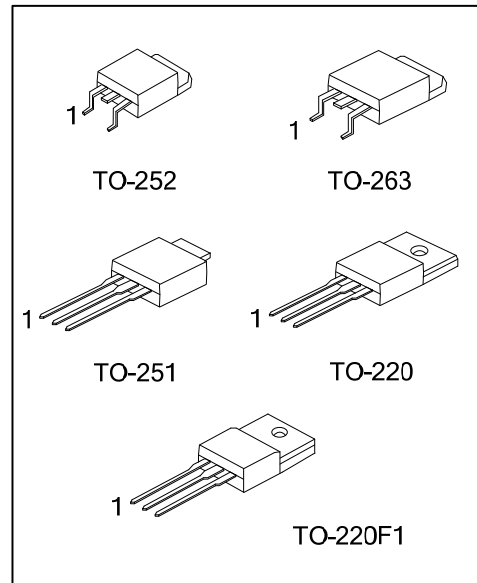
## NPN SILICON TRANSISTOR

**HIGH VOLTAGE  
FAST-SWITCHING NPN  
POWER TRANSISTOR**

■ **DESCRIPTION**

The **TUL1102** is manufactured which is using high voltage Multi Epitaxial Planar technology for high voltage capability and high switching speeds. For enhancing switching speeds while maintaining a wide RBSOA, the **TUL1102** uses a Cellular Emitter structure with planar edge termination.

Because of an increased intermediate layer which has an intrinsic ruggedness, and it enables the transistor to withstand a high collector current level during Breakdown condition, without using the transil protection.

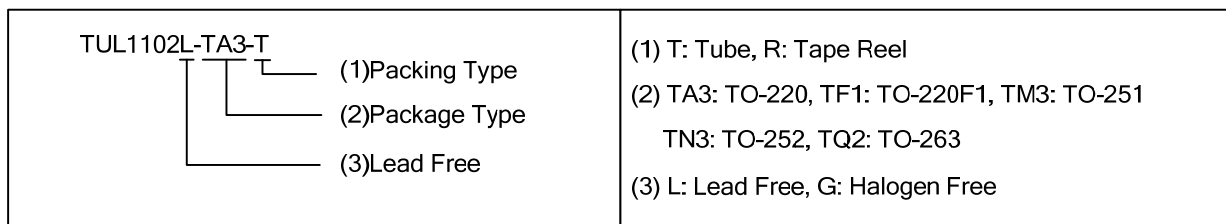


■ **FEATURES**

- \* High voltage
- \* Dynamic parameters: low spread
- \* For reliable operation: minimum lot-to-lot spread
- \* High switching speed

■ **ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment			Packing
Lead Free Plating	Halogen-Free		1	2	3	
TUL1102L-TA3-T	TUL1102G-TA3-T	TO-220	B	C	E	Tube
TUL1102L-TF1-T	TUL1102G-TF1-T	TO-220F1	B	C	E	Tube
TUL1102L-TM3-T	TUL1102G-TM3-T	TO-251	B	C	E	Tube
TUL1102L-TN3-R	TUL1102G-TN3-R	TO-252	B	C	E	Tape Reel
TUL1102L-TQ2-T	TUL1102G-TQ2-T	TO-263	B	C	E	Tube
TUL1102L-TQ2-R	TUL1102G-TQ2-R	TO-263	B	C	E	Tape Reel



■ **MARKING INFORMATION**

PACKAGE	MARKING
TO-220 TO-220F1 TO-251 TO-252 TO-263	<p>UTC TUL1102 Lot Code → Data Code 1 L: Lead Free G: Halogen Free</p>

### ■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATINGS	UNIT
Collector-Emitter Voltage ( $V_{BE} = 0$ )	$V_{CES}$	1100	V
Collector-Emitter Voltage ( $I_B = 0$ )	$V_{CEO}$	450	V
Emitter-Base Voltage ( $I_C = 0$ )	$V_{EBO}$	12	V
Collector Current	$I_C$	4	A
Collector Peak Current ( $t_P < 5$ ms)	$I_{CM}$	8	A
Base Current	$I_B$	2	A
Base Peak Current ( $t_P < 5$ ms)	$I_{BM}$	4	A
Power Dissipation ( $T_C = 25^\circ\text{C}$ )	TO-220/TO-263	70	W
	TO-220F1	30	
	TO-251/TO-252	45	
Junction Temperature	$T_J$	+150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-65 ~ +150	$^\circ\text{C}$

Note: Absolute maximum ratings are the values beyond which the device will be damaged permanently.

Absolute maximum ratings are only stress ratings and it is not implied for functional device operation.

### ■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Case	TO-220/TO-263	1.78	$^\circ\text{C/W}$
	TO-220F1	4.2	
	TO-251/TO-252	2.78	

### ■ ELECTRICAL CHARACTERISTICS ( $T_C = 25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Collector Cut-off Current	$I_{CES}$	$V_{CE} = 1100$ V, $V_{BE} = 0$			100	$\mu\text{A}$
Emitter Cut-off Current	$I_{EBO}$	$V_{EB} = 12$ V, $I_B = 0$			1	mA
Collector-Emitter Sustaining Voltage	$V_{CEO(SUS)}$	$I_C = 100$ mA, $I_B = 0$ (Note)	450			V
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	$I_C = 2$ A, $I_B = 400$ mA (Note)			1.5	V
Base-Emitter Saturation Voltage	$V_{BE(SAT)}$	$I_C = 2$ A, $I_B = 400$ mA (Note)			1.5	V
DC Current Gain (Note)	$h_{FE}$	$I_C = 250$ mA, $V_{CE} = 5$ V	35		70	
		$I_C = 2$ A, $V_{CE} = 5$ V	12		20	
Resistive Load	Storage Time	$I_C = 2.5$ A, $I_{B1} = 0.5$ A, $I_{B2} = 1$ A $V_{CC} = 250$ V			2.5	$\mu\text{s}$
	Fall Time				300	ns
Avalanche Energy	$E_{AR}$	$L = 2$ mH, $C = 1.8$ nF $I_{BR} \leq 2.5$ A, $25^\circ\text{C} < T_C < 125^\circ\text{C}$	6			mJ

Note: Pulsed: Pulse duration = 300  $\mu\text{s}$ , duty cycle 1.5 %

■ TEST CIRCUIT

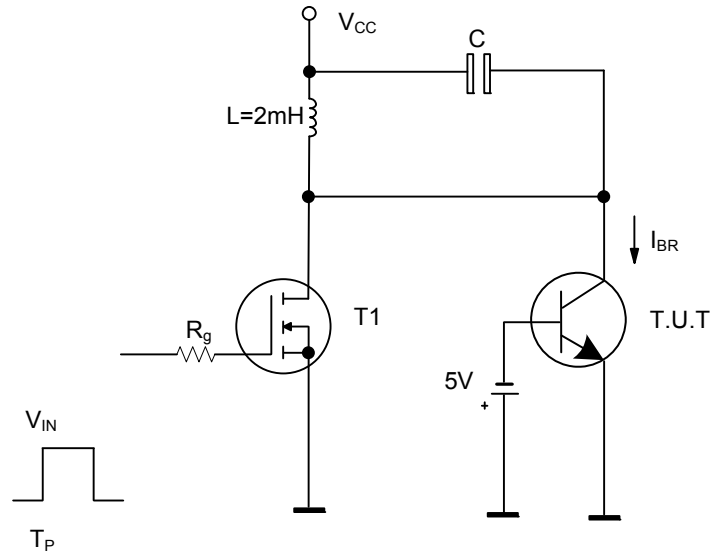


Fig.1 Energy Rating Test Circuit

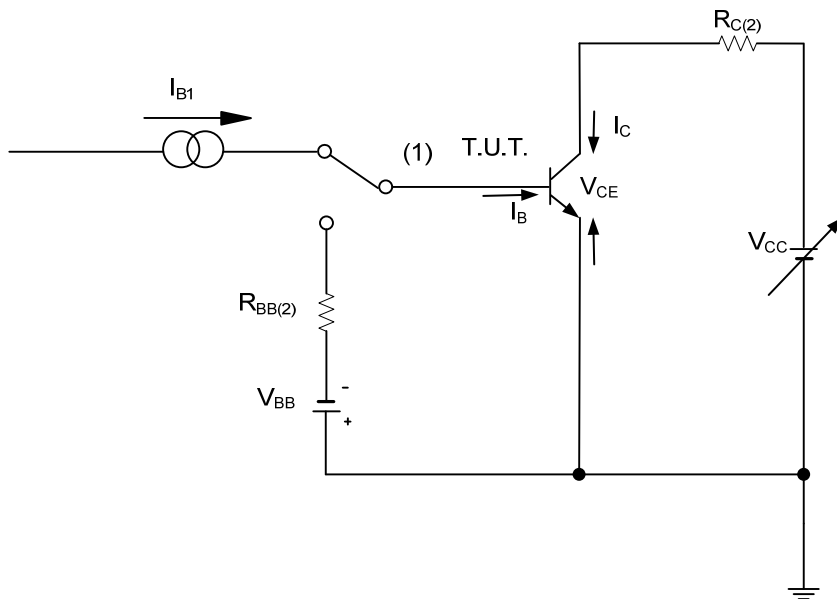
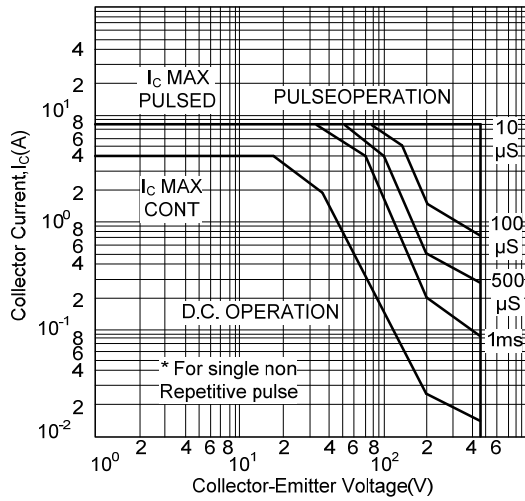


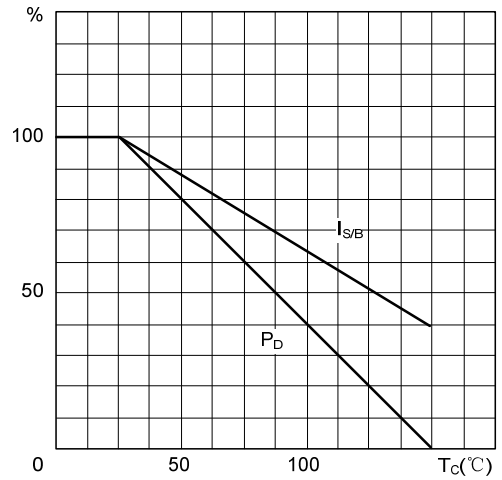
Fig.2 Resistive Load Switching Test Circuit

## TYPICAL CHARACTERISTICS

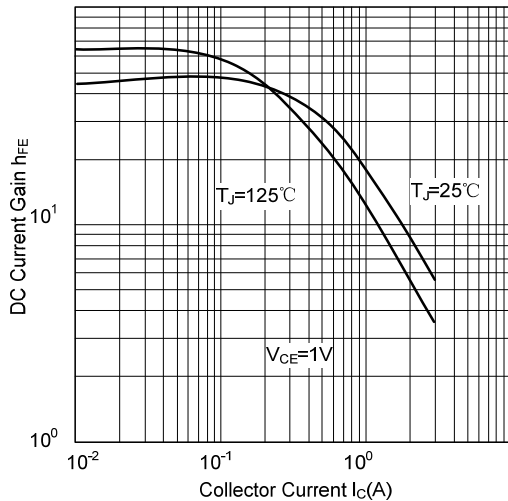
Safe Operating Areas



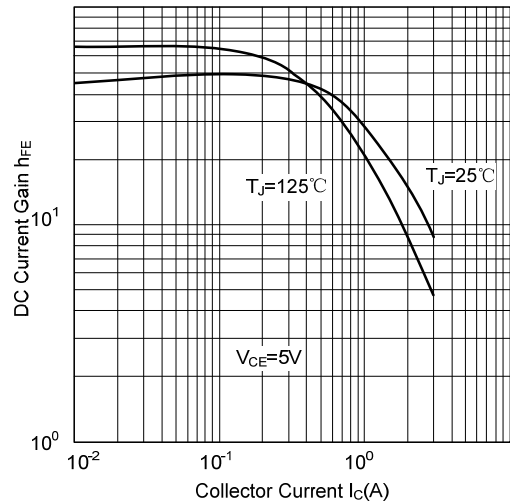
Derating Curve



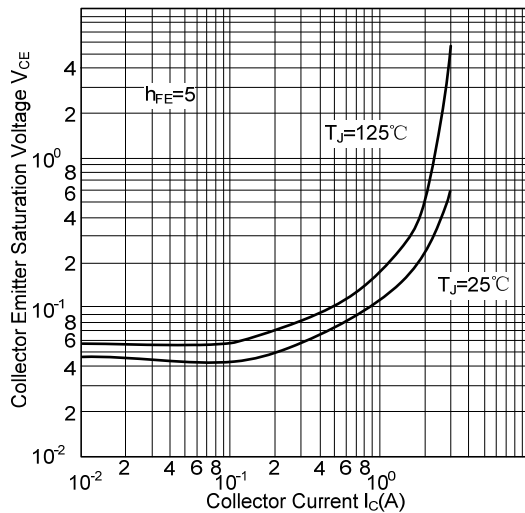
DC Current Gain



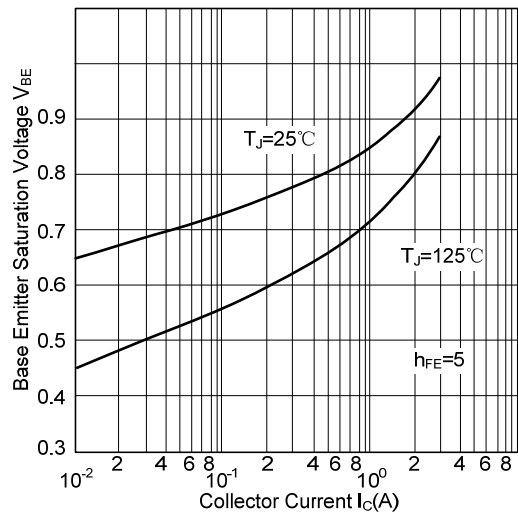
DC Current Gain



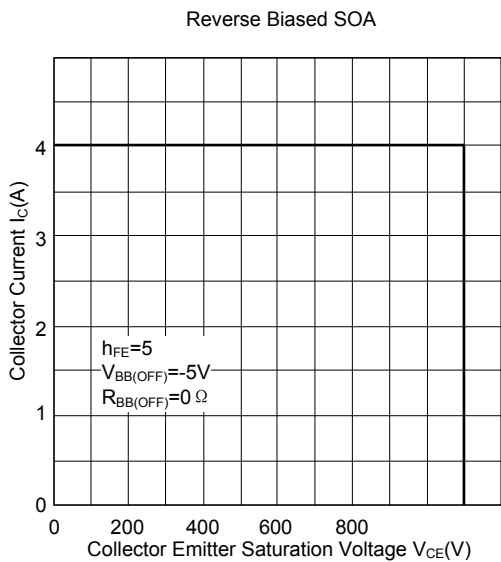
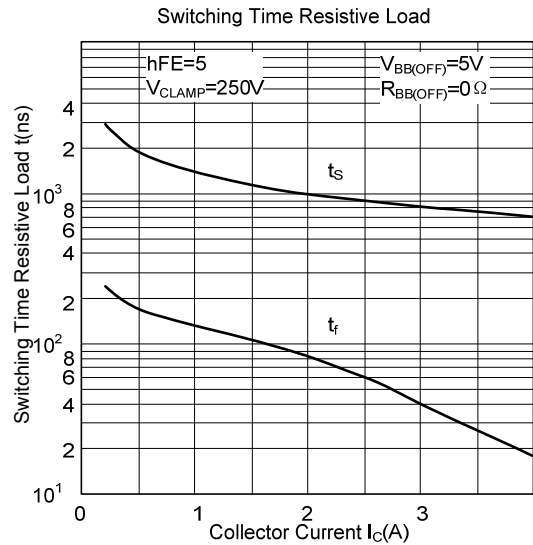
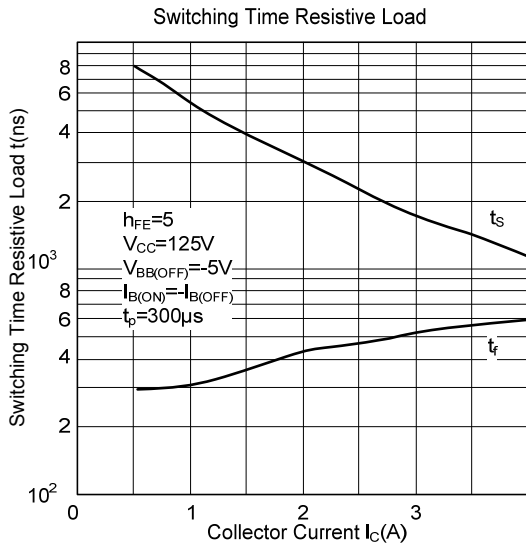
Collector Emitter Saturation Voltage



Base Emitter Saturation Voltage



■ TYPICAL CHARACTERISTICS(Cont.)



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