



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.

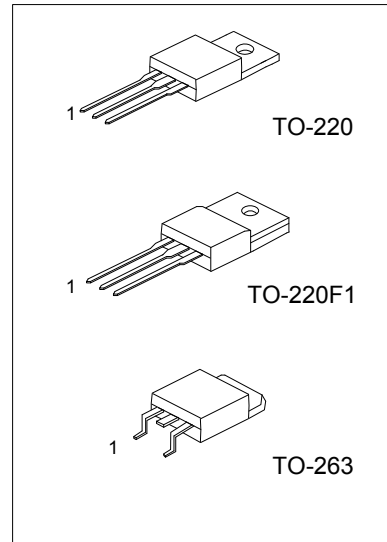
Because of an increased intermediate layer which has an intrinsic ruggedness, and it enables the transistor to withstand a high collector current level during Breakdown condition, without using the transil protection.

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-TQ2-T	TUL1102G-TQ2-T	TO-263	B	C	E	Tube
TUL1102L-TQ2-R	TUL1102G-TQ2-R	TO-263	B	C	E	Tape Reel



<p>TUL1102L-TA3-T</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Lead Free</p>	<p>(1) T: Tube, R: Tape Reel</p> <p>(2) TA3: TO-220, TF1: TO-220F1, TQ2: TO-263</p> <p>(3) G: Halogen Free, L: Lead Free</p>
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■ 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	P_D	70	W
	TO-220F1		30	
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	θ_{JC}	1.78	$^\circ\text{C}/\text{W}$
	TO-220F1		4.2	

■ 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	μA
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	t_S	$I_C = 2.5$ A, $I_{B1} = 0.5$ A, $I_{B2} = 1$ A			2.5	μs
	Fall Time	t_F	$V_{CC} = 250$ V, $T_P = 30$ ms			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 μs , duty cycle 1.5 %

■ TEST CIRCUIT

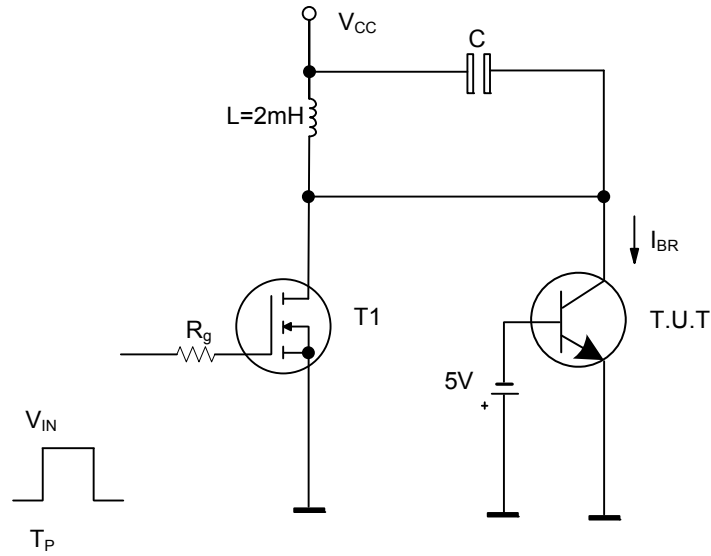


Fig.1 Energy Rating Test Circuit

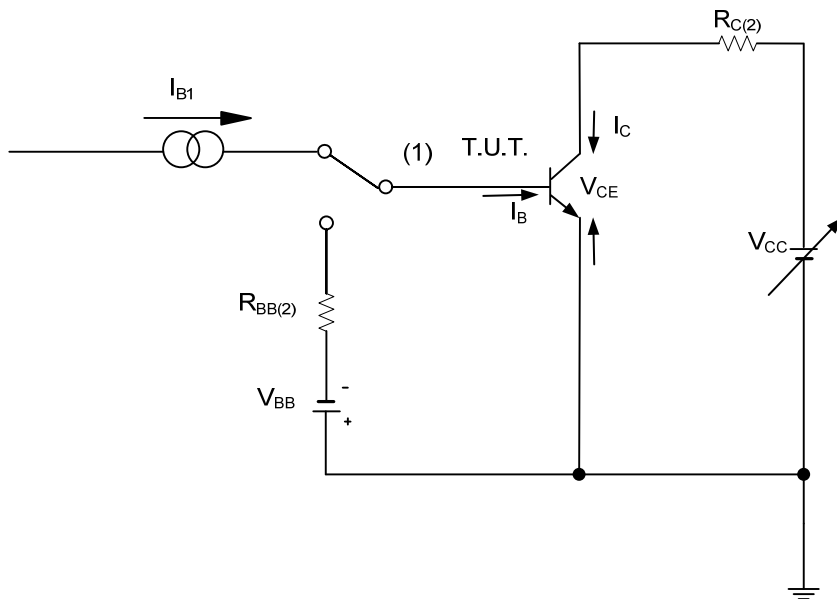
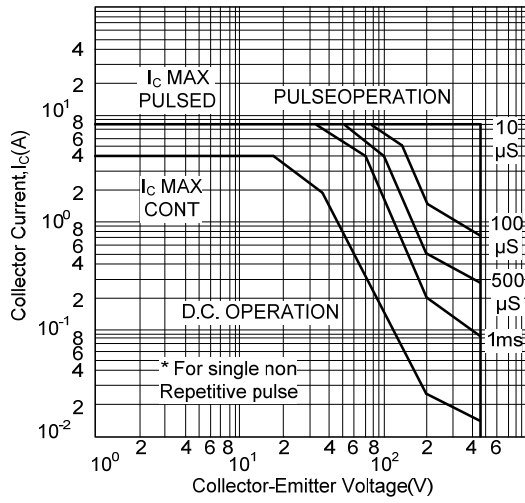


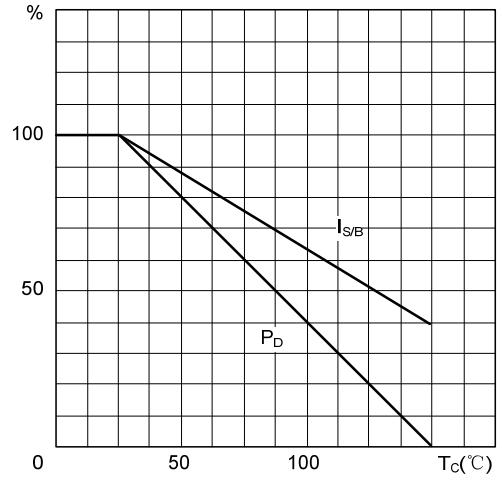
Fig.2 Resistive Load Switching Test Circuit

TYPICAL CHARACTERISTICS

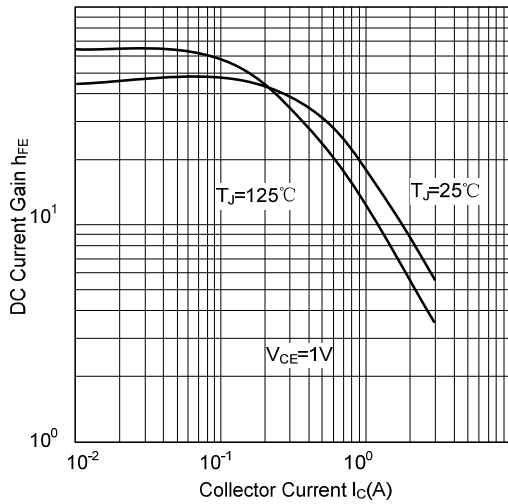
Safe Operating Areas



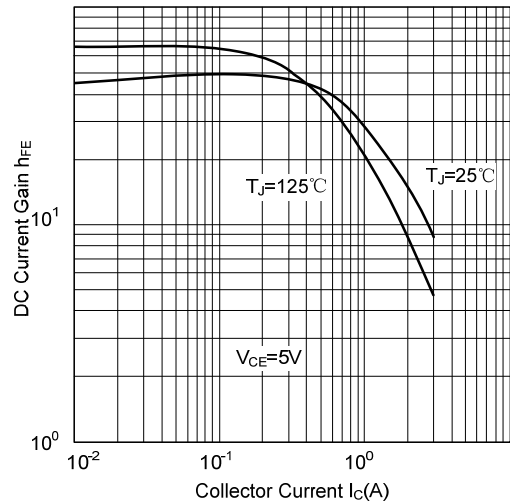
Derating Curve



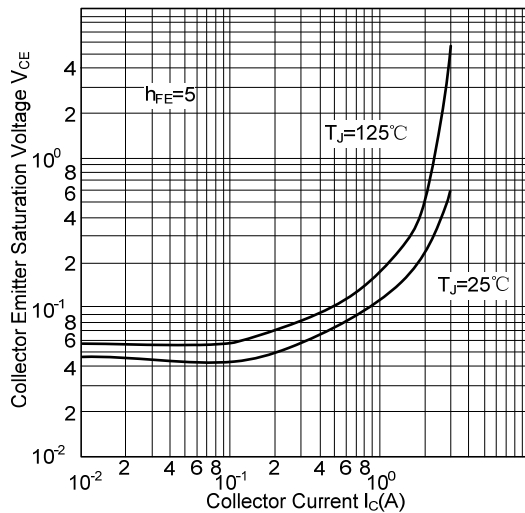
DC Current Gain



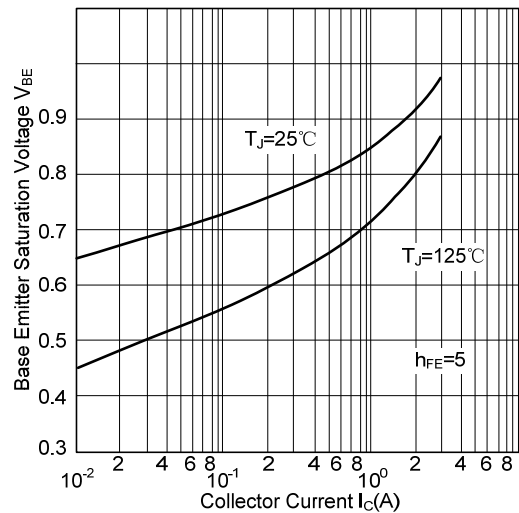
DC Current Gain



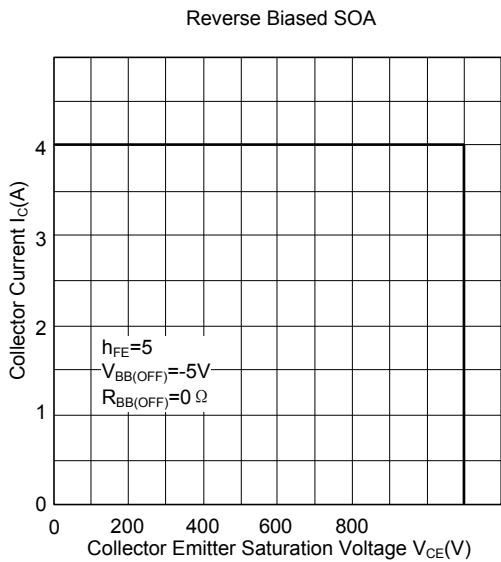
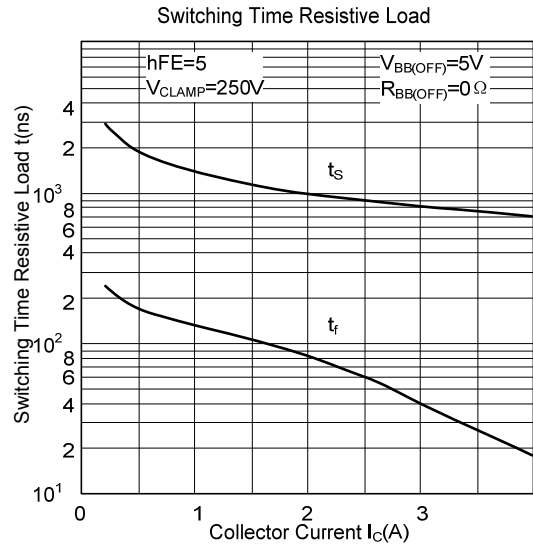
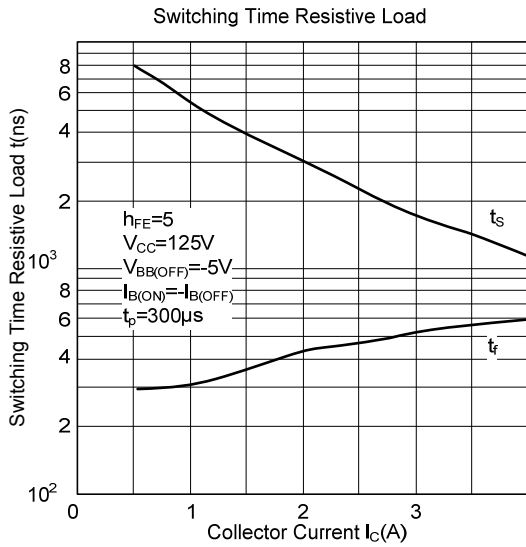
Collector Emitter Saturation Voltage



Base Emitter Saturation Voltage



■ TYPICAL CHARACTERISTICS(Cont.)



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