



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

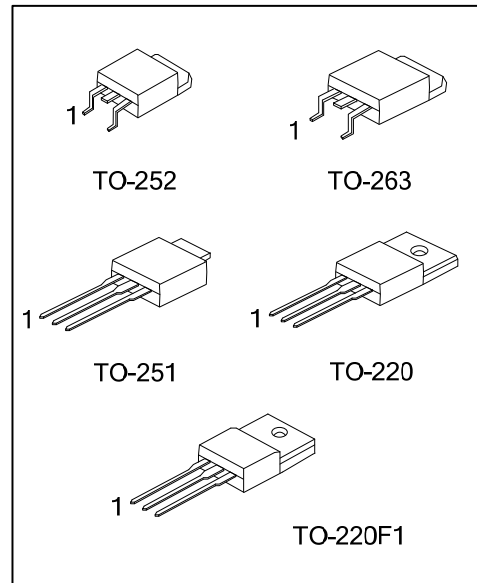
ORDERING INFORMATION

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

TUL1102L-TA3-T (1)Packing Type (2)Package Type (3)Lead Free	(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TF1: TO-220F1, TM3: TO-251 TN3: TO-252, TQ2: TO-263 (3) L: Lead Free, G: Halogen Free
---	---

MARKING INFORMATION

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



■ 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	
	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	θ_{JC}	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	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, $I_{B1}=0.5\text{A}, I_{B2}=1\text{A}$			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

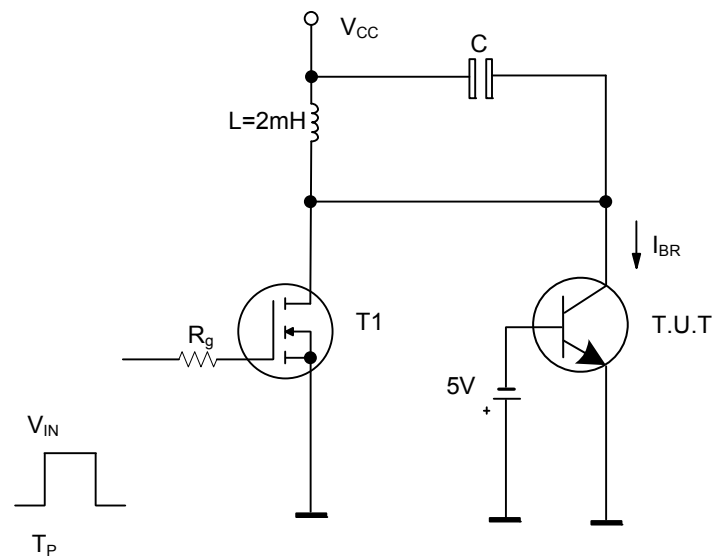


Fig.1 Energy Rating Test Circuit

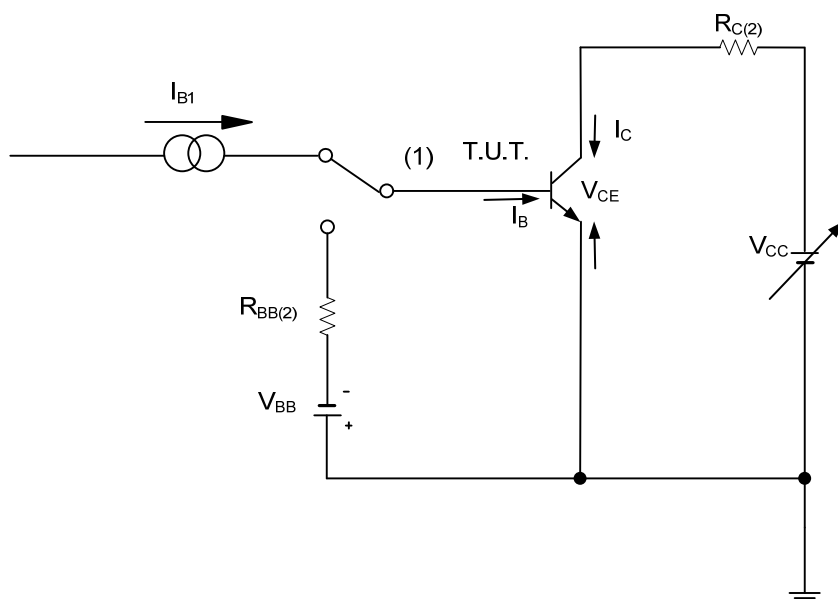
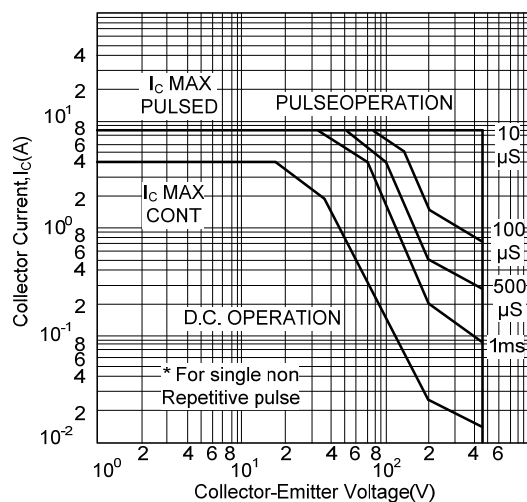


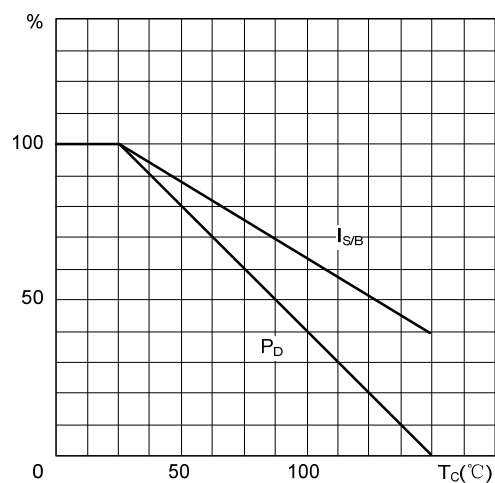
Fig.2 Resistive Load Switching Test Circuit

■ TYPICAL CHARACTERISTICS

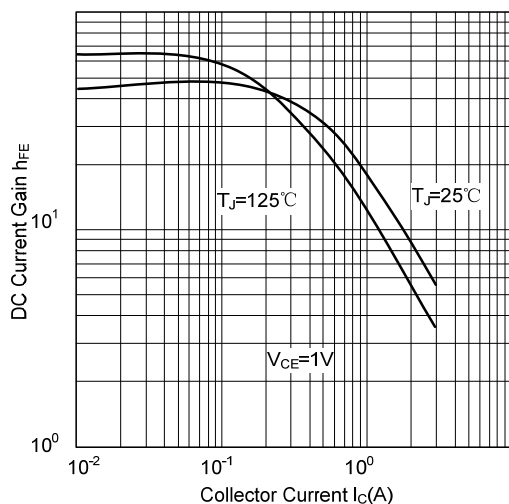
Safe Operating Areas



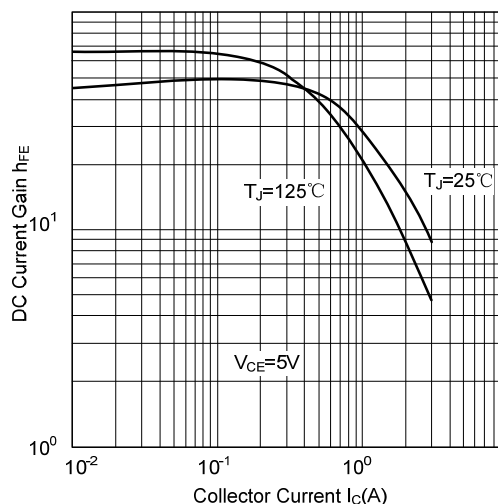
Derating Curve



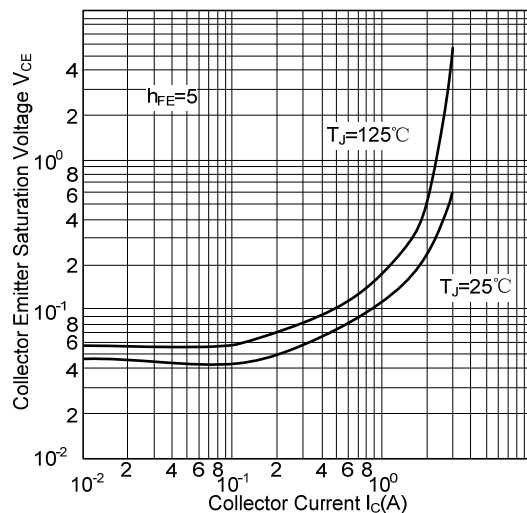
DC Current Gain



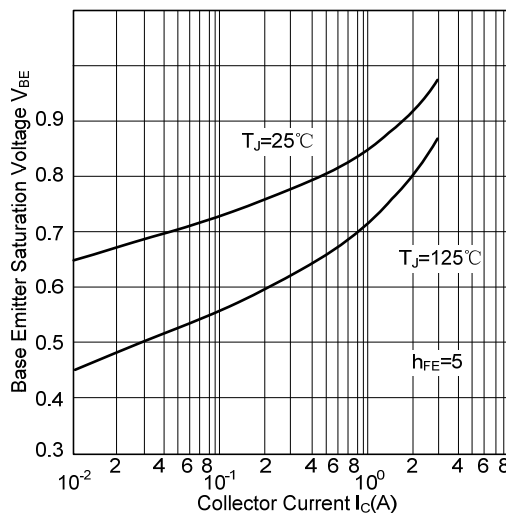
DC Current Gain



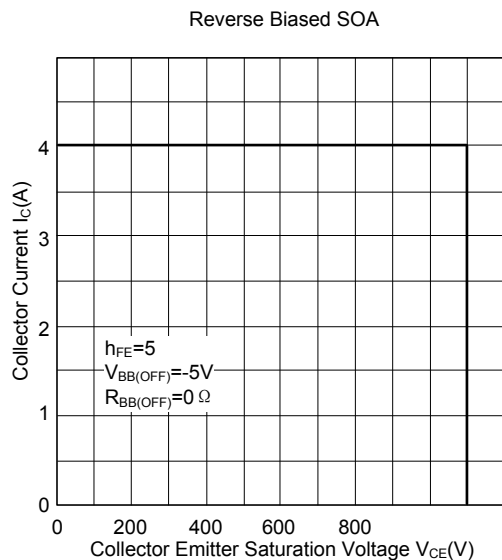
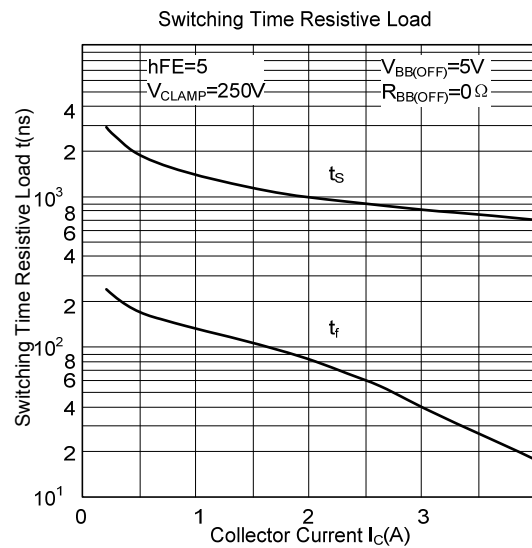
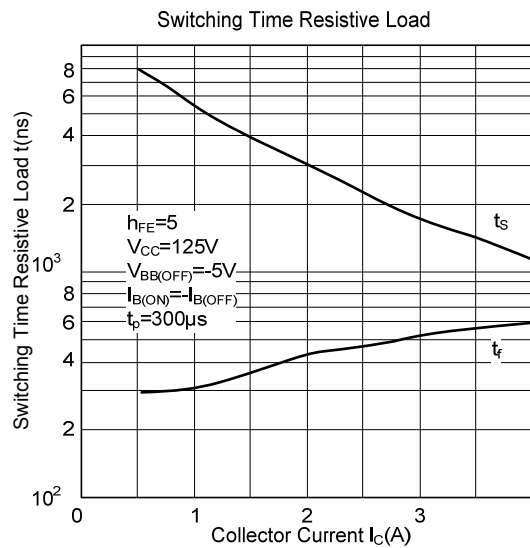
Collector Emitter Saturation Voltage



Base Emitter Saturation Voltage



■ TYPICAL CHARACTERISTICS(Cont.)



UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice.