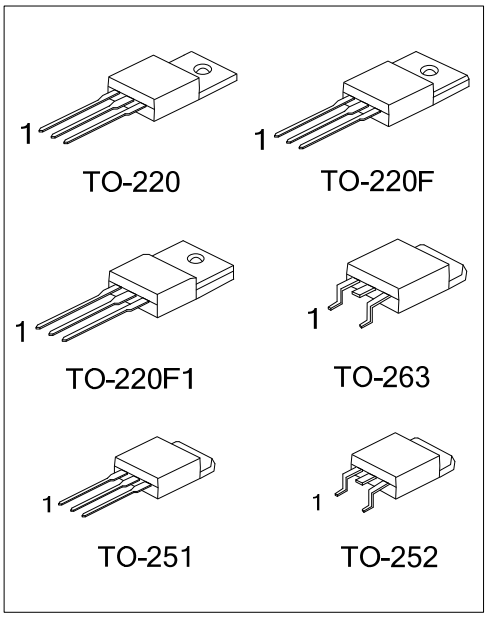
TUL1102

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

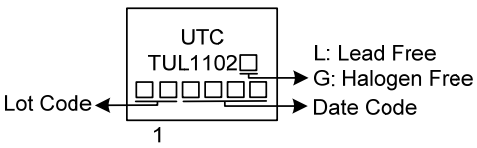
* High voltage
* Dynamic parameters: low spread
* For reliable operation: minimum lot-to-lot spread
* High switching speed

■ 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-TF3-T	TUL1102G-TF3-T	TO-220F	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

(1) T: Tube, R: Tape Reel
(2) TA3: TO-220, TF1: TO-220F1, TF3: TO-220F
TM3: TO-251, TN3: TO-252, TQ2: TO-263
(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



■ 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°C)	TO-220/TO-263	P_D	70	W
	TO-220F/TO-220F1		30	W
	TO-251/TO-252		45	W
Junction Temperature		T_J	+150	°C
Storage Temperature		T_{STG}	-65 ~ +150	°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	°C/W
	TO-220F/TO-220F1		4.2	°C/W
	TO-251/TO-252		2.78	°C/W

■ ELECTRICAL CHARACTERISTICS (T_C = 25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Collector Cut-off Current		I_{CES}	V_{CE}=1100V, V_{BE}=0				100	μA
Emitter Cut-off Current		I_{EBO}	V_{EB}=12V, I_B=0				1	mA
Collector-Emitter Sustaining Voltage		$V_{CEO(SUS)}$	I_C=100mA, I_B=0 (Note)		450			V
Collector-Emitter Saturation Voltage		$V_{CE(SAT)}$	I_C=2A, I_B=400mA (Note)				1.5	V
Base-Emitter Saturation Voltage		$V_{BE(SAT)}$	I_C=2A, I_B=400mA (Note)				1.5	V
DC Current Gain (Note)		h_{FE}	I_C=250mA, V_{CE}=5V I_C=2A, V_{CE}=5V		35 5		70 20	
Resistive Load	Storage Time	t_S	I_C=2.5A,	I_{B1}=0.5A, I_{B2}=1A			2.5	μs
	Fall Time	t_F	V_{CC}=250V	T_P=30ms			300	ns
Avalanche Energy		E_{AR}	L=2mH, C=1.8nF I_{BR}≤2.5A, 25°C<T_C<125°C		6			mJ

Note: Pulsed: Pulse duration = 300 μs, duty cycle ≤ 1.5 %.

■ TEST CIRCUIT

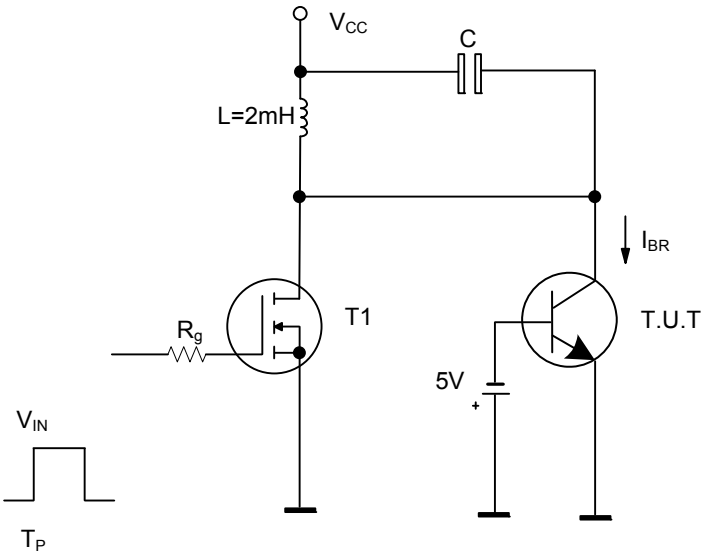


Fig.1 Energy Rating Test Circuit

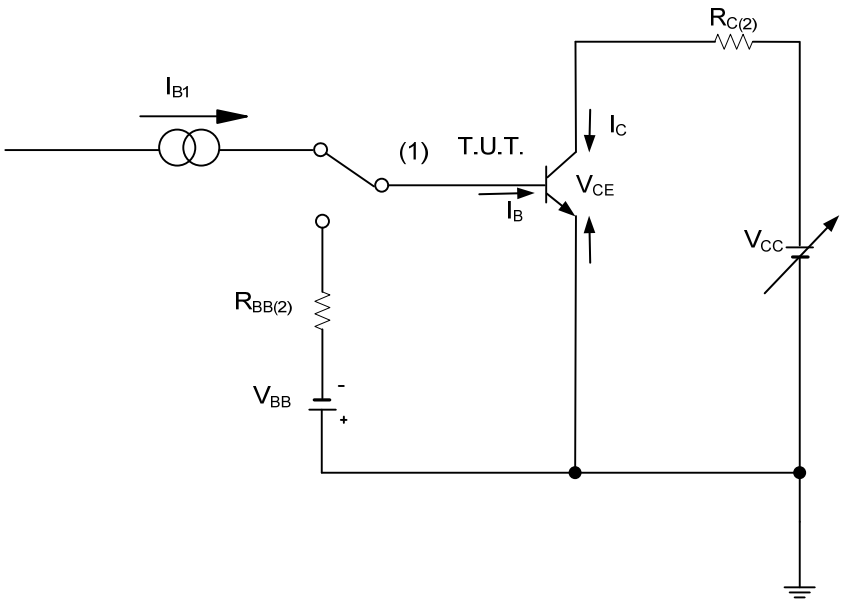
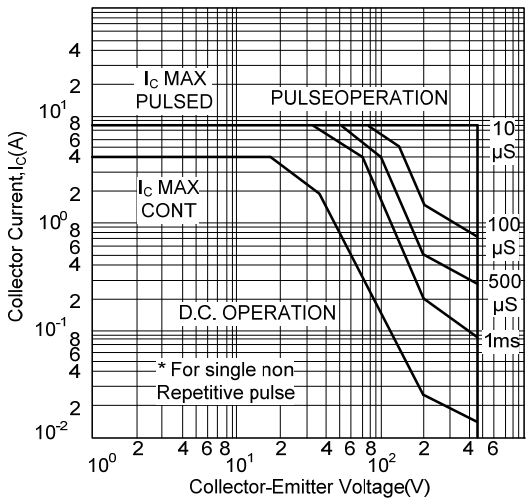


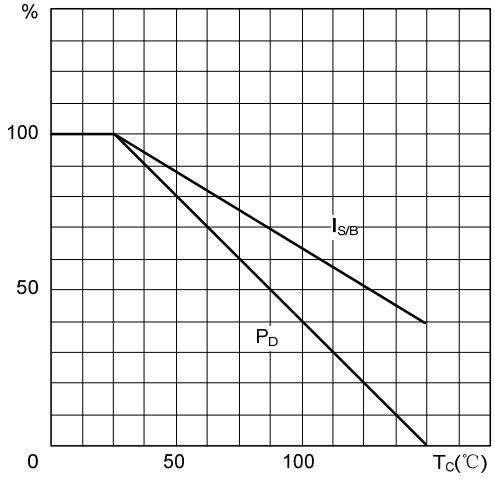
Fig.2 Resistive Load Switching Test Circuit

■ TYPICAL CHARACTERISTICS

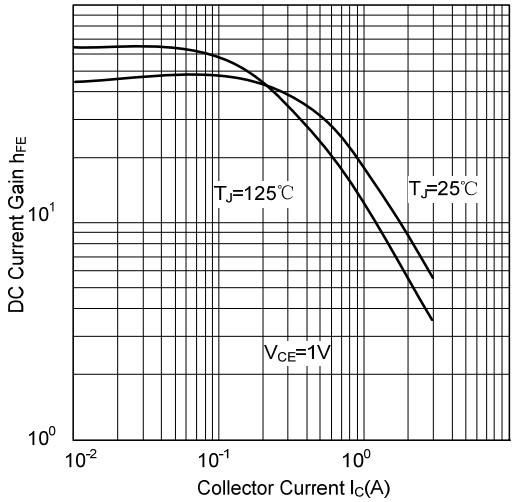
Safe Operating Areas



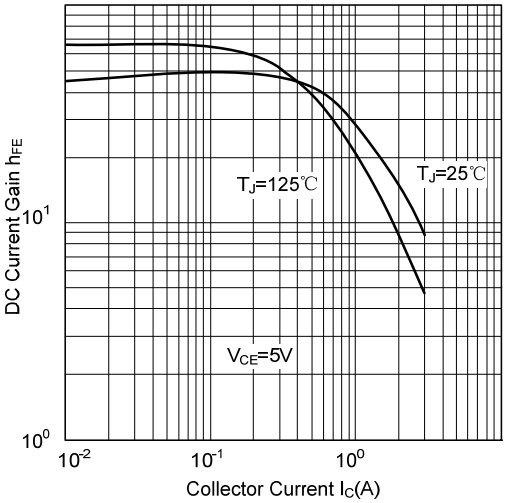
Derating Curve



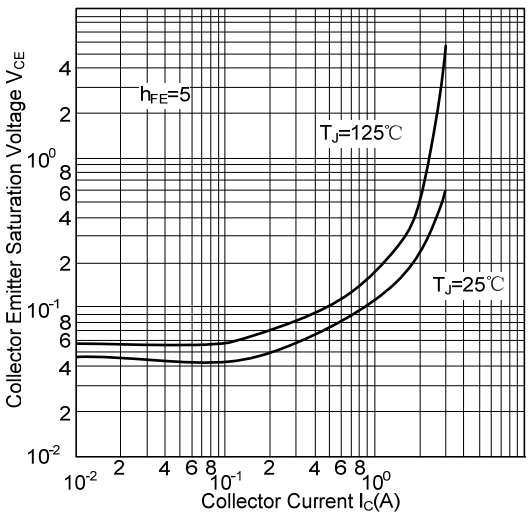
DC Current Gain



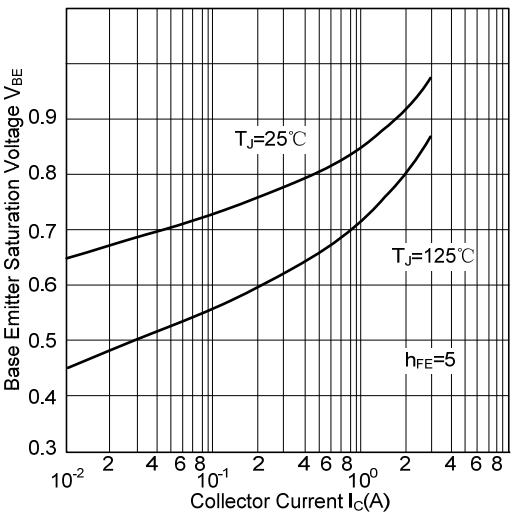
DC Current Gain



Collector Emitter Saturation Voltage

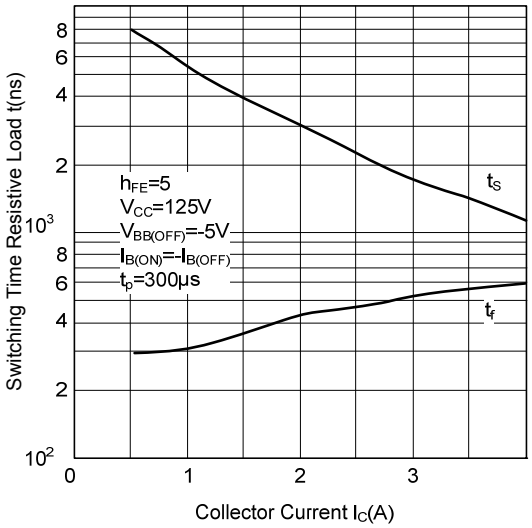


Base Emitter Saturation Voltage

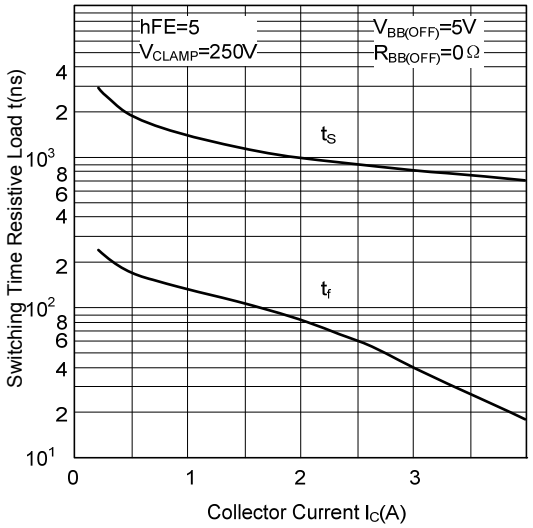


■ TYPICAL CHARACTERISTICS (Cont.)

Switching Time Resistive Load



Switching Time Resistive Load



Reverse Biased SOA