



**UTG50N120-S**

Preliminary

*Insulated Gate Bipolar Transistor*

**1200V TRENCH GATE  
FIELD-STOP IGBT**

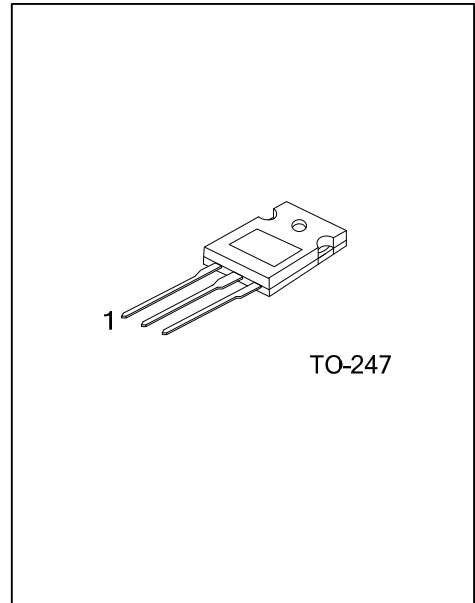
■ DESCRIPTION

The UTC **UTG50N120-S** is an Trench Field-Stop Insulated Gate Bipolar Transistor. it uses UTC's advanced technology to provide customers with high switching speed, low saturation voltage and low switching loss, etc.

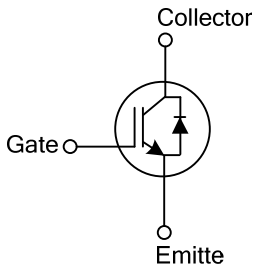
The UTC **UTG50N120-S** is suitable for the resonant or soft switching applications.

■ FEATURES

- \* High switching speed
- \* High avalanche ruggedness
- \* Low saturation voltage:  $V_{CE(SAT),Typ.}=1.45V @ I_C=50A, V_{GE}=15V$   
( $T_C = 25^{\circ}C$ )



■ SYMBOL



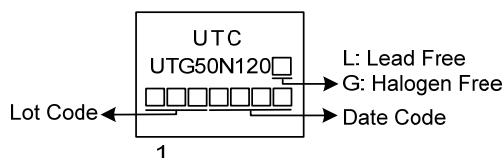
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTG50N120L-T47-T	UTG50N120G-T47-T	TO-247	G	C	E	Tube

Note: Pin Assignment: G: Gate C: Collector E: Emitter

	<p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Green Package</p>	<p>(1) T: Tube</p> <p>(2) T47: TO-247</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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■ MARKING



### ■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATINGS	UNIT
Collector-Emitter Voltage	$V_{CES}$	1200	V
Gate-Emitter Voltage	$V_{GES}$	$\pm 20$	V
Transient Gate-emitter voltage ( $t_p < 5$ ms)		$\pm 25$	V
Continuous Collector Current	$I_C$	$T_C=25^\circ\text{C}$	A
		$T_C=100^\circ\text{C}$	A
Collector Current Pulsed (Note 1)	$I_{CM}$	200	A
Diode Forward Current	$I_F$	$T_C=25^\circ\text{C}$	A
		$T_C=100^\circ\text{C}$	A
Short Circuit Withstand Time $V_{GE} = 15\text{V}$ , $V_{CC} \leq 200\text{V}$ Allowed number of short circuits < 1000 Time between short circuits: $\geq 1.0\text{s}$ $T_{VJ} = 25^\circ\text{C}$	$t_{SC}$	10	$\mu\text{s}$
Power Dissipation ( $T_C=25^\circ\text{C}$ )	$P_D$	285	W
Operating Junction Temperature	$T_J$	-40 ~ +175	$^\circ\text{C}$
Storage Temperature Range	$T_{STG}$	-55 ~ +175	$^\circ\text{C}$

Notes: 1. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

Absolute maximum ratings are those values beyond which the device could be permanently damaged.

2. Pulse width limited by maximum junction temperature.

### ■ THERMAL DATA

PARAMETER	SYMBOL	RATING	UNIT
Junction to Case	$\theta_{JC}$	0.44	$^\circ\text{C/W}$

■ ELECTRICAL CHARACTERISTICS (T<sub>C</sub>=25°C, unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
<b>Off Characteristics</b>							
Collector-Emitter Breakdown Voltage	BV <sub>CES</sub>		1200			V	
Collector Cut-Off Current	I <sub>CES</sub>	V <sub>CE</sub> =1200V, V <sub>GE</sub> =0V			5	μA	
G-E Leakage Current	I <sub>GES</sub>	V <sub>CE</sub> =0V, V <sub>GE</sub> =±20V			±100	nA	
<b>On Characteristics</b>							
Gate to Emitter Threshold Voltage	V <sub>GE(TH)</sub>	I <sub>C</sub> =250μA, V <sub>CE</sub> =V <sub>GE</sub>	2.5		6.5	V	
Collector to Emitter Saturation Voltage	V <sub>CE(SAT)</sub>	I <sub>C</sub> =50A, V <sub>GE</sub> =15V	T <sub>C</sub> =25°C	1.45	1.7	V	
			T <sub>C</sub> =125°C	1.8		V	
<b>Dynamic Characteristics</b>							
Input Capacitance	C <sub>IES</sub>	V <sub>CE</sub> =25V, V <sub>GE</sub> =0V, f=1MHz		3620		pF	
Output Capacitance	C <sub>OES</sub>			227		pF	
Reverse Transfer Capacitance	C <sub>RES</sub>			152		pF	
<b>Switching Characteristics</b>							
Total Gate Charge	Q <sub>G</sub>	V <sub>CE</sub> =600V, I <sub>C</sub> =50A, V <sub>GE</sub> =15V		327		nC	
Gate-Emitter Charge	Q <sub>GE</sub>			26		nC	
Gate-Collector Charge	Q <sub>GC</sub>			220		nC	
Turn-On Delay Time	t <sub>DON)</sub>	V <sub>CC</sub> =600V, I <sub>C</sub> =50A, R <sub>G</sub> =5Ω, V <sub>GE</sub> =0~15V, L=500uH		21.2		ns	
Rise Time	t <sub>R</sub>			30.9		ns	
Turn-Off Delay Time	t <sub>DOFF)</sub>			367.5		ns	
Fall Time	t <sub>F</sub>			206.5		ns	
Turn-On Switching Loss	E <sub>ON</sub>			2.82		mJ	
Turn-Off Switching Loss	E <sub>OFF</sub>			4.834		mJ	
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>							
Forward Voltage Drop	V <sub>F</sub>		I <sub>F</sub> =20A			2.0	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> =50A, dI/dt=100A/μS, V <sub>CC</sub> =600V		71.6		ns	
Reverse Recovery Charge	Q <sub>rr</sub>			4.84		μC	

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