



UTG40N120

Preliminary

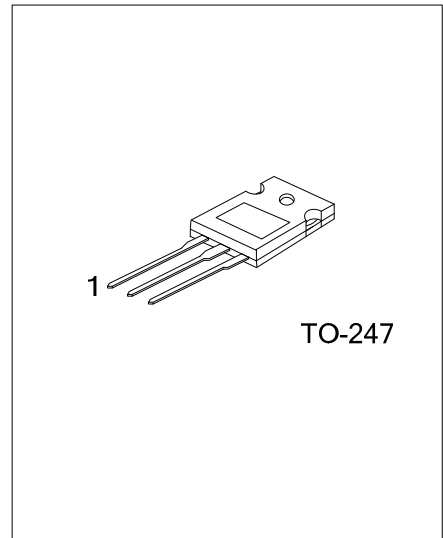
Insulated Gate Bipolar Transistor

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

■ DESCRIPTION

The UTC **UTG40N120** 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.

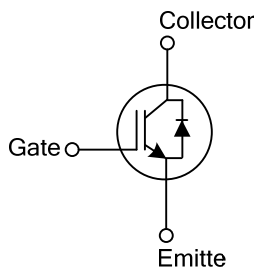
The UTC **UTG40N120** is suitable for the resonant or soft switching applications.



■ FEATURES

- * High switching speed
- * High avalanche ruggedness
- * Low saturation voltage: $V_{CE(SAT),Typ.}=2.1V @ I_C=40A, V_{GE}=15V$
($T_C = 25^\circ C$)

■ SYMBOL



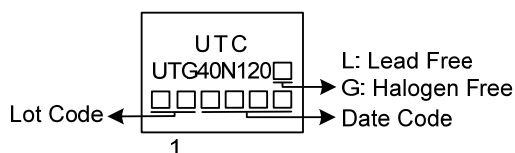
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTG40N120L-TA3-T	UTG40N120G-TA3-T	TO-220	G	C	E	Tube

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

<p>UTG40N120G-TA3-T</p> <p>(1)Packing Type (2)Package Type (3)Green Package</p>	<p>(1) T: Tube (2) T47: TO-247 (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}	± 20	V
Transient Gate-emitter voltage ($t_p < 5$ ms)		± 25	V
Continuous Collector Current	I_C	$T_C=25^\circ\text{C}$	80
		$T_C=100^\circ\text{C}$	40
Collector Current Pulsed (Note 1)	I_{CM}	160	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	μs
Power Dissipation ($T_C=25^\circ\text{C}$)	P_D	245	W
Operating Junction Temperature	T_J	$-55 \sim +150$	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	$-55 \sim +150$	$^\circ\text{C}$

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	θ_{JC}	0.51	$^\circ\text{C/W}$

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Off Characteristics							
Collector-Emitter Breakdown Voltage	BV_{CES}		1200			V	
Collector Cut-Off Current	I_{CES}	$V_{CE}=1200\text{V}$, $V_{GE}=0\text{V}$			5	μA	
G-E Leakage Current	I_{GES}	$V_{CE}=0\text{V}$, $V_{GE}=\pm 20\text{V}$			± 400	nA	
On Characteristics							
Gate to Emitter Threshold Voltage	$V_{GE(TH)}$	$I_C=250\mu\text{A}$, $V_{CE}=V_{GE}$	5		7.5	V	
Collector to Emitter Saturation Voltage	$V_{CE(SAT)}$	$I_C=40\text{A}$, $V_{GE}=15\text{V}$	$T_C=25^\circ\text{C}$		2.1	V	
			$T_C=125^\circ\text{C}$		2.0	V	
Dynamic Characteristics							
Input Capacitance	C_{IES}	$V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$, $f=1\text{MHz}$		3250		pF	
Output Capacitance	C_{OES}			211		pF	
Reverse Transfer Capacitance	C_{RES}			126.6		pF	
Switching Characteristics							
Total Gate Charge	Q_G	$V_{CE}=600\text{V}$, $I_C=40\text{A}$, $V_{GE}=15\text{V}$		415		nC	
Gate-Emitter Charge	Q_{GE}			106.3		nC	
Gate-Collector Charge	Q_{GC}			244.5		nC	
Turn-On Delay Time	t_{DON}	$V_{CC}=600\text{V}$, $I_C=40\text{A}$, $R_G=10\Omega$, $V_{GE}=15\text{V}$, $L=500\mu\text{H}$		31.6		ns	
Rise Time	t_R			107		ns	
Turn-Off Delay Time	t_{DOFF}			383		ns	
Fall Time	t_F			163		ns	
Turn-On Switching Loss	E_{ON}			4.13		mJ	
Turn-Off Switching Loss	E_{OFF}			3.52		mJ	
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Forward Voltage Drop	V_F		$I_F=40\text{A}$			2.5	V
Reverse Recovery Time	t_{rr}	$I_F=40\text{A}$, $dI/dt=100\text{A}/\mu\text{S}$, $V_{CC}=600\text{V}$		57.9		ns	
Reverse Recovery Charge	Q_{rr}			790.2		nC	

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