



## UTG50N120-G2

Preliminary

Insulated Gate Bipolar Transistor

### 1200V TRENCH GATE FIELD-STOP IGBT

#### DESCRIPTION

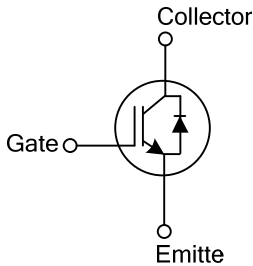
The UTC **UTG50N120-G2** is an Trench Field-Stop Insulated Gate Bipolar Transistor. it uses UTC's advanced technology to provide customers with high switching speed, low saturation voltage and low switching loss, etc.

The UTC **UTG50N120-G2** is suitable for the resonant or soft switching applications.

#### FEATURES

- \* High switching speed
- \* High avalanche ruggedness
- \* Low saturation voltage:  $V_{CE(SAT), typ.} = 1.75V @ I_C=15A (T_C = 25^{\circ}C)$
- \* Low switching loss:  $E_{OFF, typ.} = 4.582mJ @ I_C=50A (T_C = 25^{\circ}C)$

#### SYMBOL



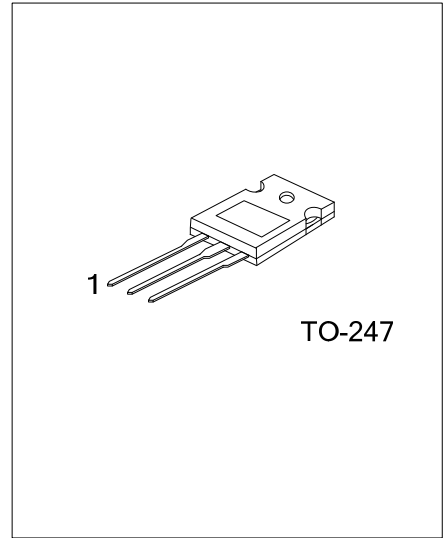
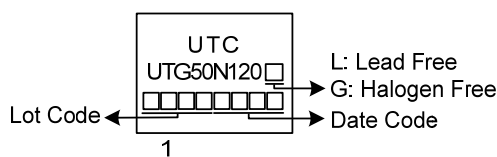
#### ORDERING INFORMATION

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>UTG50N120G-T47-T</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
Continuous Collector Current	$I_C$	$T_C=25^\circ\text{C}$	100
		$T_C=100^\circ\text{C}$	50
Collector Current Pulsed (Note 1)	$I_{CM}$	200	A
Diode Forward Current	$I_F$	$T_C=25^\circ\text{C}$	100
		$T_C=100^\circ\text{C}$	50
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
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	$^\circ\text{C}/\text{W}$

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>Off Characteristics</b>						
Collector-Emitter Breakdown Voltage	$BV_{CES}$		1200			V
Collector Cut-Off Current	$I_{CES}$	$V_{CE}=V_{CES}, V_{GE}=0\text{V}$			5	$\mu\text{A}$
G-E Leakage Current	$I_{GES}$	$V_{GE}=V_{GES}, V_{CE}=0\text{V}$			$\pm 100$	nA
<b>On Characteristics</b>						
Gate to Emitter Threshold Voltage	$V_{GE(TH)}$	$I_C=250\mu\text{A}, V_{CE}=V_{GE}$	4.5		7.5	V
Collector to Emitter Saturation Voltage	$V_{CE(SAT)}$	$I_C=50\text{A}, V_{GE}=15\text{V}$		1.75	2.1	V
		$I_C=50\text{A}, V_{GE}=15\text{V}, T_C=125^\circ\text{C}$		2.1		V
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{IES}$	$V_{CE}=25\text{V}, V_{GE}=0\text{V}, f=1\text{MHz}$		2640		pF
Output Capacitance	$C_{OES}$			134.6		pF
Reverse Transfer Capacitance	$C_{RES}$			70		pF
<b>Switching Characteristics</b>						
Total Gate Charge	$Q_G$	$V_{CE}=600\text{V}, I_C=50\text{A}, V_{GE}=15\text{V}$		213.6		nC
Gate-Emitter Charge	$Q_{GE}$			20		nC
Gate-Collector Charge	$Q_{GC}$			133.4		nC
Turn-On Delay Time	$t_{DON}$	$V_{CC}=600\text{V}, I_C=50\text{A}, R_G=5\Omega, V_{GE}=0\sim 15\text{V}, L=500\mu\text{H}$		17		ns
Rise Time	$t_R$			24		ns
Turn-Off Delay Time	$t_{DOFF}$			260		ns
Fall Time	$t_F$			213		ns
Turn-On Switching Loss	$E_{ON}$			4.29		mJ
Turn-Off Switching Loss	$E_{OFF}$			4.582		mJ
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Forward Voltage Drop	$V_{FM}$	$I_F=50\text{A}$			3.0	V
Reverse Recovery Time	$t_{rr}$	$I_F=50\text{A}$		73.7		ns
Reverse Recovery Charge	$Q_{rr}$	$dI/dt=100\text{A}/\mu\text{s}$		2.2		$\mu\text{C}$

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