



600V TRENCH GATE FIELD-STOP IGBT

DESCRIPTION

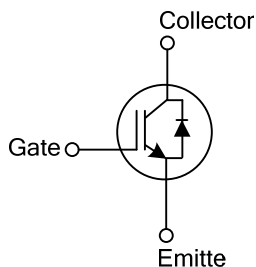
The UTC **UTG20N60-S** is an Trench Field-Stop Insulated Gate Bipolar Transistor. it uses UTC's advanced technology to provide customers with high switching speed, low saturation voltage and low switching loss, etc.

The UTC **UTG20N60-S** is suitable for the resonant or soft switching applications.

FEATURES

- * High switching speed
- * High avalanche ruggedness
- * Low saturation voltage: $V_{CE(SAT), Typ.} = 1.86V @ I_C = 20A, V_{GE} = 15V$ ($T_C = 25^\circ C$)

SYMBOL

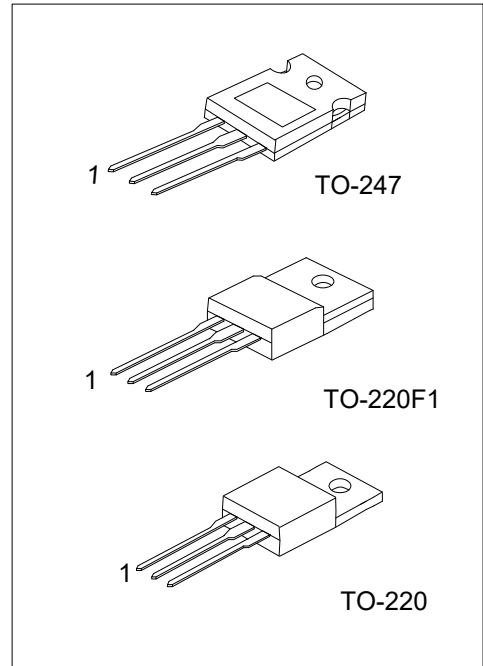


ORDERING INFORMATION

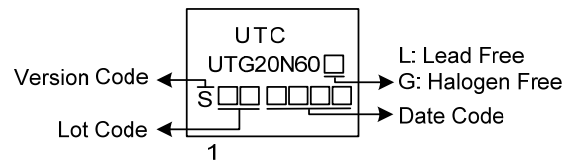
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTG20N60L-S-TA3-T	UTG20N60G-S-TA3-T	TO-220	G	C	E	Tube
UTG20N60L-S-TF1-T	UTG20N60G-S-TF1-T	TO-220F1	G	C	E	Tube
UTG20N60L-S-T47-T	UTG20N60G-S-T47-T	TO-247	G	C	E	Tube

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

UTG20N60G-S-TA3-T (1) Packing Type (2) Package Type (3) Version Code (4) Green Package		(1) T: Tube (2) TA3: TO-220, TF1: TO-220F1, T47: TO-247 (3) Version S (4) G: Halogen Free and Lead Free, L: Lead Free
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■ MARKING



ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	RATINGS	UNIT
Collector-Emitter Voltage		V_{CES}	600	V
Gate-Emitter Voltage		V_{GES}	± 20	V
Transient Gate-emitter voltage ($t_p < 5\text{ ms}$)			± 25	V
Continuous Collector Current	$T_C=25^{\circ}\text{C}$	I_C	40	A
	$T_C=100^{\circ}\text{C}$		20	A
Collector Current Pulsed (Note 1)		I_{CM}	80	A
Diode Forward Current	$T_C=25^{\circ}\text{C}$	I_F	40	A
	$T_C=100^{\circ}\text{C}$		20	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}	5	μs
Power Dissipation ($T_C=25^{\circ}\text{C}$)	TO-220	P_D	95	W
	TO-220F1		38	W
	TO-247		291	W
Operating Junction Temperature		T_J	-40 ~ +150	$^{\circ}\text{C}$
Storage Temperature Range		T_{STG}	-55 ~ +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	RATINGS		UNIT
			IGBT	DIODE	
Junction to Case	TO-220	θ_{JC}	1.31	2.82	$^\circ\text{C/W}$
	TO-220F1		3.29	6.8	$^\circ\text{C/W}$
	TO-247		0.43	0.92	$^\circ\text{C/W}$

■ **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}			600			V
Collector Cut-Off Current	I _{CES}	V _{CE} =600V, V _{GE} =0V				5	μA
G-E Leakage Current	I _{GES}	V _{CE} =0V, V _{GE} =±20V				±100	nA
On Characteristics							
Gate to Emitter Threshold Voltage	V _{GE(TH)}	I _C =250μA, V _{CE} =V _{GE}		4.5		6.5	V
Collector to Emitter Saturation Voltage	V _{CE(SAT)}	I _C =20A, V _{GE} =15V	T _C =25°C		1.86	2.3	V
			T _C =125°C		2.26		V
Dynamic Characteristics							
Input Capacitance	C _{IES}	V _{CE} =25V, V _{GE} =0V, f=1MHz			950		pF
Output Capacitance	C _{OES}				65		pF
Reverse Transfer Capacitance	C _{RES}				13		pF
Switching Characteristics							
Total Gate Charge	Q _G	V _{CE} =520V, I _C =20A, V _{GE} =15V			55		nC
Gate-Emitter Charge	Q _{GE}				20		nC
Gate-Collector Charge	Q _{GC}				21.5		nC
Turn-On Delay Time	t _{DON}	V _{CC} =400V, I _C =20A, R _G =5Ω, V _{GE} =0~15V, L=500μH			5.5		ns
Rise Time	t _R				20		ns
Turn-Off Delay Time	t _{DOFF}				29		ns
Fall Time	t _F				189		ns
Turn-On Switching Loss	E _{ON}				0.75		mJ
Turn-Off Switching Loss	E _{OFF}				0.55		mJ
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Forward Voltage Drop	V _F	I _F =20A				2.5	V
Reverse Recovery Time	t _{rr}	V _{CE} =400V, I _C =20A, V _{GE} =15V ,			31		ns
Reverse Recovery Charge	Q _{rr}	R _G =5Ω, L=500μH			149		nC

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