



## UTG6N65-S

Preliminary

Insulated Gate Bipolar Transistor

### 650V, TRENCH GATE FIELD-STOP IGBT

#### DESCRIPTION

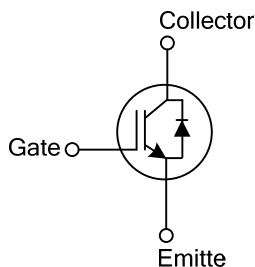
The UTC **UTG6N65-S** is an Trench Field-Stop Insulated Gate Bipolar Transistor. it uses UTC's advanced technology to provide customers with high switching speed, low saturation voltage and low switching loss, etc.

The UTC **UTG6N65-S** is suitable for the resonant or soft switching applications.

#### FEATURES

- \* High switching speed
- \* High avalanche ruggedness
- \* Low saturation voltage:  $V_{CE(SAT), Typ.} = 1.47V @ I_C = 6.0A, V_{GE} = 15V (T_C = 25^{\circ}C)$

#### SYMBOL

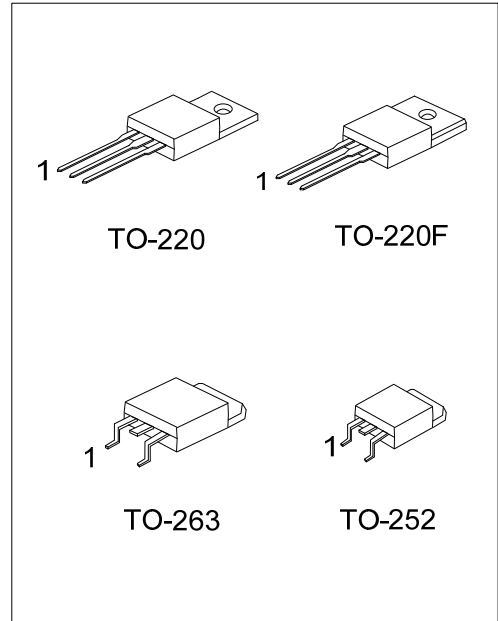


#### ORDERING INFORMATION

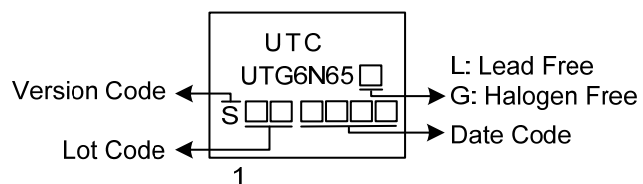
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTG6N65L-S-TA3-T	UTG6N65G-S-TA3-T	TO-220	G	C	E	Tube
UTG6N65L-S-TF3-T	UTG6N65G-S-TF3-T	TO-220F	G	C	E	Tube
UTG6N65L-S-TN3-R	UTG6N65G-S-TN3-R	TO-252	G	C	E	Tape Reel
UTG6N65L-S-TQ2-T	UTG6N65G-S-TQ2-T	TO-263	G	C	E	Tube
UTG6N65L-S-TQ2-R	UTG6N65G-S-TQ2-R	TO-263	G	C	E	Tape Reel

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

UTG6N65G-S-TA3-T		(1) Packing Type	(1) T: Tube, R: Tape Reel
		(2) Package Type	(2) TA3: TO-220, TF3: TO-220F, TN3: TO-252
		(3) Version Code	TQ2: TO-263
		(4) Green Package	(3) Version S
			(4) G: Halogen Free and Lead Free, L: Lead Free



### ■ MARKING



■ ABSOLUTE MAXIMUM RATINGS ( $T_A=25^{\circ}\text{C}$ , unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Collector-Emitter Voltage		$V_{CES}$	650	V
Gate-Emitter Voltage		$V_{GES}$	$\pm 20$	V
Transient Gate-Emitter Voltage (tp < 5 ms)			$\pm 25$	V
Continuous Collector Current	Tc=25°C	$I_C$	12	A
	Tc=100°C		6	A
Collector Current Pulsed (Note 1)		$I_{CM}$	24	A
Diode Forward Current	Tc=25°C	$I_F$	12	A
	Tc=100°C		6	A
Short Circuit Withstand Time VGE = 15V, VCC ≤ 200V Allowed number of short circuits < 1000 Time between short circuits: ≥1.0s TVJ= 25°C		tSC	3	μs
Power Dissipation (Tc=25°C)	TO-220	PD	93	W
	TO-263			
	TO-220F		30	W
	TO-252		39	W
Operating Junction Temperature		TJ	-40 ~ +150	°C
Storage Temperature Range		TSTG	-55 ~ +150	°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
Junction to Case	TO-220	$\theta_{JC}$	1.34	$^{\circ}\text{C/W}$
	TO-263			
	TO-220F		4.167	$^{\circ}\text{C/W}$
	TO-252		3.205 (Note)	$^{\circ}\text{C/W}$

Note: Device mounted on FR-4 substrate  $P_c$  board, 2oz copper, with 1inch square copper plate.

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Off Characteristics						
Collector-Emitter Breakdown Voltage	BV <sub>CES</sub>		650			V
Collector Cut-Off Current	I <sub>CES</sub>	V <sub>CE</sub> =650V, 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
On Characteristics						
Gate to Emitter Threshold Voltage	V <sub>GE(TH)</sub>	I <sub>C</sub> =250μA, V <sub>CE</sub> =V <sub>GE</sub>	4.0		6.5	V
Collector to Emitter Saturation Voltage	V <sub>CE(SAT)</sub>	I <sub>C</sub> =6.0A, V <sub>GE</sub> =15V	T <sub>C</sub> =25°C	1.47	2.1	V
			T <sub>C</sub> =125°C	1.9		V
Dynamic Characteristics						
Input Capacitance	C <sub>IES</sub>	V <sub>CE</sub> =25V, V <sub>GE</sub> =0V, f=1MHz		598		pF
Output Capacitance	C <sub>OES</sub>			37.8		pF
Reverse Transfer Capacitance	C <sub>RES</sub>			10.7		pF
Switching Characteristics						
Total Gate Charge	Q <sub>G</sub>	V <sub>CE</sub> =520V, I <sub>C</sub> =6.0A, V <sub>GE</sub> =15V		49.4		nC
Gate-Emitter Charge	Q <sub>GE</sub>			14.3		nC
Gate-Collector Charge	Q <sub>GC</sub>			21.9		nC
Turn-On Delay Time	t <sub>DON</sub>	V <sub>CC</sub> =400V, I <sub>C</sub> =6.0A, R <sub>G</sub> =5Ω, V <sub>GE</sub> =0~15V, L=1000μH		15		ns
Rise Time	t <sub>tr</sub>			19		ns
Turn-Off Delay Time	t <sub>DOFF</sub>			39		ns
Fall Time	t <sub>f</sub>			290		ns
Turn-On Switching Loss	E <sub>ON</sub>			0.154		mJ
Turn-Off Switching Loss	E <sub>OFF</sub>			0.147		mJ
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Forward Voltage Drop	V <sub>F</sub>	I <sub>F</sub> =6.0A		1.6	3.0	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> =6.0A, dI/dt=100A/μS,		43.8		ns
Reverse Recovery Charge	Q <sub>rr</sub>	V <sub>CC</sub> =400V		3.8		nC

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