

### Insulated Gate Bipolar Transistor

## 650V TRENCH GATE FIELD-STOP IGBT

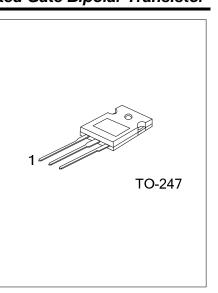
### DESCRIPTION

The UTC **UTG70N65-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.

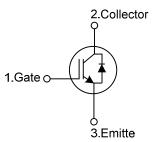
The UTC **UTG70N65-S** is suitable for the resonant or soft switching applications.

### FEATURES

- \* High switching speed
- \* High avalanche ruggedness
- \* Low saturation voltage:  $V_{CE(SAT).Typ.}$ =1.75V @ I<sub>C</sub>=70A, V<sub>GE</sub>=15V (T<sub>C</sub> =25°C)



### SYMBOL

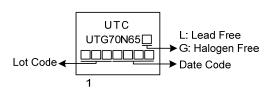


### ORDERING INFORMATION

Ordering Number		Deskars	Pin Assignment			Deeking	
Lead Free	Halogen Free	Package	1	2	3	Packing	
UTG70N65L-T47-T	UTG70N65G-T47-T	TO-247	G	С	Е	Tube	
Note: Pin Assignment: G: Gate C: Collector E: Emitter							

UTG70N65G-T47-T T T (1)Packing Type	(1) T: Tube
(2)Package Type	(2) T47: TO-247
(3)Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free

### MARKING



PARAMETER		SYMBOL	RATINGS	UNIT
Collector-Emitter Voltage		V <sub>CES</sub>	650	V
Gate-Emitter Voltage		N/	±20	V
Gate-Emitter Voltage         Transient Gate-emitter voltage ( $tp < 5 \text{ ms}$ )         Continuous Collector Current $T_c=25^{\circ}C$ Collector Current Pulsed (Note 1) $T_c=25^{\circ}C$ Diode Forward Current $T_c=25^{\circ}C$ $T_c=100^{\circ}C$ $T_c=100^{\circ}C$		V <sub>GES</sub>	±25	V
ntinuque Collector Current	T <sub>C</sub> =25°C		140	А
	T <sub>C</sub> =100°C	lc	70	А
Collector Current Pulsed (Note 1)		I <sub>CM</sub>	280	А
Diada Famurad Cumant	T <sub>C</sub> =25°C	IF	140	А
Diode Forward Current	T <sub>C</sub> =100°C		70	А
Short Circuit Withstand Time $V_{GE} = 15V, V_{CC} \le 200V$ Allowed number of short circuits < 1000 Time between short circuits: $\ge 1.0s$ $T_{VJ}= 25^{\circ}C$ Power Dissipation (T <sub>C</sub> =25°C)		tsc		
			3	μs
			PD	310
		Operating Junction Temperature		TJ
Storage Temperature Range		T <sub>STG</sub>	-55 ~ +175	°C

#### ABSOLUTE MAXIMUM RATINGS (TA=25°C, unless otherwise noted)

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	θις	0.4	°C/W

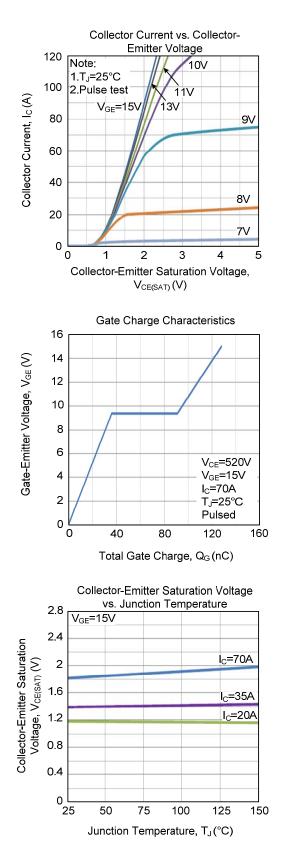


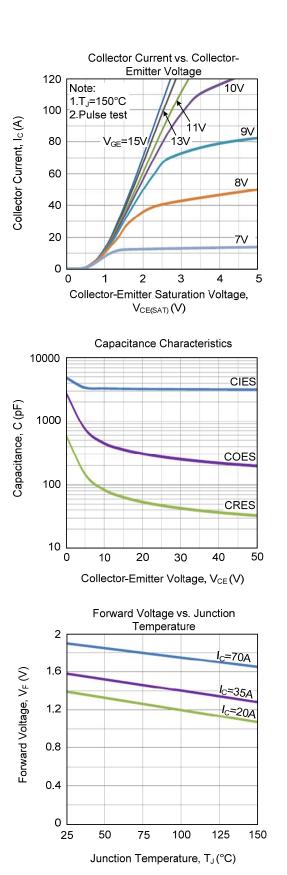
### ■ ELECTRICAL CHARACTERISTICS (Tc=25°C, unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Off Characteristics							
Collector-Emitter Breakdown Voltage	BV <sub>CES</sub>			650			V
Collector Cut-Off Current	ICES	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				±400	nA
On Characteristics							
Gate to Emitter Threshold Voltage	V <sub>GE(TH)</sub>	I <sub>C</sub> =250μΑ, V <sub>CE</sub> =V <sub>GE</sub>		4.5		6.5	V
Collector to Emitter Saturation Voltage	V <sub>CE(SAT)</sub>	I <sub>C</sub> =70A, V <sub>GE</sub> =15V	T <sub>C</sub> =25°C		1.75	2.1	V
	· · · ·	T <sub>C</sub> =125			2.0		V
Dynamic Characteristics	1 _	i		i		i	
Input Capacitance	CIES	V <sub>CE</sub> =25V, V <sub>GE</sub> =0V, f=1MHz			3220		pF
Output Capacitance	COES				272		pF
Reverse Transfer Capacitance	CRES				44.6		pF
Switching Characteristics							
Total Gate Charge	Q <sub>G</sub>	V <sub>CE</sub> =520V, I <sub>C</sub> =70A, V <sub>GE</sub> =15V			125.7		nC
Gate-Emitter Charge	$Q_{GE}$				34		nC
Gate-Collector Charge	Q <sub>GC</sub>				58.3		nC
Turn-On Delay Time	t <sub>DON)</sub>	V <sub>cc</sub> =400V, I <sub>c</sub> =70A, R <sub>G</sub> =5Ω, V <sub>GE</sub> =0~15V, L=500uH			21		ns
Rise Time	t <sub>R</sub>				75		ns
Turn-Off Delay Time	t <sub>DOFF)</sub>				113		ns
Fall Time	t⊧				55		ns
Turn-On Switching Loss	Eon				2.97		mJ
Turn-Off Switching Loss	EOFF				2.45		mJ
SOURCE- DRAIN DIODE RATINGS AN	D CHARAC	TERISTICS					
Forward Voltage Drop	VF	I⊧=70A			1.5	3.0	V
Reverse Recovery Time	trr	−I <sub>F</sub> =70A, dl/dt=100A/μS, V <sub>CC</sub> =400V			41.5		ns
Reverse Recovery Charge	Qrr				201.3		nC

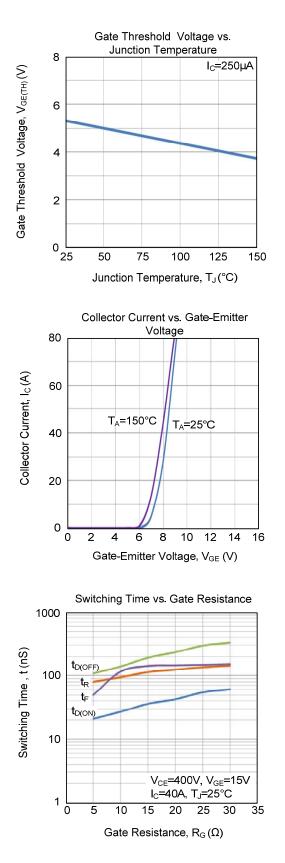


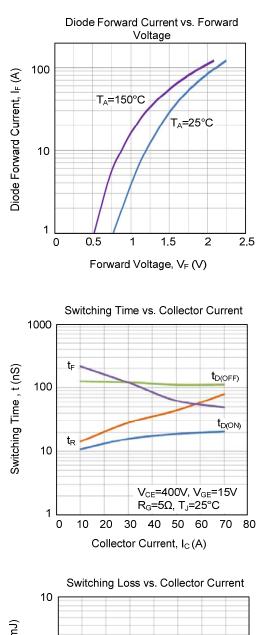
### TYPICAL CHARACTERISTICS

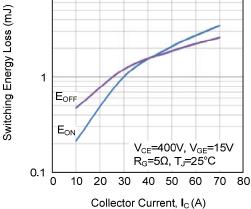




### ■ TYPICAL CHARACTERISTICS (Cont.)

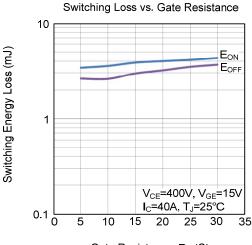




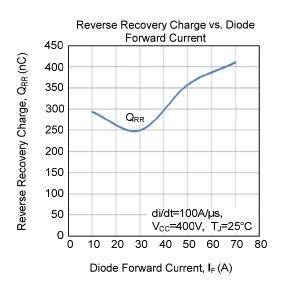


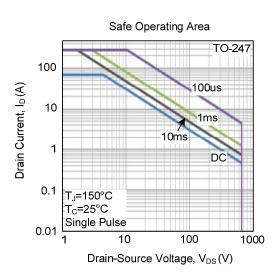


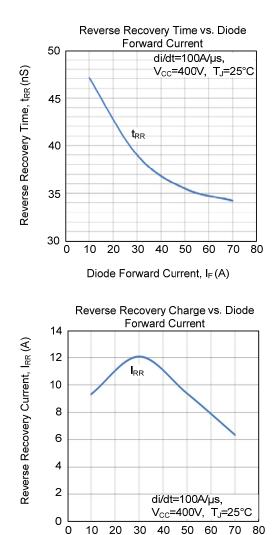
### ■ TYPICAL CHARACTERISTICS (Cont.)



Gate Resistance,  $R_G(\Omega)$ 







Diode Forward Current,  $I_F(A)$ 

UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. UTC reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

