

UTG40N65HLX1

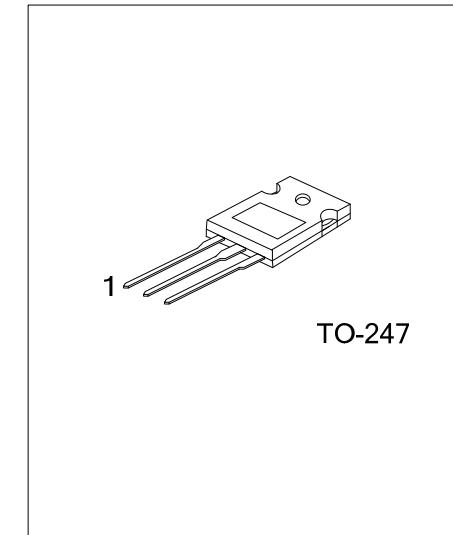
Preliminary

*Insulated Gate Bipolar Transistor*650V TRENCH GATE
FIELD-STOP IGBT

■ DESCRIPTION

The UTC **UTG40N65HLX1** 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.

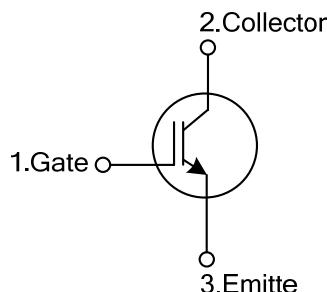
The UTC **UTG40N65HLX1** is suitable for the resonant or soft switching applications.



■ FEATURES

- * High switching speed
- * High avalanche ruggedness
- * Low saturation voltage: $V_{CE(SAT),Typ.} = 1.6V$ @ $I_c=40A$, $V_{GE}=15V$ ($T_c=25^\circ C$)

■ SYMBOL



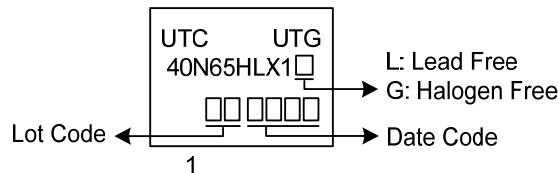
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTG40N65HLX1L-T47-T	UTG40N65HLX1G-T47-T	TO-247	G	C	E	Tube

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

UTG40N65HLX1G-T47-T	(1)Packing Type (2)Package Type (3)Green Package	(1) T: Tube (2) T47: TO-247 (3) G: Halogen Free and Lead Free, L: Lead Free
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■ 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}	± 20	V
Transient Gate-Emitter Voltage ($t_p < 5 \text{ ms}$)		± 25	V
Continuous Collector Current	I_C	80	A
		40	A
Collector Current Pulsed (Note 1)	I_{CM}	160	A
Diode Forward Current	I_F	80	A
		40	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}	8	μs
Power Dissipation ($T_C=25^\circ\text{C}$)	P_D	298	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	RATING	UNIT
Junction to Case	θ_{JC}	0.41	$^\circ\text{C/W}$

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Off Characteristics						
Collector-Emitter Breakdown Voltage	BV_{CES}		650			V
Collector Cut-Off Current	I_{CES}	$V_{CE}=650\text{V}$, $V_{GE}=0\text{V}$		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	$V_{GE(TH)}$	$I_C=250\mu\text{A}$, $V_{CE}=V_{GE}$	3.5		6.5	V
Collector to Emitter Saturation Voltage	$V_{CE(SAT)}$	$I_C=40\text{A}$, $V_{GE}=15\text{V}$	$T_C=25^\circ\text{C}$	1.6	2.1	V
			$T_C=125^\circ\text{C}$	2.0		V
Dynamic Characteristics						
Input Capacitance	C_{IES}	$V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$, $f=1\text{MHz}$		2010		pF
Output Capacitance	C_{OES}			129		pF
Reverse Transfer Capacitance	C_{RES}			37		pF
Switching Characteristics						
Total Gate Charge	Q_G	$V_{CE}=520\text{V}$, $I_C=40\text{A}$, $V_{GE}=15\text{V}$		94		nC
Gate-Emitter Charge	Q_{GE}			28		nC
Gate-Collector Charge	Q_{GC}			46		nC
Turn-On Delay Time	t_{DON}	$V_{CC}=400\text{V}$, $I_C=40\text{A}$, $R_G=5\Omega$, $V_{GE}=0\sim 15\text{V}$, $L=500\mu\text{H}$		16		ns
Rise Time	t_R			33		ns
Turn-Off Delay Time	t_{DOFF}			77		ns
Fall Time	t_F			46		ns
Turn-On Switching Loss	E_{ON}			2		mJ
Turn-Off Switching Loss	E_{OFF}			1		mJ

■ TEST CIRCUIT AND WAVEFORMS

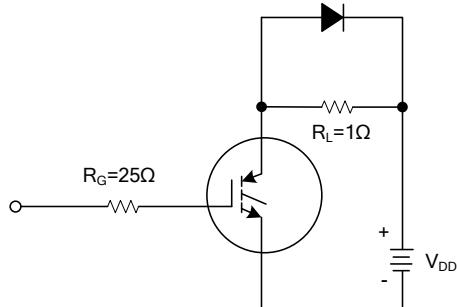


Fig 1. INDUCTIVE SWITCHING TEST CIRCUIT

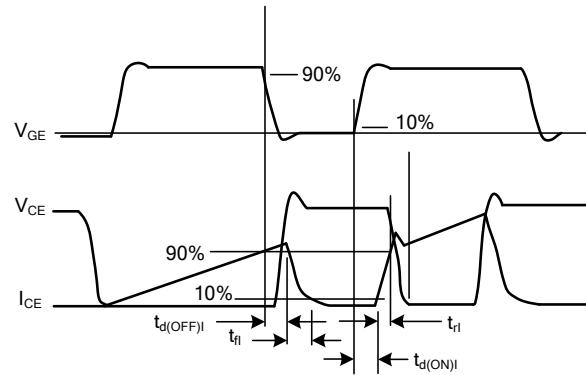


Fig 2. SWITCHING TEST WAVEFORMS

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