



UTG40N65WAFQ

Preliminary

Insulated Gate Bipolar Transistor

650V TRENCH GATE FIELD-STOP IGBT

DESCRIPTION

The UTC **UTG40N65WAFQ** 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.

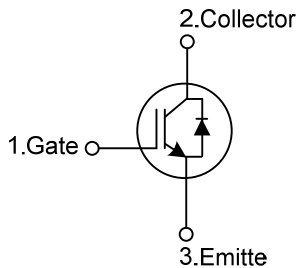
The UTC **UTG40N65WAFQ** is suitable for the resonant or soft switching applications.

FEATURES

- * High switching speed
- * High avalanche ruggedness
- * Low saturation voltage:

$V_{CE(SAT),Typ.}=1.52V @ I_C=40A, V_{GE}=15V (T_C =25^{\circ}C)$

SYMBOL



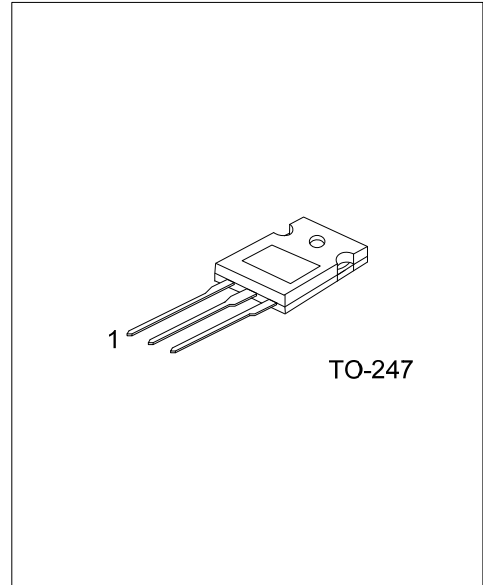
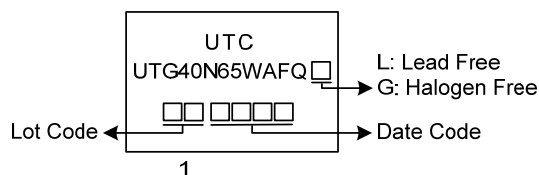
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTG40N65WAFQL-T47-T	UTG40N65WAFQG-T47-T	TO-247	G	C	E	Tube

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

<p>UTG40N65WAFQG-T47-T</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Green Package</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 ($T_C=25^\circ\text{C}$, 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	$T_C=25^\circ\text{C}$	A
		$T_C=100^\circ\text{C}$	A
Collector Current Pulsed (Note 1)	I_{CM}	160	A
Diode Forward Current	I_F	$T_C=25^\circ\text{C}$	A
		$T_C=100^\circ\text{C}$	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}	10	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°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} =650V, 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		7.5	V	
Collector to Emitter Saturation Voltage	V _{CE(SAT)}	I _C =40A, V _{GE} =15V	T _C =25°C	1.52	2.1	V	
			T _C =125°C	1.92		V	
Dynamic Characteristics							
Input Capacitance	C _{IES}	V _{CE} =25V, V _{GE} =0V, f=1MHz		2690		pF	
Output Capacitance	C _{OES}			216		pF	
Reverse Transfer Capacitance	C _{RES}			53		pF	
Switching Characteristics							
Total Gate Charge	Q _G	V _{CE} =520V, I _C =40A, V _{GE} =15V		121		nC	
Gate-Emitter Charge	Q _{GE}			31		nC	
Gate-Collector Charge	Q _{GC}			59		nC	
Turn-On Delay Time	t _{DON)}	V _{CC} =400V, I _C =40A, R _G =5Ω, V _{GE} =0~15V, L=500uH		17		ns	
Rise Time	t _R			40		ns	
Turn-Off Delay Time	t _{DOFF)}			86		ns	
Fall Time	t _F			131		ns	
Turn-On Switching Loss	E _{ON}			1.76		mJ	
Turn-Off Switching Loss	E _{OFF}			1.19		mJ	
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Forward Voltage Drop	V _F		I _F =20A			2.0	V
Reverse Recovery Time	t _{rr}	I _F =40A, dI/dt=100A/μS, V _{CC} =400V		42		ns	
Reverse Recovery Charge	Q _{rr}				379		nC

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