



UTG28N65LND1

Insulated Gate Bipolar Transistor

650V TRENCH GATE FIELD-STOP IGBT

■ DESCRIPTION

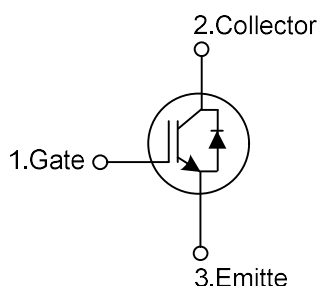
The UTC **UTG28N65LND1** is an Trench Field-Stop Insulated Gate Bipolar Transistor. it uses UTC's advanced technology to provide customers with high switching speed, low saturation voltage and low switching loss, etc.

The UTC **UTG28N65LND1** is suitable for the resonant or soft switching applications.

■ FEATURES

- * High switching speed
- * High avalanche ruggedness
- * Low saturation voltage: $V_{CE(SAT).Typ.}=1.5V$ @ $I_C=28A$, $V_{GE}=15V$ ($T_C=25^{\circ}C$)

■ SYMBOL

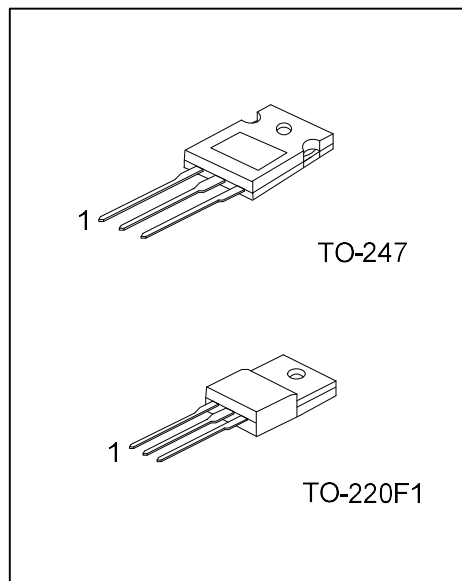


■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTG28N65LND1L-TF1-T	UTG28N65LND1G-TF1-T	TO-220F1	G	C	E	Tube
UTG28N65LND1L-T47-T	UTG28N65LND1G-T47-T	TO-247	G	C	E	Tube

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

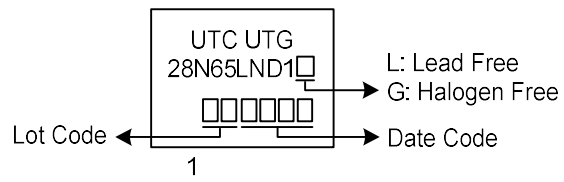
UTG28N65LND1G-TF1-T	(1) Packing Type	(1) T: Tube
	(2) Package Type	(2) TF1: TO-220F1, T47: TO-247
	(3) Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free



UTG28N65LND1

Insulated Gate Bipolar Transistor

■ MARKING



■ ABSOLUTE MAXIMUM RATINGS (T_A=25°C, unless otherwise noted)

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 ms)			±25	V
Continuous Collector Current	T _C =25°C	I _C	56	A
	T _C =100°C		28	A
Collector Current Pulsed (Note 1)		I _{CM}	112	A
Diode Forward Current	T _C =25°C	I _F	56	A
	T _C =100°C		28	A
Short Circuit Withstand Time V _{GE} = 15V, V _{CC} ≤ 200V Allowed number of short circuits < 1000 Time between short circuits: ≥ 1.0s T _{VJ} = 25°C		t _{sc}	8	μs
Power Dissipation (T _C =25°C)	TO-220F1	P _D	35	W
	TO-247		290	W
Operating Junction Temperature		T _J	-40 ~ +150	°C
Storage Temperature Range		T _{STG}	-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-220F1	θ_{JC}	3.57	°C/W
	TO-247		0.43	°C/W

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

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			±400	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 =28A, V _{GE} =15V	T _C =25°C	1.5	2.0	V
			T _C =125°C	1.7		V
Dynamic Characteristics						
Input Capacitance	C _{IES}	V _{CE} =25V, V _{GE} =0V, f=1MHz		1.4		nF
Output Capacitance	C _{OES}			195		pF
Reverse Transfer Capacitance	C _{RES}			33		pF
Switching Characteristics						
Total Gate Charge	Q _G	V _{CE} =520V, I _C =28A, V _{GE} =15V		71		nC
Gate-Emitter Charge	Q _{GE}			23		nC
Gate-Collector Charge	Q _{GC}			31		nC
Turn-On Delay Time	t _{DON}	V _{CC} =400V, I _C =28A, R _G =5Ω, V _{GE} =0~15V, L=500μH		13		ns
Rise Time	t _R			29		ns
Turn-Off Delay Time	t _{DOFF}			54		ns
Fall Time	t _F			121		ns
Turn-On Switching Loss	E _{ON}			1.3		mJ
Turn-Off Switching Loss	E _{OFF}			0.6		mJ
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Forward Voltage Drop	V _F	I _F =28A			2.0	V
Reverse Recovery Time	t _{rr}	I _F =28A, dI/dt=100A/μS,		58		ns
Reverse Recovery Charge	Q _{rr}	V _{CC} =400V		502		μC

■ TEST CIRCUIT AND WAVEFORMS

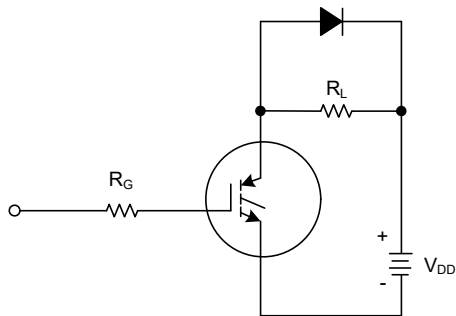


Fig 1. INDUCTIVE SWITCHING TEST CIRCUIT

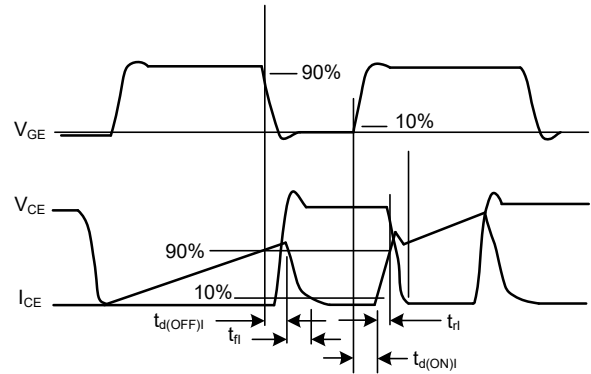
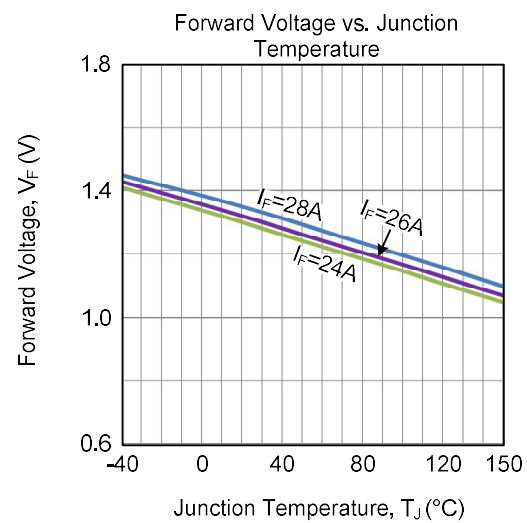
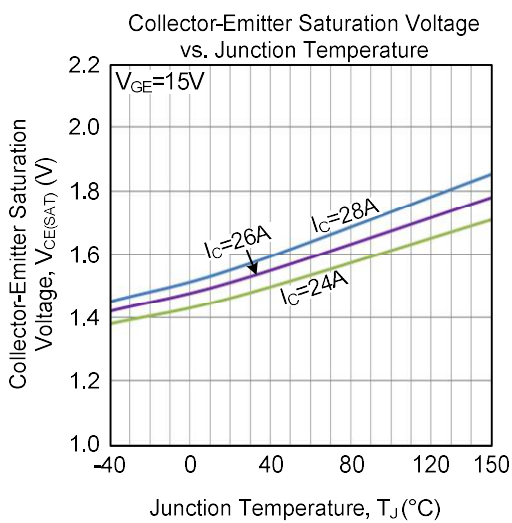
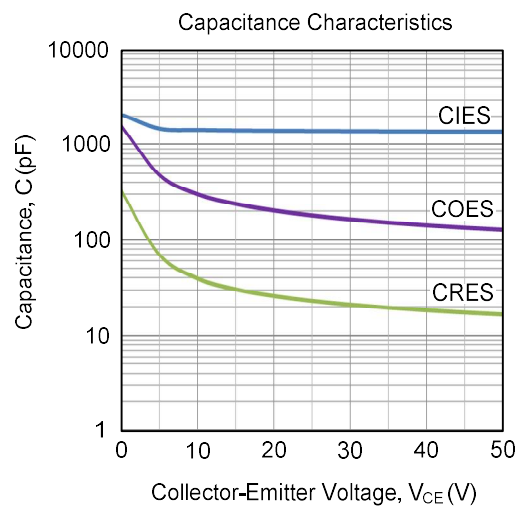
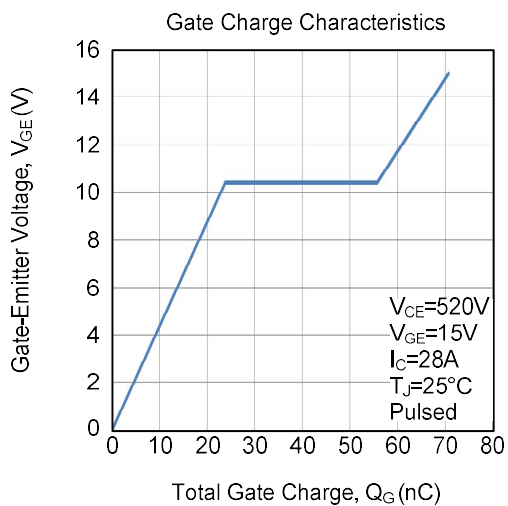
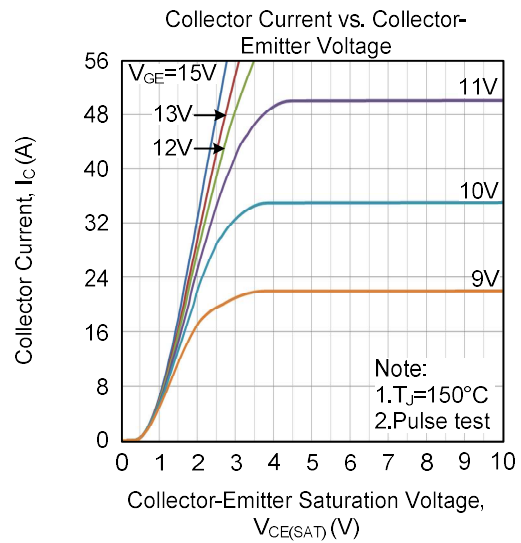
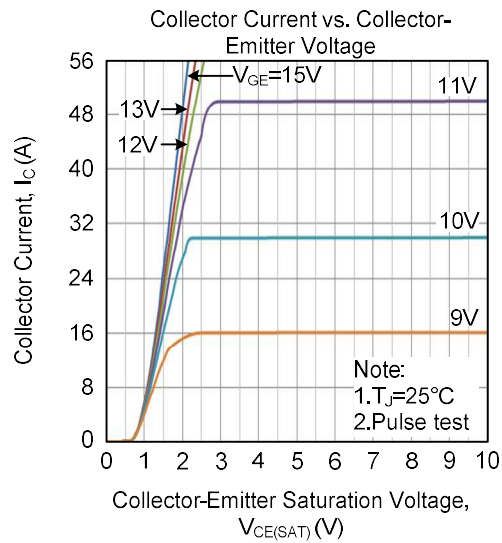
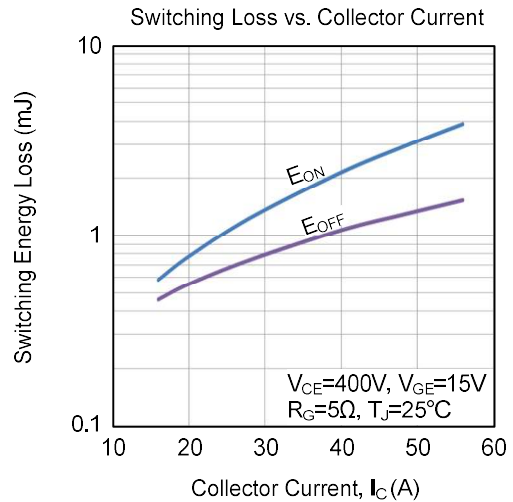
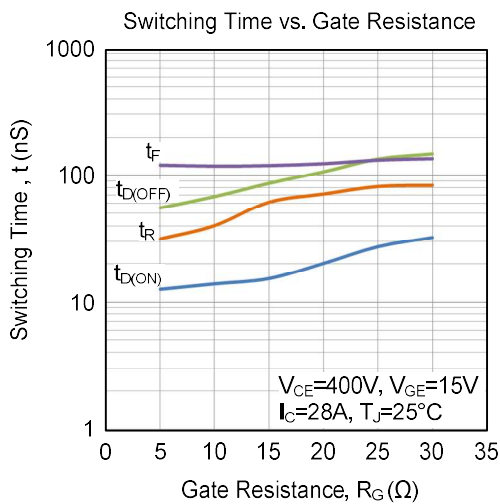
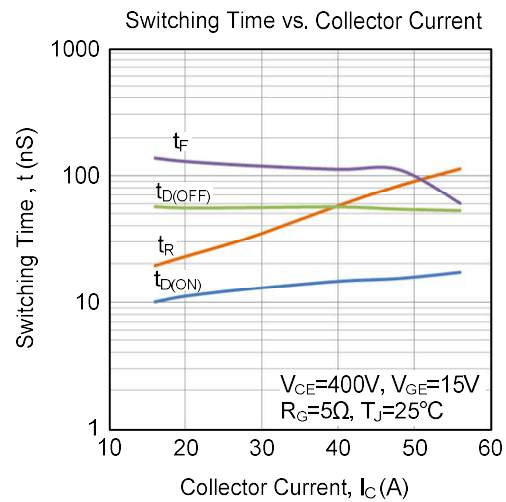
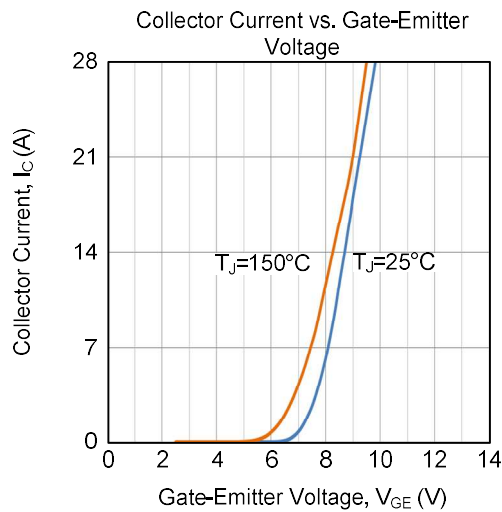
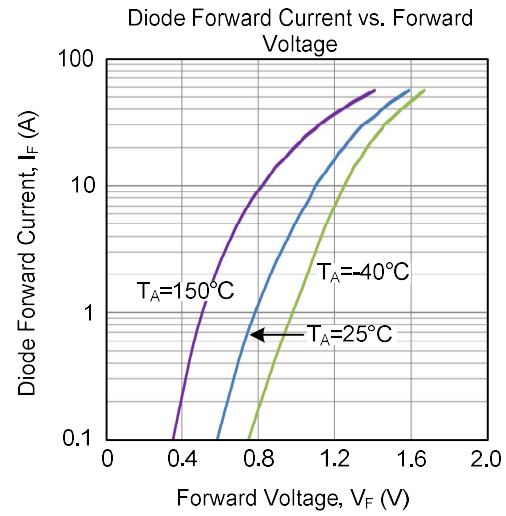
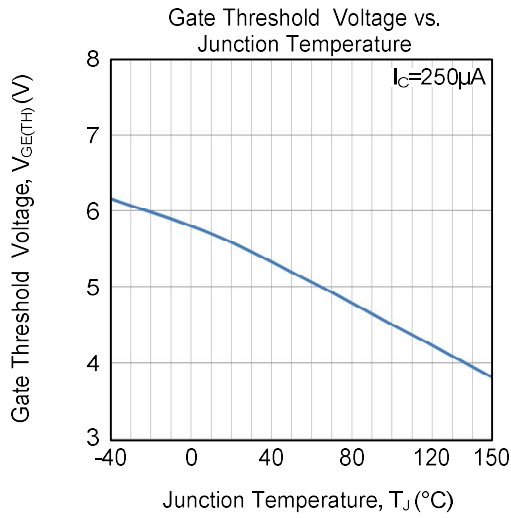


Fig 2. SWITCHING TEST WAVEFORMS

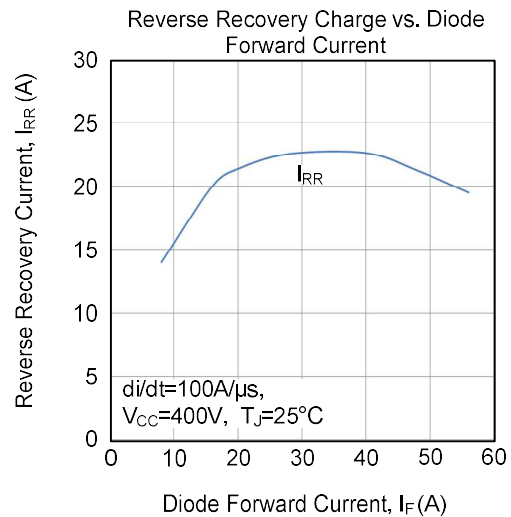
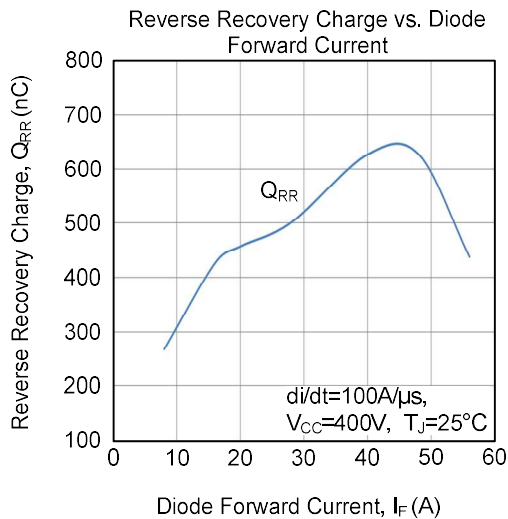
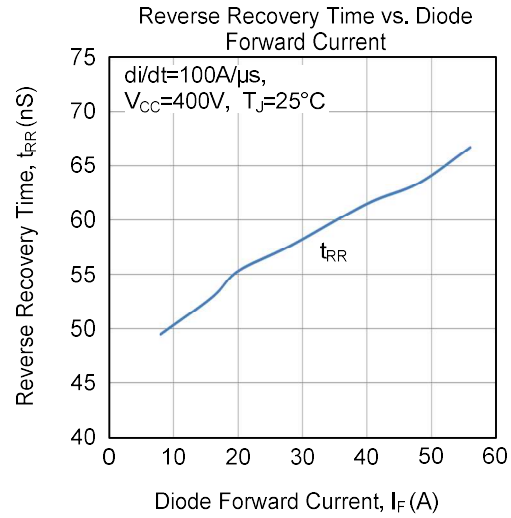
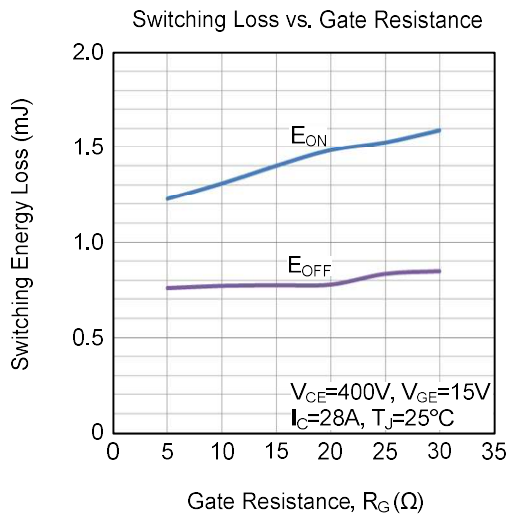
■ TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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