

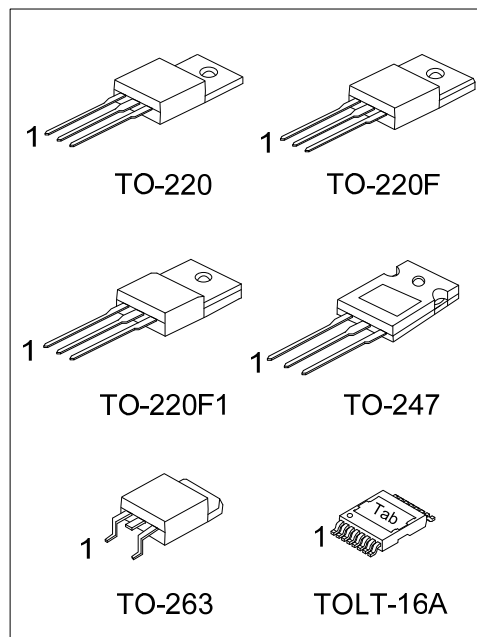
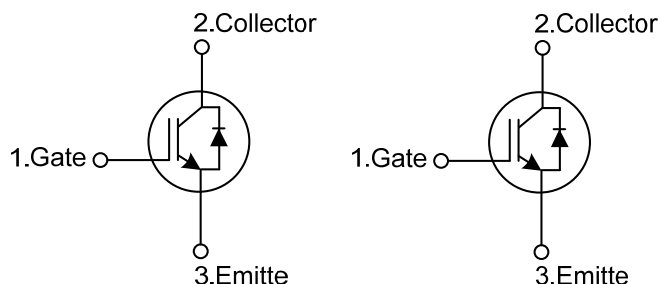
**UTG16N65LLS1***Insulated Gate Bipolar Transistor***650V, SMPS N-CHANNEL IGBT****DESCRIPTION**

The UTC **UTG16N65LLS1** is a N-channel IGBT. it uses UTC's advanced technology to provide customers with high input impedance, high switching speed and low conduction loss, etc.

The UTC **UTG16N65LLS1** is suitable for high voltage switching, high frequency switch mode power supplies.

FEATURES

- * High switching speed
- * High avalanche ruggedness
- * Low saturation voltage: $V_{CE(SAT), Typ.} = 1.65V @ I_C=16A, V_{GE}=15V$ ($T_C=25^\circ C$)

**SYMBOL****ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTG16N65LLS1L-TA3-T	UTG16N65LLS1G-TA3-T	TO-220	G	C	E	Tube
UTG16N65LLS1L-TF1-T	UTG16N65LLS1G-TF1-T	TO-220F1	G	C	E	Tube
UTG16N65LLS1L-TF3-T	UTG16N65LLS1G-TF3-T	TO-220F	G	C	E	Tube
UTG16N65LLS1L-T47-T	UTG16N65LLS1G-T47-T	TO-247	G	C	E	Tube
UTG16N65LLS1L-TQ2-T	UTG16N65LLS1G-TQ2-T	TO-263	G	C	E	Tube
UTG16N65LLS1L-TQ2-R	UTG16N65LLS1G-TQ2-R	TO-263	G	C	E	Tape Reel
UTG16N65LLS1L-TPA-R	UTG16N65LLS1G-TPA-R	TOLT-16A	refet to PIN CONFIGURATION			Tape Reel

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

UTG16N65LLS1G-TA3-T	(1)Packing Type	(1) T: Tube, R: Tape Reel
	(2)Package Type	(2) TA3: TO-220, TF1: TO-220F1, TF3: TO-220F
	(3)Green Package	T47: TO-247, TQ2: TO-263, TPA: TOLT-16A
		(3) G: Halogen Free and Lead Free, L: Lead Free

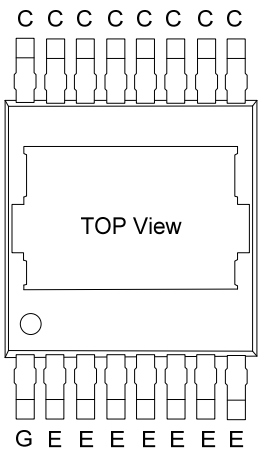
UTG16N65LLS1

Insulated Gate Bipolar Transistor

MARKING

TO-220 / TO-263	TOLT-16A
Diagram of TO-220 / TO-263 marking. The package is shown with 'UTC' and 'UTG' at the top, '16N65LLS1' in the center, and a date code '1' at the bottom. Arrows indicate 'Lot Code' on the left and 'Date Code' on the right. A legend indicates 'L: Lead Free' and 'G: Halogen Free'.	Diagram of TOLT-16A marking. The package is shown with 'UTC' and 'UTG' at the top, 'Tab' in the center, and '16N65LLS1' at the bottom. Arrows indicate 'Lot Code' on the left and 'Date Code' on the right. A legend indicates 'L: Lead Free' and 'G: Halogen Free'.

TOLT-16A PIN CONFIGURATION



■ ABSOLUTE MAXIMUM RATINGS (T_A=25°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 ms)			±25	V
Continuous Collector Current	T _C =25°C	I _C	32	A
	T _C =100°C		16	A
Collector Current Pulsed (Note 1)		I _{CM}	64	A
Diode Forward Current	T _C =25°C	I _F	32	A
	T _C =100°C		16	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-220	P _D	94	W
	TO-220F		33	W
	TO-220F1			
	TO-247		285	W
	TO-263		95	W
	TOLT-16A		155	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	RATING	UNIT
Junction to Case	TO-220	θ _{JC}	1.32	°C/W
	TO-220F		3.79	°C/W
	TO-220F1			
	TO-247		0.44	°C/W
	TO-263		1.31	°C/W
	TOLT-16A		0.8 (Note)	°C/W

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

■ 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			±400	nA
On Characteristics						
Gate to Emitter Threshold Voltage	V _{GE(TH)}	I _C =250μA, V _{CE} =V _{GE}	4.0		7.0	V
Collector to Emitter Saturation Voltage	V _{CE(SAT)}	I _C =16A, V _{GE} =15V	T _C =25°C	1.65	2.1	V
			T _C =125°C	2.2		V
Dynamic Characteristics						
Input Capacitance	C _{IES}	V _{CE} =25V, V _{GE} =0V, f=1MHz		64		pF
Output Capacitance	C _{OES}			11		pF
Reverse Transfer Capacitance	C _{RES}			53		pF
Switching Characteristics						
Total Gate Charge	Q _G	V _{CE} =520V, I _C =16A, V _{GE} =15V		47.5		nC
Gate-Emitter Charge	Q _{GE}			17.5		nC
Gate-Collector Charge	Q _{GC}			18.4		nC
Turn-On Delay Time	t _{DON}	V _{CC} =400V, I _C =16A, R _G =5Ω, V _{GE} =0~15V, L=1000uH		7.5		ns
Rise Time	t _R			18		ns
Turn-Off Delay Time	t _{DOFF}			27		ns
Fall Time	t _F			188		ns
Turn-On Switching Loss	E _{ON}			0.59		mJ
Turn-Off Switching Loss	E _{OFF}			0.45		mJ
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Forward Voltage Drop	V _F	I _F =16A			2.6	V
Reverse Recovery Time	t _{rr}	I _F =16A, dI/dt=100A/μS, V _{CC} =400V		47		ns
Reverse Recovery Charge	Q _{rr}			263		nC

■ TEST CIRCUIT AND WAVEFORMS

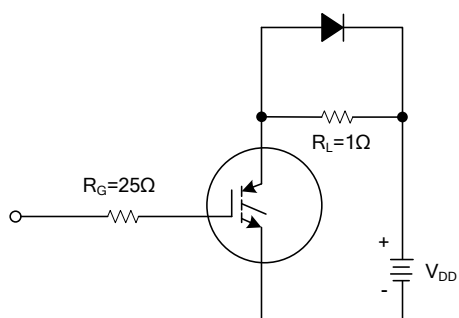


Fig 1. INDUCTIVE SWITCHING TEST CIRCUIT

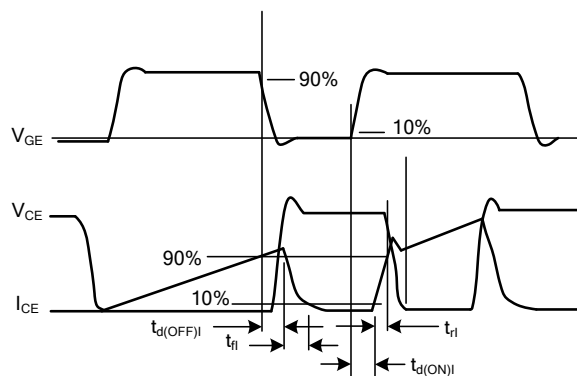
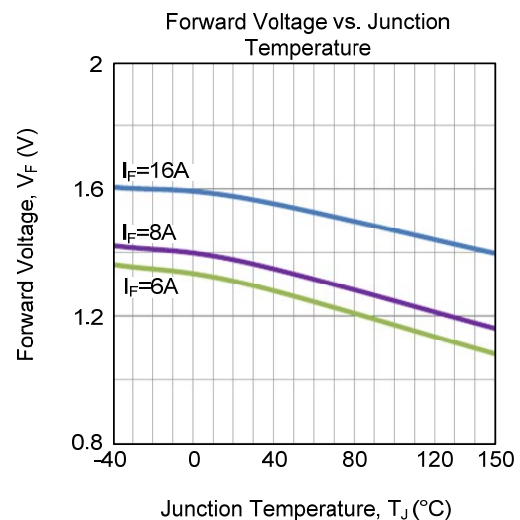
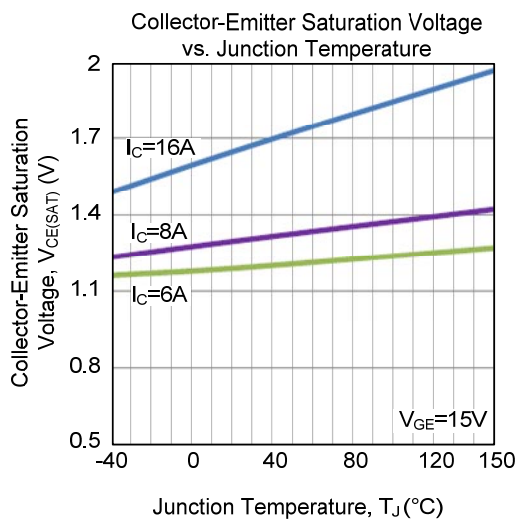
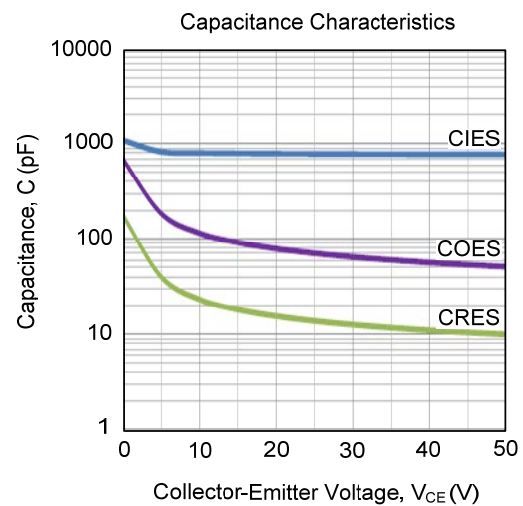
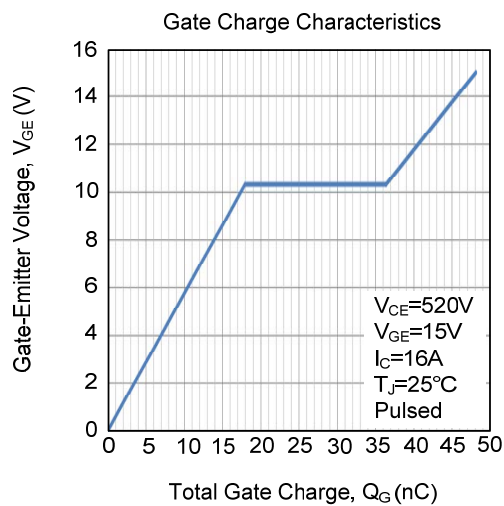
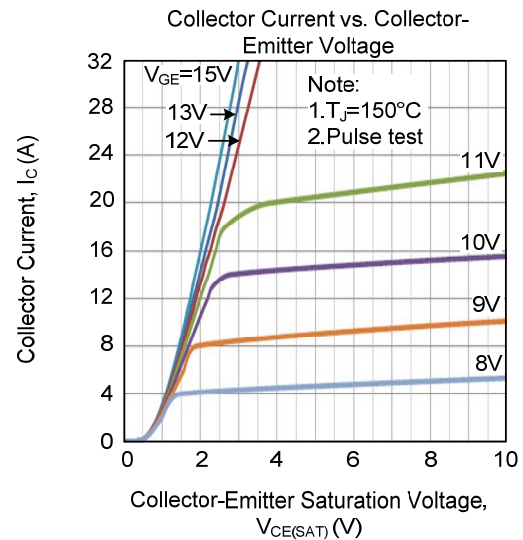
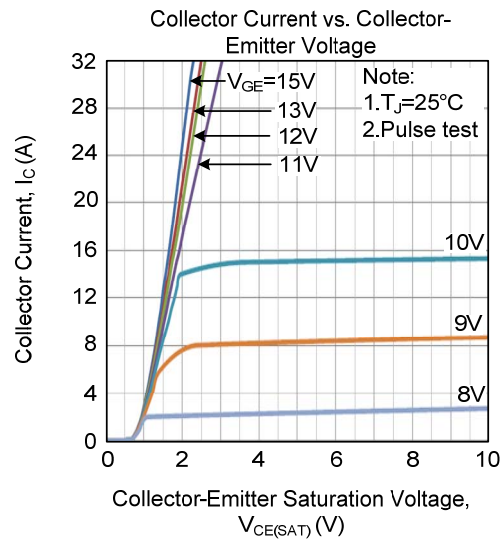
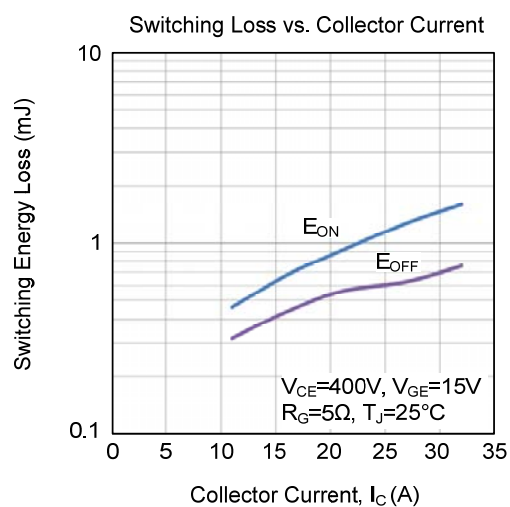
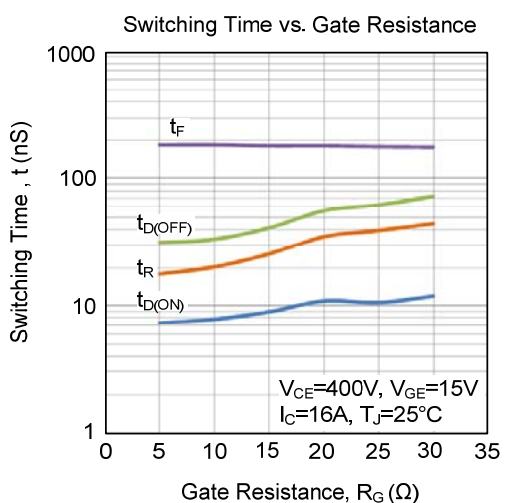
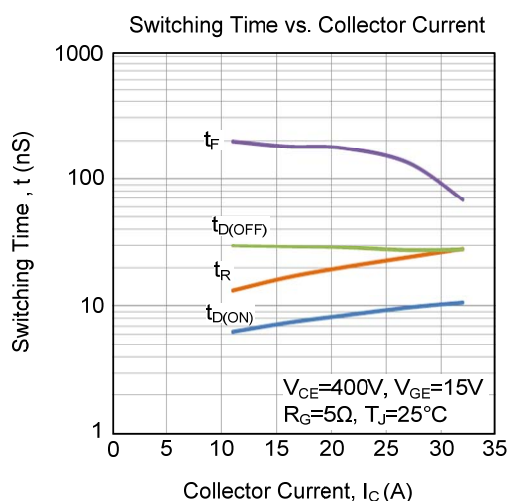
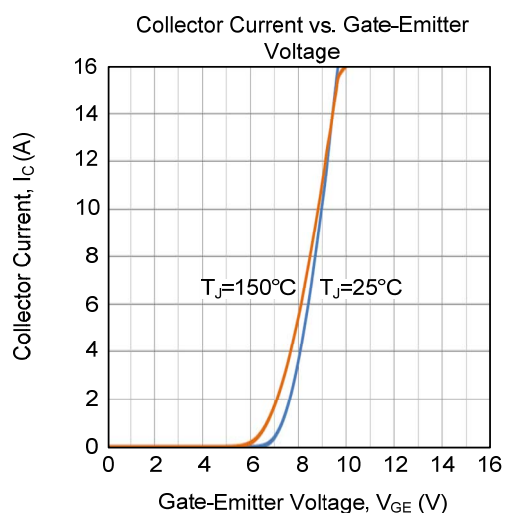
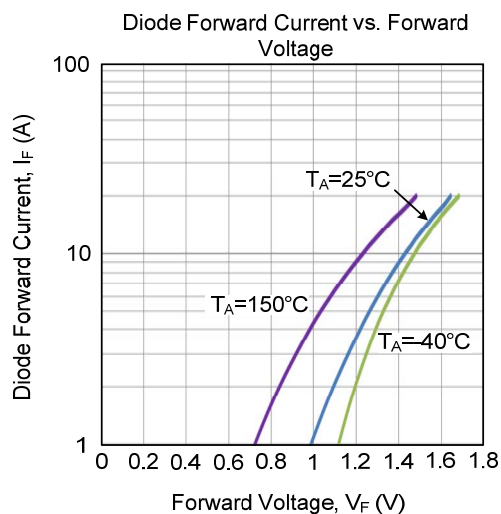
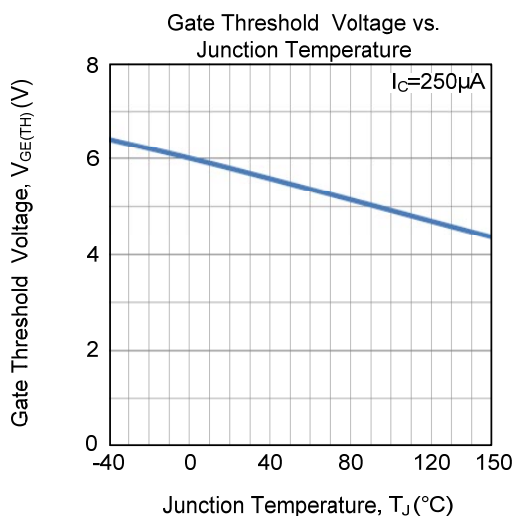


Fig 2. SWITCHING TEST WAVEFORMS

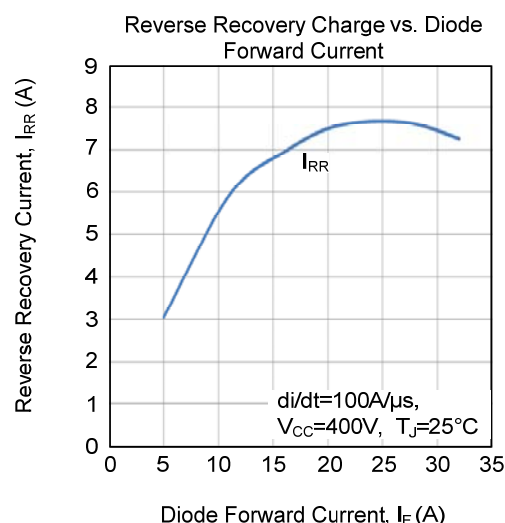
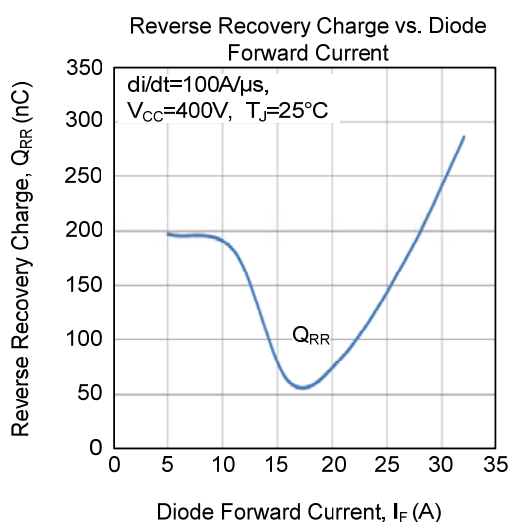
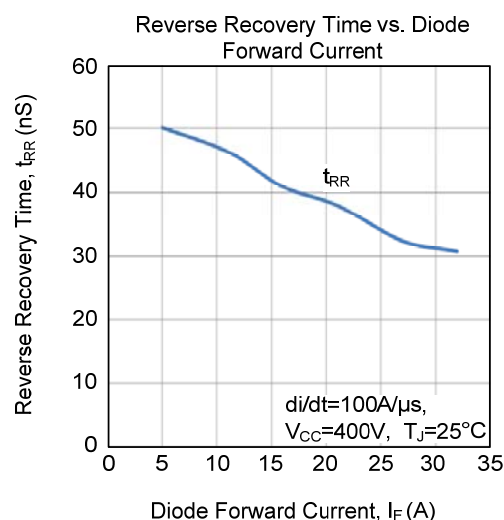
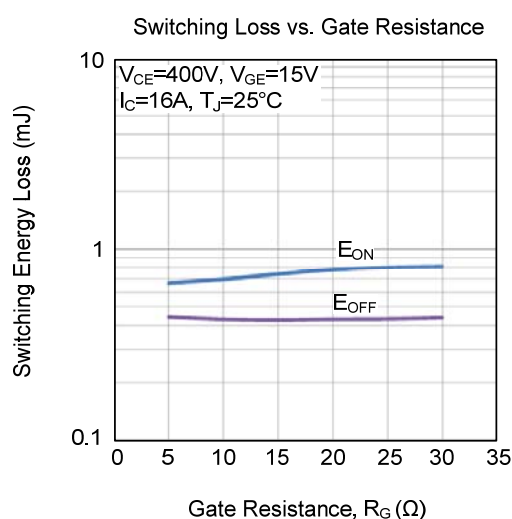
■ TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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