



## UPG30N60E

Insulated Gate Bipolar Transistor

### 600V, SMPS N-CHANNEL IGBT

#### DESCRIPTION

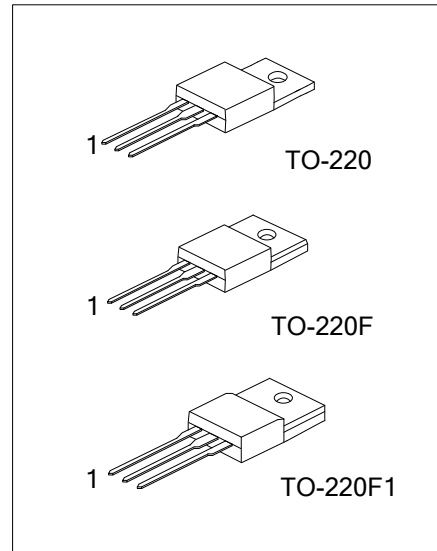
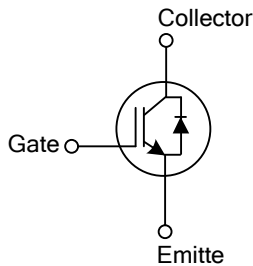
The UTC **UPG30N60E** is a N-channel IGBT. it uses UTC's advanced technology to provide customers with high input impedance, high switching speed and low conduction loss, etc.

The UTC **UPG30N60E** is suitable for high voltage switching, high frequency switch mode power supplies.

#### FEATURES

- \*  $V_{CE(SAT)} \leq 2.3V @ I_C=30A, V_{GE}=15V$
- \* High switching speed
- \* High input impedance
- \* Low conduction loss

#### SYMBOL



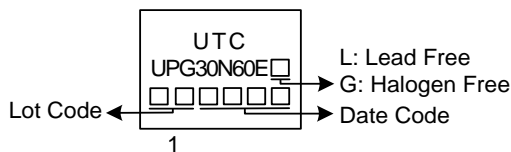
#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UPG30N60EL-TA3-T	UPG30N60EG-TA3-T	TO-220	G	C	E	Tube
UPG30N60EL-TF1-T	UPG30N60EG-TF1-T	TO-220F1	G	C	E	Tube
UPG30N60EL-TF3-T	UPG30N60EG-TF3-T	TO-220F	G	C	E	Tube

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

UPG30N60EG-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	(3) G: Halogen Free and Lead Free, L: Lead Free

#### MARKING



### ■ ABSOLUTE MAXIMUM RATINGS (T<sub>C</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Collector-Emitter Voltage	V <sub>CES</sub>	600	V
Gate to Emitter Voltage Continuous	V <sub>GES</sub>	±20	V
Continuous Collector Current	I <sub>C</sub>	T <sub>C</sub> =25°C	60
		T <sub>C</sub> =100°C	30
Collector Current Pulsed (Note 2)	I <sub>CM</sub>	100	A
Continuous Forward Current	I <sub>F</sub>	T <sub>C</sub> =25°C	30
		T <sub>C</sub> =100°C	15
Forward Current Pulsed	I <sub>FM</sub>	132	A
Peak Diode Recovery dv/dt (Note 4)	dv/dt	7.1	V/ns
Power Dissipation	P <sub>D</sub>	TO-220	100
		TO-220F	35
		TO-220F1	
Junction Temperature	T <sub>J</sub>	-55 ~ +150	°C
Storage Temperature Range	T <sub>STG</sub>	-55 ~ +150	°C

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. Repetitive Rating: Pulse width limited by maximum junction temperature.

3. I<sub>F</sub> ≤ 30A, di/dt ≤ 200A/μs, V<sub>CC</sub> ≤ BV<sub>CES</sub>, Starting T<sub>J</sub>=25°C

### ■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Case	θ <sub>JC</sub>	TO-220	1.25
		TO-220F	3.57
		TO-220F1	

### ■ ELECTRICAL CHARACTERISTICS (T<sub>J</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Collector-Emitter Breakdown Voltage	BV <sub>CES</sub>	I <sub>C</sub> =250μA, V <sub>GE</sub> =0V	600			V
Collector-Emitter Leakage Current	I <sub>CES</sub>	V <sub>CE</sub> =600V, V <sub>GE</sub> =0V			200	μA
Collector-Emitter Saturation Voltage	V <sub>CE(SAT)</sub>	I <sub>C</sub> =30A, V <sub>GE</sub> =15V	T <sub>J</sub> =25°C	1.9	2.3	V
			T <sub>J</sub> =125°C	2.2		V
Gate to Emitter Threshold Voltage	V <sub>GE(TH)</sub>	I <sub>C</sub> =250μA, V <sub>CE</sub> =V <sub>GE</sub>	4.0		6.5	V
Gate to Emitter Leakage Current	I <sub>GES</sub>	V <sub>CE</sub> =0V, V <sub>GE</sub> =20V			±400	nA
Input Capacitance	C <sub>IES</sub>	V <sub>CE</sub> =30V, V <sub>GE</sub> =0V, f=1MHz		1220		pF
Output Capacitance	C <sub>OES</sub>			138		pF
Reverse Transfer Capacitance	C <sub>RES</sub>			23		pF
Total Gate Charge	Q <sub>G</sub>			42		nC
Gate-Emitter Charge	Q <sub>GE</sub>	I <sub>C</sub> =30A, V <sub>CE</sub> =100V, V <sub>GE</sub> =10V		9.4		nC
Gate-Collector Charge	Q <sub>GC</sub>			18.8		nC
Current Turn-On Delay Time	t <sub>d(ON)</sub>	I <sub>C</sub> =30A, V <sub>CE</sub> =50V, V <sub>GE</sub> =10V, R <sub>G</sub> =10Ω		60		ns
Current Rise Time	t <sub>r</sub>			93		ns
Current Turn-Off Delay Time	t <sub>d(OFF)</sub>			100		ns
Current Fall Time	t <sub>f</sub>			139		ns

### SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS

Forward Voltage Drop	V <sub>FM</sub>	I <sub>F</sub> =10A			2.3	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> =10A, di/dt=100A/μs		86		ns
Reverse Recovery Charge	Q <sub>rr</sub>			195		nC

Note: Pulse Test: Pulse width ≤ 50μs.

### ■ TEST CIRCUIT AND WAVEFORMS

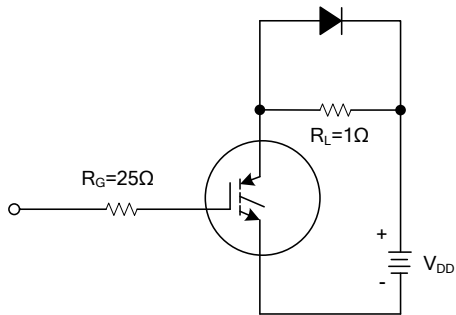


Fig 1. INDUCTIVE SWITCHING TEST CIRCUIT

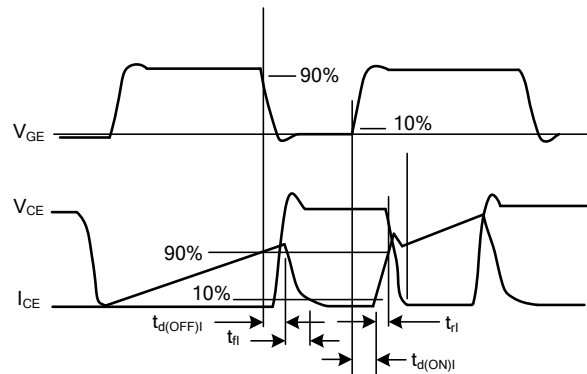
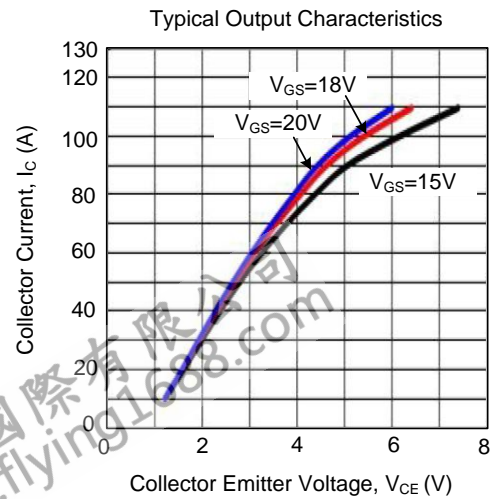
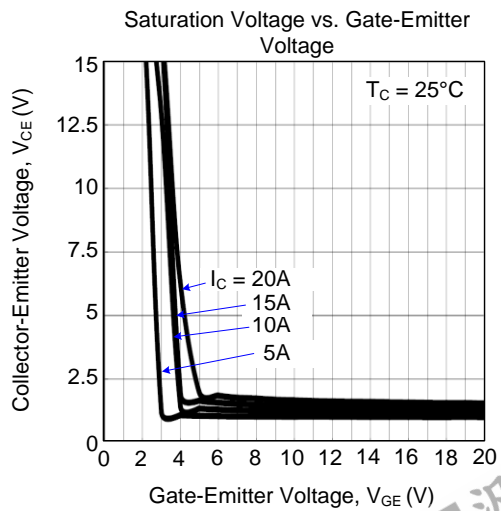
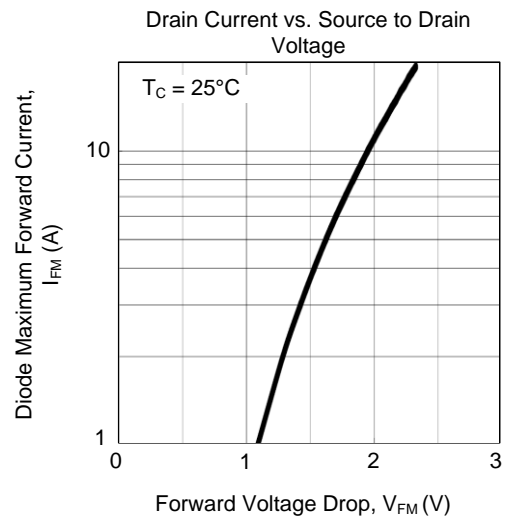
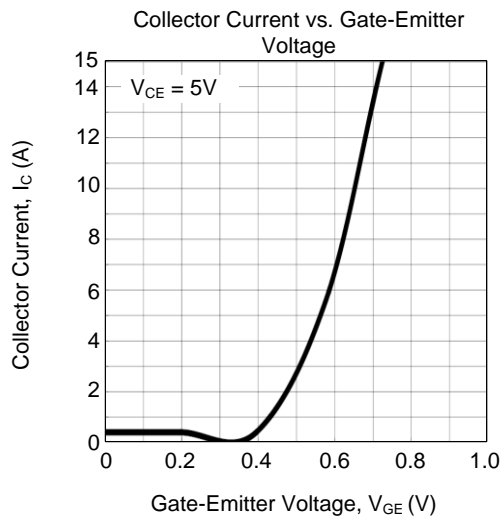
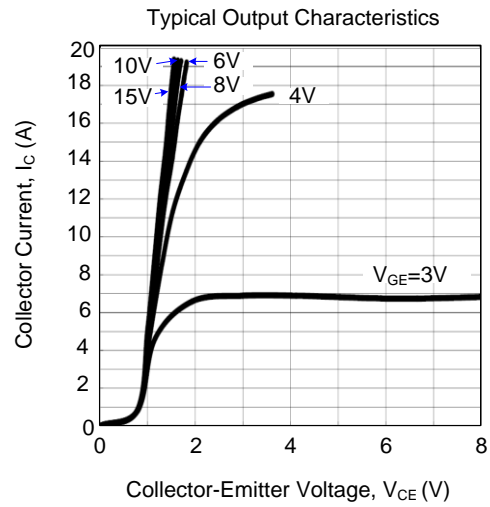
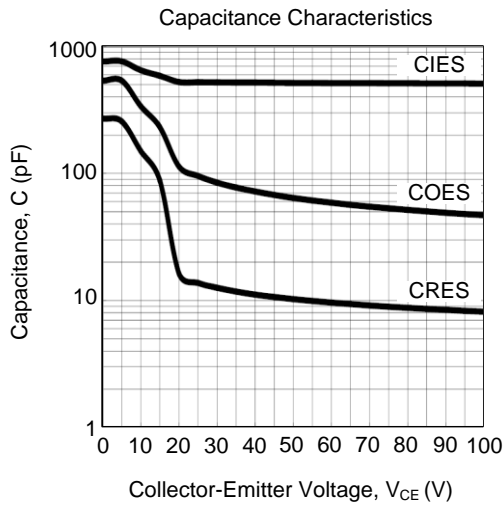


Fig 2. SWITCHING TEST WAVEFORMS

### TYPICAL CHARACTERISTICS



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