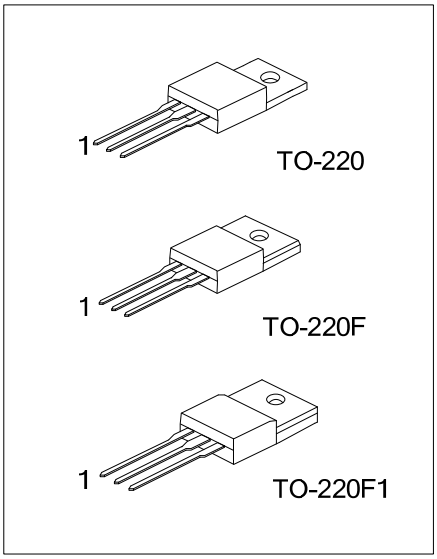
UPG30N60

Insulated Gate Bipolar Transistor

600V, SMPS N-CHANNEL IGBT



■ DESCRIPTION

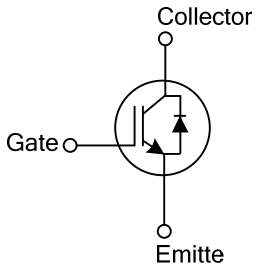
The UTC **UPG30N60** is a N-channel IGBT. it uses UTC's advanced technology to provide customers with high input impedance, high switching speed and low conduction loss, etc.

The UTC **UPG30N60** is suitable for high voltage switching, high frequency switch mode power supplies.

■ FEATURES

* $V_{CE(SAT)}$ ≤ 2.3V @ I_C=30A, V_{GE}=15V
* 600V Switching SOA Capability
* High switching speed
* High input impedance
* Low conduction loss

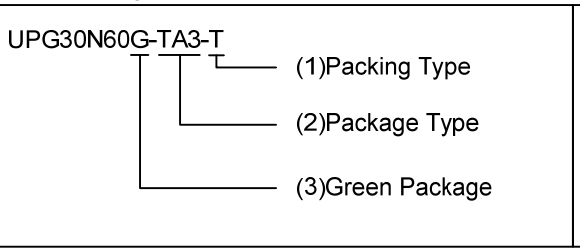
■ SYMBOL



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UPG30N60L-TA3-T	UPG30N60G-TA3-T	TO-220	G	C	E	Tube
UPG30N60L-TF1-T	UPG30N60G-TF1-T	TO-220F1	G	C	E	Tube
UPG30N60L-TF3-T	UPG30N60G-TF3-T	TO-220F	G	C	E	Tube

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

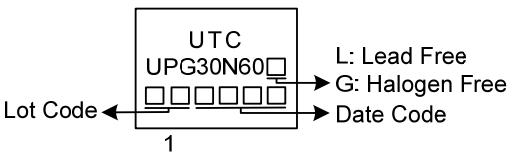


(1) T: Tube, R: Tape Reel

(2) TA3: TO-220, TF1: TO-220F1, TF3: TO-220F

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

■ MARKING



■ ABSOLUTE MAXIMUM RATINGS (T_C=25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Collector-Emitter Voltage		V_{CES}	600	V
Gate to Emitter Voltage Continuous		V_{GES}	±20	V
Continuous Collector Current	T_C=25°C	I_C	60	A
	T_C=100°C		30	A
Collector Current Pulsed (Note 2)		I_{CM}	100	A
Single Pulse Avalanche Energy (Note 3)		E_{AS}	66	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	7	V/ns
Power Dissipation	TO-220	P_D	125	W
	TO-220F TO-220F1		41.6	W
Junction Temperature		T_J	-55 ~ +150	°C
Storage Temperature Range		T_{STG}	-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. L=5.0mH, PK_{IL}=5.15A, V_{CC}=50V, R_G=25Ω, Starting T_J=25°C
4. I_F ≤8A, di/dt ≤200A/μs, V_{CC} ≤ BV_{CES}, Starting T_J=25°C

■ THERMAL CHARACTERISTICS

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Case	TO-220	θ_{JC}	1	°C/W
	TO-220F TO-220F1		3	°C/W

■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Collector-Emitter Breakdown Voltage	BV_{CES}	I_C=250μA, V_{GE}=0V		600			V
Collector-Emitter Leakage Current	I_{CES}	V_{CE}=600V, V_{GE}=0V				200	μA
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	I_C=30A, V_{GE}=15V	T_J=25°C		1.9	2.3	V
			T_J=125°C		2.2		V
Gate to Emitter Threshold Voltage	$V_{GE(TH)}$	I_C=250μA, V_{CE}= V_{GE}		1.0		3.0	V
Gate to Emitter Leakage Current	I_{GES}	V_{CE}=0V, V_{GE}=20V				±400	nA
Input Capacitance	C_{IES}	V_{CE}=30V, V_{GE}=0V, f=1MHz			520		pF
Output Capacitance	C_{OES}				90		pF
Reverse Transfer Capacitance	C_{RES}				12		pF
Total Gate Charge	Q_G	I_C=15A, V_{CE}=400V, V_{GE}=15V			70		nC
Gate-Emitter Charge	Q_{GE}				4.4		nC
Gate-Collector Charge	Q_{GC}				12		nC
Current Turn-On Delay Time	$t_{D(ON)}$	I_C=15A, V_{CE}=400V, V_{GE}=10V, R_G=10Ω			8		ns
Current Rise Time	t_R				19		ns
Current Turn-Off Delay Time	$t_{D(OFF)}$				80		ns
Current Fall Time	t_F				2500		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Forward Voltage Drop	V_{FM}	I_F=8A				2.4	V
Reverse Recovery Time	t_{rr}	I_F=8A, dI/dt=200A/μS			70		ns
Reverse Recovery Charge	Q_{rr}				90		μC

Note: Pulse Test: Pulse width≦50μs.

■ TEST CIRCUIT AND WAVEFORMS

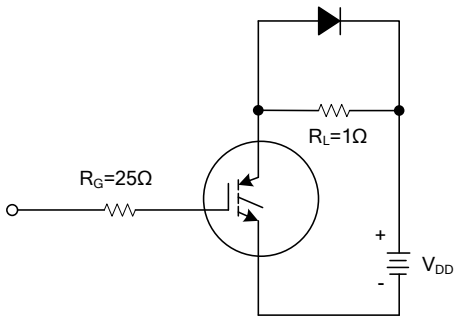


Fig 1. INDUCTIVE SWITCHING TEST CIRCUIT

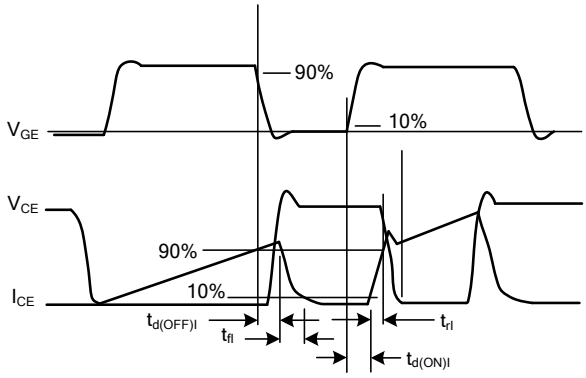
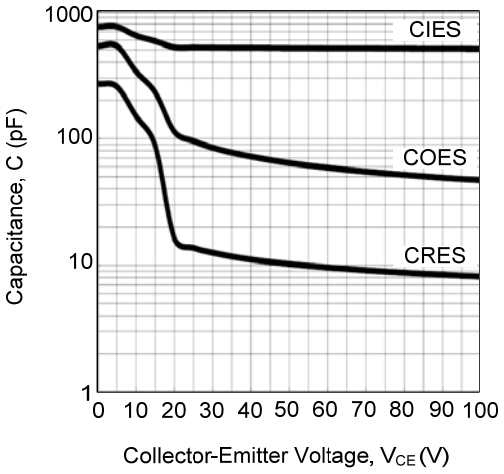


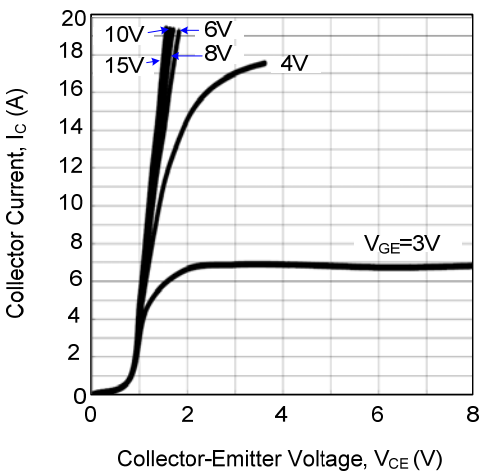
Fig 2. SWITCHING TEST WAVEFORMS

■ TYPICAL CHARACTERISTICS

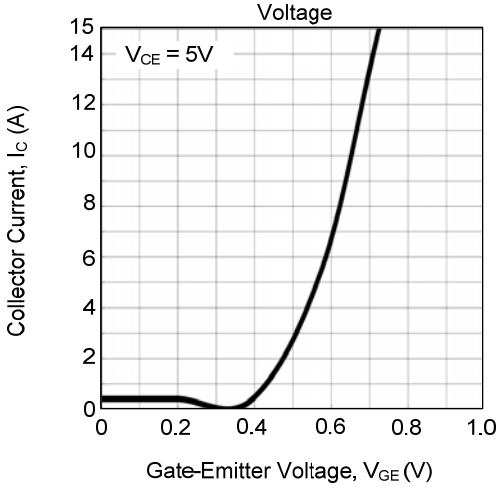
Capacitance Characteristics



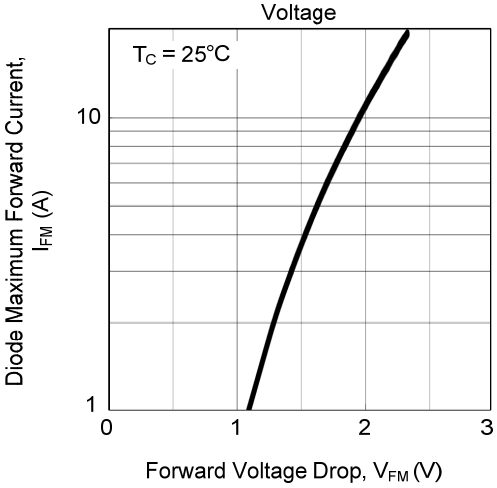
Typical Output Characteristics



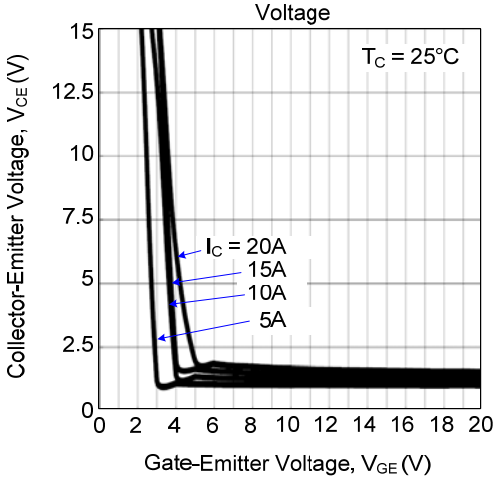
Collector Current vs. Gate-Emitter Voltage



Drain Current vs. Source to Drain Voltage



Saturation Voltage vs. Gate-Emitter Voltage



Typical Output Characteristics