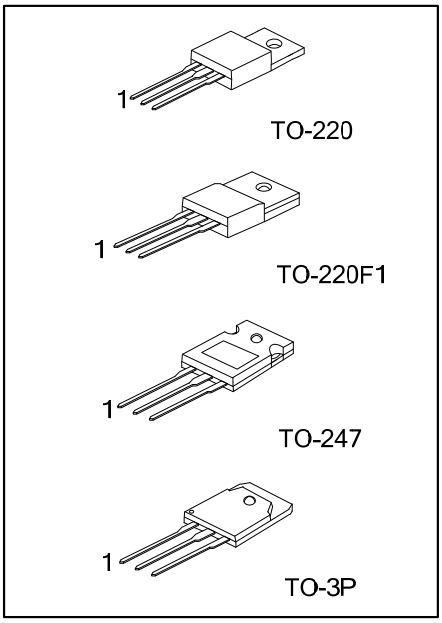
UPG20N60

Insulated Gate Bipolar Transistor

600V, SMPS N-CHANNEL IGBT



■ DESCRIPTION

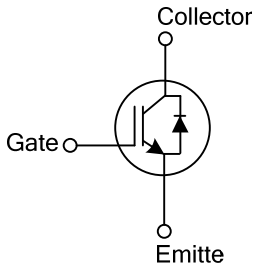
The UTC **UPG20N60** is a N-channel IGBT. it uses UTC's advanced technology to provide customers with high input impedance, high switching speed and low conduction loss, etc.

The UTC **UPG20N60** is suitable for high voltage switching, high frequency switch mode power supplies.

■ FEATURES

* $V_{CE(SAT)}$ ≤ 2.8V @ I_C=20A, V_{GE}=15V
* 600V Switching SOA Capability
* High switching speed
* High input impedance
* Low conduction loss

■ SYMBOL



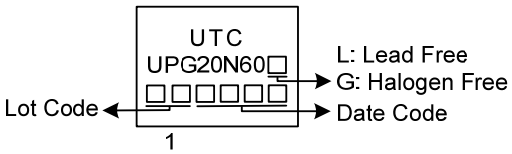
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UPG20N60L-TA3-T	UPG20N60G-TA3-T	TO-220	G	C	E	Tube
UPG20N60L-TF1-T	UPG20N60G-TF1-T	TO-220F1	G	C	E	Tube
UPG20N60L-T3P-T	UPG20N60G-T3P-T	TO-3P	G	C	E	Tube
UPG20N60L-T47-T	UPG20N60G-T47-T	TO-247	G	C	E	Tube

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

UPG20N60G-TA3-T (1)Packing Type (2)Package Type (3)Green Package	(1) T: Tube (2) TA3: TO-220, TF1: TO-220F1, T47: TO-247 (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	40	A
	T_C=100°C		20	A
Collector Current Pulsed (Note 2)		I_{CM}	80	A
Peak Diode Recovery dv/dt (Note 3)		dv/dt	6.4	V/ns
Power Dissipation	TO-220	P_D	125	W
	TO-220F1		41.6	W
	TO-3P		375	W
	TO-247		300	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=10mH, PK_{IL}=3.5A, 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-220F1		3	°C/W
	TO-3P		0.33	°C/W
	TO-247		0.38	°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				10	μA
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	I_C=20A, V_{GE}=15V	T_J=25°C		2.3	2.8	V
			T_J=150°C		2.64		V
Gate to Emitter Threshold Voltage	$V_{GE(TH)}$	I_C=250μA, V_{CE}= V_{GE}		4.5		6.5	V
Gate to Emitter Leakage Current	I_{GES}	V_{CE}=0V, V_{GE}=±20V				±100	nA
Input Capacitance	C_{IES}	V_{CE}=25V, V_{GE}=0V, f=1MHz			1778		pF
Output Capacitance	C_{OES}				246		pF
Reverse Transfer Capacitance	C_{RES}				44		pF
Total Gate Charge	Q_G	I_C=20A, V_{CE}=50V, V_{GE}=15V			79		nC
Gate-Emitter Charge	Q_{GE}				12.7		nC
Gate-Collector Charge	Q_{GC}				27.4		nC
Current Turn-On Delay Time	$t_{D(ON)}$	I_C=20A, V_{CE}=50V, V_{GE}=15V, R_G=10Ω			40		ns
Current Rise Time	t_R				27.75		ns
Current Turn-Off Delay Time	$t_{D(OFF)}$				160		ns
Current Fall Time	t_F				42		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Forward Voltage Drop	V_{FM}	I_F=20A			1.5		V
Reverse Recovery Time	t_{rr}	I_F=20A, dI/dt=100A/μS, V_R=400V			170		ns
Reverse Recovery Charge	Q_{rr}				0.82		μC

Note: Pulse Test: Pulse width≦50μs.

■ TEST CIRCUIT AND WAVEFORMS

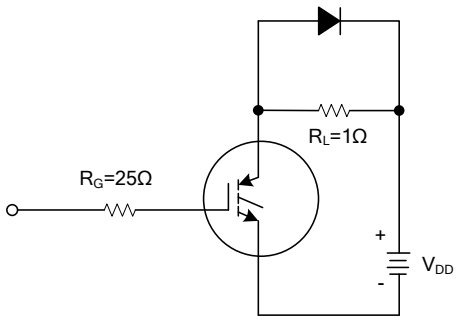


Fig 1. INDUCTIVE SWITCHING TEST CIRCUIT

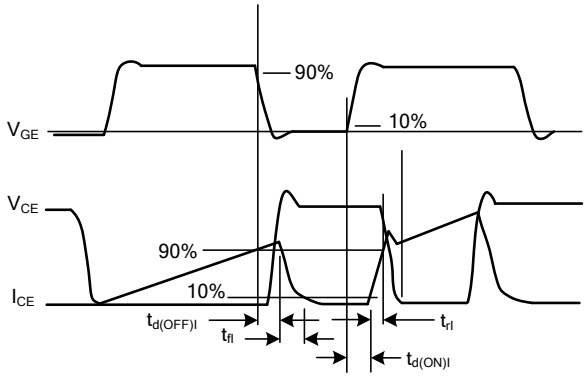


Fig 2. SWITCHING TEST WAVEFORMS

■ TYPICAL CHARACTERISTICS