



UPG40N120

Insulated Gate Bipolar Transistor

1200V, SMPS N-CHANNEL IGBT

DESCRIPTION

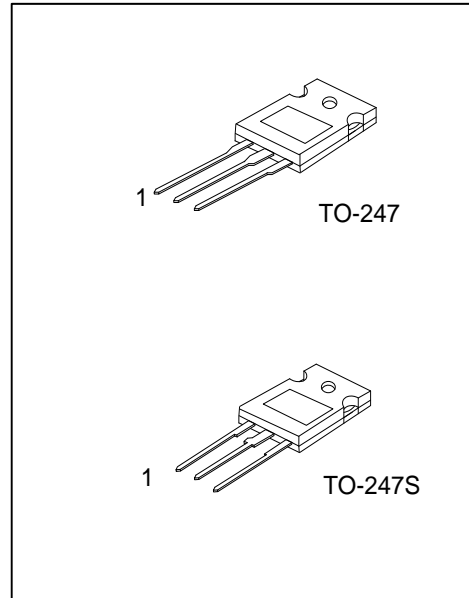
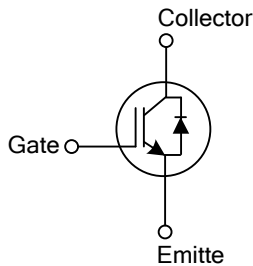
The UTC **UPG40N120** is a N-channel IGBT. it uses UTC's advanced technology to provide customers with high input impedance, high switching speed and low conduction loss, etc.

The UTC **UPG40N120** is suitable for high voltage switching, high frequency switch mode power supplies.

FEATURES

- * $V_{CE(SAT)} \leq 2.7V @ I_C=40A, V_{GE}=15V$
- * 1200V Switching SOA Capability
- * High switching speed
- * High input impedance
- * Low conduction loss

SYMBOL



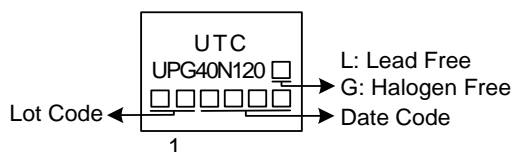
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UPG40N120L-T47-T	UPG40N120G-T47-T	TO-247	G	C	E	Tube
UPG40N120L-T47S-T	UPG40N120G-T47S-T	TO-247S	G	C	E	Tube

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

<p>UPG40N120G-T47-T</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) T: Tube (2) T47: TO-247, T47S: TO-247S (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING



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

PARAMETER	SYMBOL	RATINGS	UNIT
Collector-Emitter Voltage	V _{CES}	1200	V
Gate to Emitter Voltage Continuous	V _{GES}	±20	V
Continuous Collector Current	I _C	T _C =25°C	80
		T _C =100°C	40
Collector Current Pulsed (Note 2)	I _{CM}	160	A
Single Pulse Avalanche Energy (Note 3)	E _{AS}	720	mJ
Peak Diode Recovery dv/dt (Note 4)	dv/dt	4.25	V/ns
Power Dissipation	P _D	450	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}=12A, 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 DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Case	θ _{JC}	0.28	°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	1200			V
Collector-Emitter Leakage Current	I _{CES}	V _{CE} =1200V, V _{GE} =0V			200	μA
Collector-Emitter Saturation Voltage	V _{CE(SAT)}	I _C =40A, V _{GE} =15V	T _J =25°C	1.9	2.7	V
			T _J =150°C	2.2		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			±400	nA
Input Capacitance	C _{IES}	V _{CE} =25V, V _{GE} =0V, f=1MHz		2900		pF
Output Capacitance	C _{OES}			310		pF
Reverse Transfer Capacitance	C _{RES}			104		pF
Total Gate Charge	Q _G	I _C =40A, V _{CE} =50V, V _{GE} =15V		169		nC
Gate-Emitter Charge	Q _{GE}			22		nC
Gate-Collector Charge	Q _{GC}			86		nC
Current Turn-On Delay Time	t _{D(ON)}	I _C =40A, V _{CE} =50V, V _{GE} =15V, R _G =10Ω		75		ns
Current Rise Time	t _R			151		ns
Current Turn-Off Delay Time	t _{D(OFF)}			258		ns
Current Fall Time	t _F			130		ns

SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS

Forward Voltage Drop	V _{FM}	I _F =40A		3		V
Reverse Recovery Time	t _{rr}	I _F =40A, di/dt=100A/μS, V _R =400V		148		ns
Reverse Recovery Charge	Q _{rr}			0.5		μC

Note: Pulse Test: Pulse width ≤ 50μs.

■ TEST CIRCUIT AND WAVEFORMS

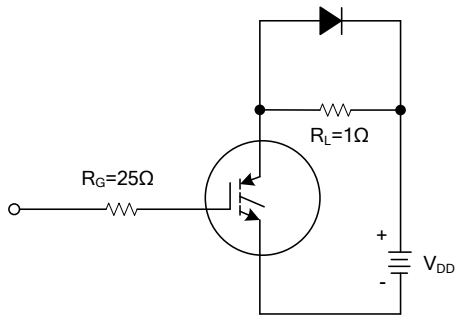


Fig 1. INDUCTIVE SWITCHING TEST CIRCUIT

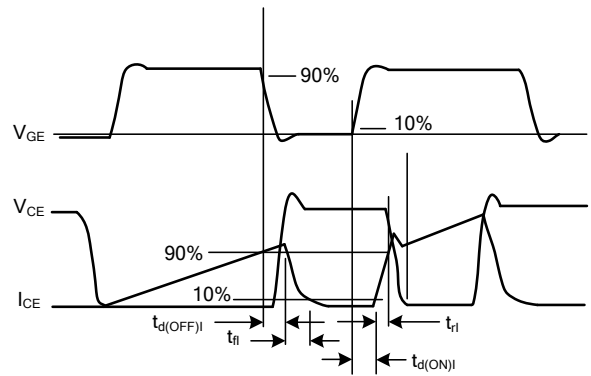
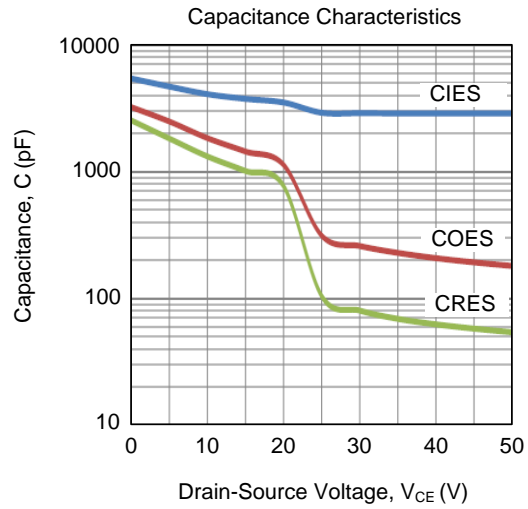
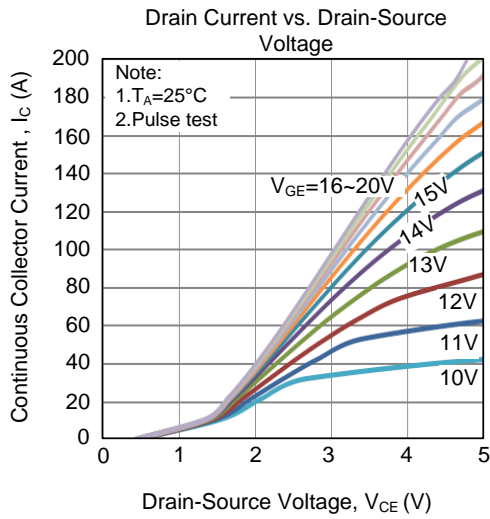


Fig 2. SWITCHING TEST WAVEFORMS

■ TYPICAL CHARACTERISTICS



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