

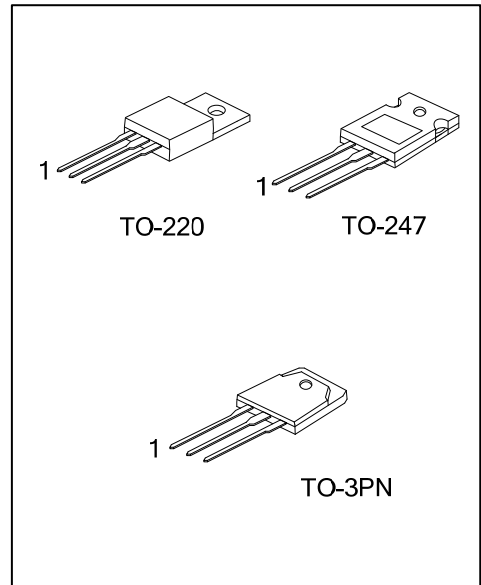


**UG5N120**

Preliminary

*Insulated Gate Bipolar Transistor*

**21A, 1200V NPT N-CHANNEL IGBT WITH ANTI-PARALLEL HYPERFAST DIODES**



■ DESCRIPTION

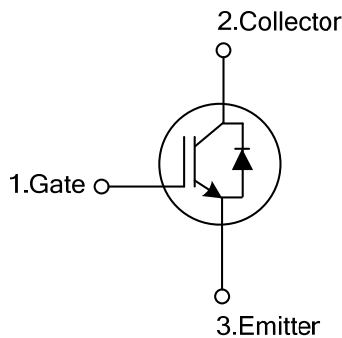
The UTC **UG5N120** is a NPT N-Channel IGBT, it uses UTC's advanced technology to provide the customers with a minimum on-state resistance, etc.

The UTC **UG5N120** is suitable for AC and DC motor controls, power supplies, and drivers for solenoids, relays and contactors, etc.

■ FEATURES

- \* Low conduction loss
- \* Short circuit rating

■ SYMBOL



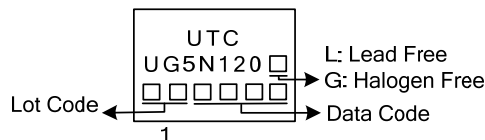
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UG5N120L-TA3-T	UG5N120G-TA3-T	TO-220	G	C	E	Tube
UG5N120L-T3N-T	UG5N120G-T3N-T	TO-3PN	G	C	E	Tube
UG5N120L-T47-T	UG5N120G-T47-T	TO-247	G	C	E	Tube

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

<p>UG5N120L-TA3-T</p>	<p>(1) T: Tube (2) TA3: TO-220, T3N: TO-3PN, T47: TO-247 (3) L: Lead Free, G: Halogen Free and Lead Free</p>
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■ MARKING



■ ABSOLUTE MAXIMUM RATING ( $T_C=25^\circ\text{C}$ , unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Collector to Emitter Voltage		$BV_{CES}$	1200	V
Gate-Emitter Voltage		$V_{GES}$	$\pm 20$	V
Gate to Emitter Voltage Pulsed		$V_{GEM}$	$\pm 30$	V
Collector Current Continuous	$T_C=25^\circ\text{C}$	$I_C$	21	A
	$T_C=110^\circ\text{C}$		10	A
Collector Current Pulsed (Note 1)		$I_{CM}$	40	A
Power Dissipation Total at $T_C = 25^\circ\text{C}$	TO-220	$P_D$	78	W
	TO-3PN		201	W
	TO-247		167	W
Power Dissipation Derating $T_C > 25^\circ\text{C}$	TO-220		0.62	W/ $^\circ\text{C}$
	TO-3PN		1.6	W/ $^\circ\text{C}$
	TO-247		1.33	W/ $^\circ\text{C}$
Short Circuit Withstand Time (Note 2) at $V_{GE}=15\text{V}$		$t_{SC}$	8	$\mu\text{s}$
Short Circuit Withstand Time (Note 2) at $V_{GE}=12\text{V}$		$t_{SC}$	15	$\mu\text{s}$
Operating Junction Temperature Range		$T_J$	-55 ~ +150	$^\circ\text{C}$
Storage Temperature Range		$T_{STG}$	-55 ~ +150	$^\circ\text{C}$

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. Pulse width limited by maximum junction temperature.

3.  $I_{CE}=10\text{A}$ ,  $L=400\mu\text{H}$ ,  $T_J=25^\circ\text{C}$ .

4.  $V_{CE(PK)}=840\text{V}$ ,  $T_J=125^\circ\text{C}$ ,  $R_G=25\Omega$ .

■ THERMAL CHARACTERISTICS

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Case	TO-220	$\theta_{JC}$	1.6	$^\circ\text{C}/\text{W}$
	TO-3PN		0.62	$^\circ\text{C}/\text{W}$
	TO-247		0.75	$^\circ\text{C}/\text{W}$

■ ELECTRICAL CHARACTERISTICS ( $T_C=25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Collector to Emitter Breakdown Voltage	$BV_{CES}$	$I_C=250\mu\text{A}$ , $V_{GE}=0\text{V}$	1200			V
Collector to Emitter Leakage Current	$I_{CES}$	$V_{CE}=1200\text{V}$	$T_C=25^\circ\text{C}$		250	$\mu\text{A}$
			$T_C=125^\circ\text{C}$		100	$\mu\text{A}$
			$T_C=150^\circ\text{C}$		1.5	mA
Collector to Emitter Saturation Voltage	$V_{CE(SAT)}$	$I_C=5\text{A}$ , $V_{GE}=15\text{V}$	$T_C=25^\circ\text{C}$	2.45	2.7	V
			$T_C=150^\circ\text{C}$	3.7	4.2	V
Gate to Emitter Threshold Voltage	$V_{GE(TH)}$	$I_C=45\mu\text{A}$ , $V_{CE}=V_{GE}$	6.0	6.8		V
Gate to Emitter Leakage Current	$I_{GES}$	$V_{GE}=\pm 20\text{V}$			$\pm 250$	nA
Switching SOA	SSOA	$T_J=150^\circ\text{C}$ , $R_G=25\Omega$ , $V_{GE}=15\text{V}$ , $L=5\text{mH}$ , $V_{CE(PK)}=1200\text{V}$	30			A
Gate to Emitter Plateau Voltage	$V_{GEP}$	$I_C=5\text{A}$ , $V_{CE}=600\text{V}$		10.5		V
On-State Gate Charge	$Q_{G(ON)}$	$I_C=5\text{A}$ , $V_{CE}=600\text{V}$	$V_{GE}=15\text{V}$	53	65	nC
			$V_{GE}=20\text{V}$	60	72	nC
Current Turn-On Delay Time	$t_{d(ON)I}$	IGBT and Diode at $T_J=25^\circ\text{C}$ $I_{CE}=1.0\text{A}$ , $V_{CE}=30\text{V}$ , $V_{GE}=15\text{V}$ , $R_G=25\Omega$		220		ns
Current Rise Time	$t_{rI}$			360		ns
Current Turn-Off Delay Time	$t_{d(OFF)I}$			320		ns
Current Fall Time	$t_{fI}$			120		ns

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