



## UG11N120

Preliminary

Insulated Gate Bipolar Transistor

### 43A, 1200V NPT N-CHANNEL IGBT WITH ANTI-PARALLEL HYPERFAST DIODES

#### DESCRIPTION

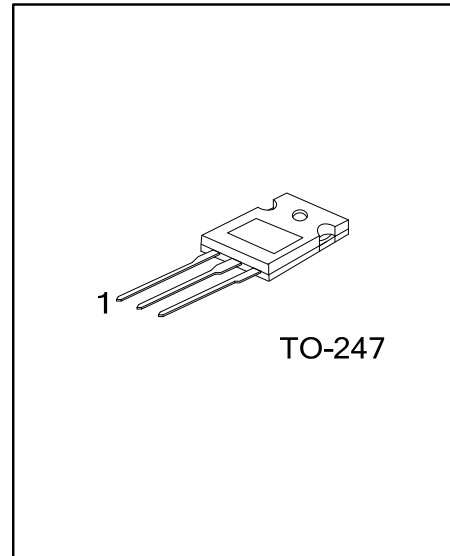
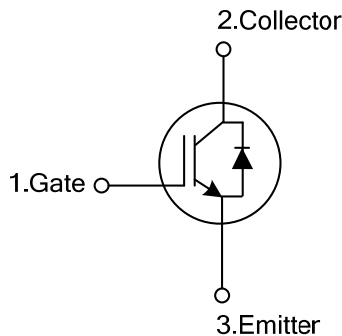
The UTC **UG11N120** is a NPT N-Channel IGBT, it uses UTC's advanced technology to provide the customers with a minimum on-state resistance, etc.

The UTC **UG11N120** 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



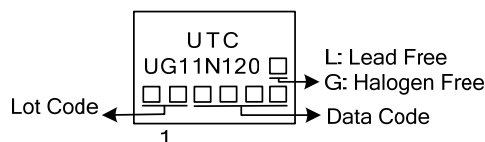
#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UG11N120L-T47-T	UG11N120G-T47-T	TO-247	G	C	E	Tube

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

	<p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Green Package</p>	<p>(1) T: Tube</p> <p>(2) T47: TO-247</p> <p>(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	$I_C$	$T_C=25^\circ\text{C}$	43	A
		$T_C=110^\circ\text{C}$	22	A
Collector Current Pulsed (Note 2)	$I_{CM}$	80	A	
Power Dissipation Total at $T_C = 25^\circ\text{C}$	$P_D$	298	W	
Power Dissipation Derating $T_C > 25^\circ\text{C}$		2.38	W/ $^\circ\text{C}$	
Short Circuit Withstand Time (Note 3) at $V_{GE}=15\text{V}$	$t_{SC}$	8	$\mu\text{s}$	
Short Circuit Withstand Time (Note 3) at $V_{GE}=12\text{V}$		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.  $V_{CE(PK)}=840\text{V}$ ,  $T_J=125^\circ\text{C}$ ,  $R_G=10\Omega$ .

■ THERMAL CHARACTERISTICS

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Case	$\theta_{JC}$	0.42	$^\circ\text{C}/\text{W}$

■ 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	$\mu\text{A}$	
			$T_C=125^\circ\text{C}$		300	$\mu\text{A}$	
			$T_C=150^\circ\text{C}$		3.5	mA	
Collector to Emitter Saturation Voltage	$V_{CE(SAT)}$	$I_C=11\text{A}$ , $V_{GE}=15\text{V}$	$T_C=25^\circ\text{C}$	2.1	2.4	V	
			$T_C=150^\circ\text{C}$	2.9	3.5	V	
Gate to Emitter Threshold Voltage	$V_{GE(TH)}$	$I_C=90\mu\text{A}$ , $V_{CE}=V_{GE}$	5.0	5.9		V	
Gate to Emitter Leakage Current	$I_{GES}$	$V_{GE}=\pm 20\text{V}$			$\pm 250$	nA	
Switching SOA	SSOA	$T_J=150^\circ\text{C}$ , $R_G=10\Omega$ , $V_{GE}=15\text{V}$ , $L=400\mu\text{H}$ , $V_{CE(PK)}=1200\text{V}$	55			A	
Gate to Emitter Plateau Voltage	$V_{GEP}$	$I_C=11\text{A}$ , $V_{CE}=600\text{V}$		10.4		V	
On-State Gate Charge	$Q_{G(ON)}$	$I_C=11\text{A}$ , $V_{CE}=600\text{V}$	$V_{GE}=15\text{V}$	100	120	nC	
			$V_{GE}=20\text{V}$	130	150	nC	
Current Turn-On Delay Time	$t_{d(ON)}$	IGBT and Diode at $T_J=25^\circ\text{C}$ $I_{CE}=11\text{A}$ , $V_{CE}=960\text{V}$ , $V_{GE}=15\text{V}$ , $R_G=10\Omega$ , $L=2\text{mH}$		23	26	ns	
Current Rise Time	$t_{rl}$			12	16	ns	
Current Turn-Off Delay Time	$t_{d(OFF)}$			180	240	ns	
Current Fall Time	$t_{fl}$			190	220	ns	
Turn-On Energy	$E_{ON}$			0.95	1.3	mJ	
Turn-Off Energy	$E_{OFF}$			1.3	1.6	mJ	
Diode Forward Voltage	$V_{EC}$		$I_{EC}=11\text{A}$		2.6	3.2	V
Diode Reverse Recovery Time	$t_{rr}$		$I_{EC}=11\text{A}$ , $dI_{EC}/dt=200\text{A}/\mu\text{s}$		60	70	ns
		$I_{EC}=1\text{A}$ , $dI_{EC}/dt=200\text{A}/\mu\text{s}$		32	40	ns	

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