



## UG25N120

Preliminary

Insulated Gate Bipolar Transistor

### 1200V NPT TRENCH IGBT

#### DESCRIPTION

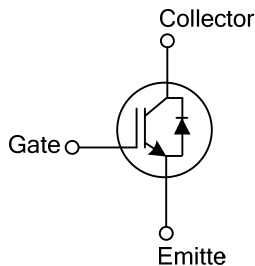
The UTC **UG25N120** is an NPT ignition Insulated Gate Bipolar Transistor. it uses UTC's advanced technology to provide customers with high switching speed, high avalanche ruggedness, low saturation voltage and low switching loss, etc.

The UTC **UG25N120** is suitable for the resonant or soft switching applications.

#### FEATURES

- \* High switching speed
- \* High avalanche ruggedness
- \* Low saturation voltage:  $V_{CE(sat), typ} = 2.0V @ I_C = 25A$  and  $T_C = 25^\circ C$
- \* Low switching loss:  $E_{off, typ} = 0.96mJ @ I_C = 25A$  and  $T_C = 25^\circ C$

#### SYMBOL



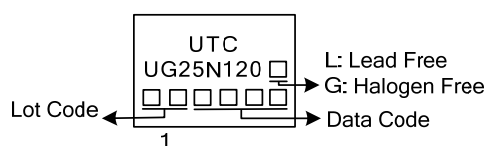
#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UG25N120L-TA3-T	UG25N120G-TA3-T	TO-220	G	C	E	Tube
UG25N120L-T3P-T	UG25N120G-T3P-T	TO-3P	G	C	E	Tube
UG25N120L-T47-T	UG25N120G-T47-T	TO-247	G	C	E	Tube

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

UG25N120L-TA3-T	(1)Packing Type	(1) T: Tube
	(2)Package Type	(2) TA3: TO-220, T3P: TO-3P, T47: TO-247
	(3)Green Package	(3) L: Lead Free, G: Halogen Free and Lead Free

#### MARKING



# ■ ABSOLUTE MAXIMUM RATINGS

PARAMETER			SYMBOL	RATINGS	UNIT
Collector-Emitter Voltage			$V_{CES}$	1200	V
Gate-Emitter Voltage			$V_{GES}$	±20	V
Continuous Collector Current	$T_C=25^{\circ}\text{C}$	$I_C$	50	A	
	$T_C=100^{\circ}\text{C}$		25	A	
Collector Current Pulsed (Note 1)			$I_{CM}$	75	A
Diode Continuous Forward Current ( $T_C=100^{\circ}\text{C}$ )			$I_F$	25	A
Diode Maximum Forward Current			$I_{FM}$	150	A
Power Dissipation	$T_C=25^{\circ}\text{C}$	TO-220	$P_D$	89	W
		TO-247		200	W
		TO-3P		312	W
Operating Junction Temperature			$T_J$	-55~+150	°C
Storage Temperature Range			$T_{STG}$	-55~+150	°C

Notes: 1. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

Absolute maximum ratings are those values beyond which the device could be permanently damaged.

2. Pulse width limited by maximum junction temperature.

# ■ THERMAL CHARACTERISTICS

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220	$\theta_{JA}$	62.5	$^\circ\text{C/W}$
	TO-247		40	$^\circ\text{C/W}$
	TO-3P		35	$^\circ\text{C/W}$
Junction to Case	TO-220	$\theta_{JC}$	1.4	$^\circ\text{C/W}$
	TO-247		0.62	$^\circ\text{C/W}$
	TO-3P		0.4	$^\circ\text{C/W}$

■ ELECTRICAL CHARACTERISTICS (T<sub>C</sub>=25°C, unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Off Characteristics							
Collector Cut-Off Current	I <sub>CES</sub>	V <sub>CE</sub> =V <sub>CES</sub> , V <sub>GE</sub> =0V			3	mA	
G-E Leakage Current	I <sub>GES</sub>	V <sub>GE</sub> =V <sub>GES</sub> , V <sub>CE</sub> = 0V			±250	mA	
On Characteristics							
Gate to Emitter Threshold Voltage	V <sub>GE(TH)</sub>	I <sub>C</sub> =25mA, V <sub>CE</sub> =V <sub>GE</sub>	3.5	5.5	7.5	V	
Collector to Emitter Saturation Voltage	V <sub>CE(SAT)</sub>	I <sub>C</sub> =25A, V <sub>GE</sub> =15V		2.0	2.5	V	
		I <sub>C</sub> =25A, V <sub>GE</sub> =15V, T <sub>C</sub> =125°C		2.15		V	
		I <sub>C</sub> =50A, V <sub>GE</sub> =15V		2.65		V	
Dynamic Characteristics							
Input Capacitance	C <sub>IES</sub>	V <sub>CE</sub> =30V, V <sub>GE</sub> =0V, f=1MHz		3700		pF	
Output Capacitance	C <sub>OES</sub>			130		pF	
Reverse Transfer Capacitance	C <sub>RES</sub>			80		pF	
Switching Characteristics							
Turn-On Delay Time	t <sub>DON</sub>	V <sub>CC</sub> =600V, I <sub>C</sub> =25A, R <sub>G</sub> =10Ω, V <sub>GE</sub> =15V, Inductive Load, T <sub>C</sub> =25°C		50		ns	
Rise Time	t <sub>R</sub>			40		ns	
Turn-Off Delay Time	t <sub>DOFF</sub>			190		ns	
Fall Time	t <sub>F</sub>			180		ns	
Turn-On Switching Loss	E <sub>ON</sub>			4.1	6.2	mJ	
Turn-Off Switching Loss	E <sub>OFF</sub>			0.96	1.5	mJ	
Total Switching Loss	E <sub>TS</sub>			5.06	7.7	mJ	
Turn-On Delay Time	t <sub>DON</sub>	V <sub>CC</sub> =600V, I <sub>C</sub> =25A, R <sub>G</sub> =10Ω, V <sub>GE</sub> =15V, Inductive Load, T <sub>C</sub> =125°C		50		ns	
Rise Time	t <sub>R</sub>			60		ns	
Turn-Off Delay Time	t <sub>DOFF</sub>			200		ns	
Fall Time	t <sub>F</sub>			154		ns	
Turn-On Switching Loss	E <sub>ON</sub>			4.3	6.9	mJ	
Turn-Off Switching Loss	E <sub>OFF</sub>			1.5	2.4	mJ	
Total Switching Loss	E <sub>TS</sub>			5.8	9.3	mJ	
Total Gate Charge	Q <sub>G</sub>	V <sub>CE</sub> =600V, IC=25A, V <sub>GE</sub> =15V		200	300	nC	
Gate-Emitter Charge	Q <sub>GE</sub>			15	23	nC	
Gate-Collector Charge	Q <sub>GC</sub>			100	150	nC	
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Forward Voltage Drop	V <sub>FM</sub>	I <sub>F</sub> =25A	T <sub>C</sub> =25°C		2.0	3.0	V
			T <sub>C</sub> =125°C		2.1		V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> =25A, dI/dt=200A/μS	T <sub>C</sub> =25°C		235	350	ns
			T <sub>C</sub> =125°C		300		ns
Peak Reverse Recovery Current	I <sub>rr</sub>		T <sub>C</sub> =25°C		27	40	A
			T <sub>C</sub> =125°C		31		A
Reverse Recovery Charge	Q <sub>RR</sub>		T <sub>C</sub> =25°C		3130	4700	nC
			T <sub>C</sub> =125°C		4650		nC

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