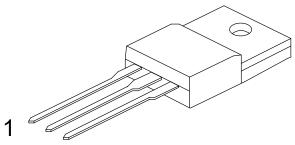
UTC **UNISONIC TECHNOLOGIES CO., LTD**

UTG12N120HSS1 **Preliminary** ***Insulated Gate Bipolar Transistor***

1200V TRENCH GATE FIELD-STOP IGBT



TO-220F1

■ DESCRIPTION

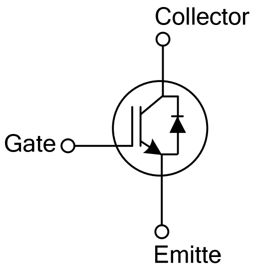
The UTC **UTG12N120HSS1** is an Trench Field-Stop Insulated Gate Bipolar Transistor. it uses UTC's advanced technology to provide customers with high switching speed, low saturation voltage and low switching loss, etc.

The UTC **UTG12N120HSS1** is suitable for the resonant or soft switching applications.

■ FEATURES

* High switching speed
* High avalanche ruggedness
* Low saturation voltage: $V_{CE(SAT).Typ.}$=1.47V @ I_C=12A, V_{GE}=15V (T_C =25°C)

■ SYMBOL



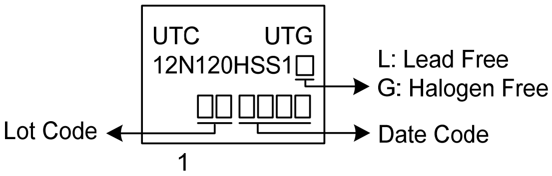
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTG12N120HSS1L-TF1-T	UTG12N120HSS1G-TF1-T	TO-220F1	G	C	E	Tube

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

UTG12N120HSS1G-TF1-T	
(1)Packing Type	(1) T: Tube
(2)Package Type	(2) TF1: TO-220F1
(3)Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING


UTC
UTG
12N120HSS1□
□□ □□□□
L: Lead Free
G: Halogen Free
Lot Code
Date Code
1

■ ABSOLUTE MAXIMUM RATINGS (T_A=25°C, unless otherwise noted)

PARAMETER		SYMBOL	RATINGS	UNIT
Collector-Emitter Voltage		V_{CES}	1200	V
Gate-Emitter Voltage		V_{GES}	±20	V
Transient Gate-emitter voltage (t_p < 5 ms)			±25	V
Continuous Collector Current	T_C=25°C	I_C	24	A
	T_C=100°C		12	A
Collector Current Pulsed (Note 1)		I_{CM}	48	A
Diode Forward Current	T_C=25°C	I_F	24	A
	T_C=100°C		12	A
Short Circuit Withstand Time V_{GE} = 15V, $V_{CC} \le$ 200V Allowed number of short circuits < 1000 Time between short circuits: ≥ 1.0s T_{VJ} = 25°C		t_{SC}	3	μs
Power Dissipation (T_C=25°C)		P_D	33	W
Operating Junction Temperature		T_J	-40 ~ +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 DATA

PARAMETER	SYMBOL	RATING	UNIT
Junction to Case	θ_{JC}	3.78	°C/W

■ ELECTRICAL CHARACTERISTICS (T_C=25°C, unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Collector-Emitter Breakdown Voltage	BV_{CES}			1200			V
Collector Cut-Off Current	I_{CES}	V_{CE}=1200V, V_{GE}=0V				5	μA
G-E Leakage Current	I_{GES}	V_{CE}=0V, V_{GE}=±20V				±250	nA
ON CHARACTERISTICS							
Gate to Emitter Threshold Voltage	$V_{GE(TH)}$	I_C=250μA, V_{CE}=V_{GE}		4.0		7.0	V
Collector to Emitter Saturation Voltage	$V_{CE(SAT)}$	I_C=12A, V_{GE}=15V	T_C=25°C		1.47	2.2	V
			T_C=125°C		2.1		V
DYNAMIC CHARACTERISTICS							
Input Capacitance	C_{IES}	V_{CE}=25V, V_{GE}=0V, f=1MHz			1090		pF
Output Capacitance	C_{OES}				56		pF
Reverse Transfer Capacitance	C_{RES}				18		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge	Q_G	V_{CE}=600V, I_C=12A, V_{GE}=15V			62		nC
Gate-Emitter Charge	Q_{GE}				18		nC
Gate-Collector Charge	Q_{GC}				28		nC
Turn-On Delay Time	$t_{DON)}$	V_{CC}=600V, I_C=12A, R_G=5Ω, V_{GE}=0~15V, L=500μH			8.2		ns
Rise Time	t_R				14		ns
Turn-Off Delay Time	$t_{DOFF)}$				44		ns
Fall Time	t_F				293		ns
Turn-On Switching Loss	E_{ON}				0.59		mJ
Turn-Off Switching Loss	E_{OFF}				0.95		mJ
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Forward Voltage Drop	V_F	I_F=12A				2.5	V
Reverse Recovery Time	t_{rr}	I_F=12A, dI/dt=100A/μS, V_{CC}=600V			51		ns
Reverse Recovery Charge	Q_{rr}				0.59		μC

■ TEST CIRCUIT AND WAVEFORMS

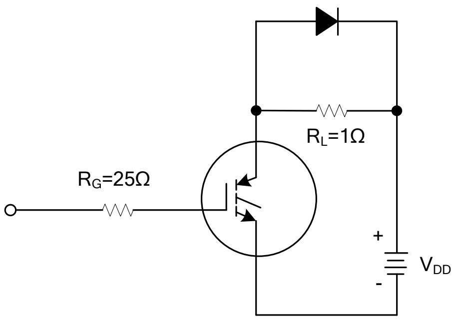


Fig 1. INDUCTIVE SWITCHING TEST CIRCUIT

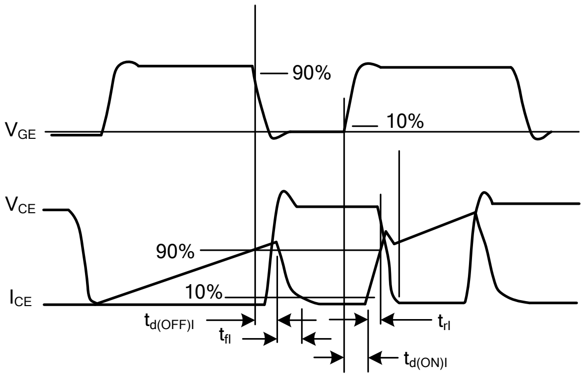


Fig 2. SWITCHING TEST WAVEFORMS