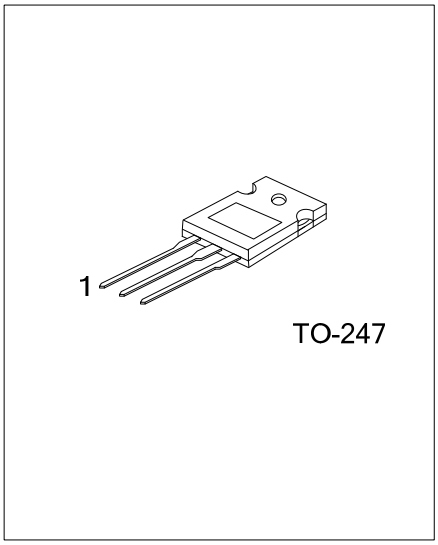
UPGE145N33

Preliminary ***Insulated Gate Bipolar Transistor***

330V, SMPS N-CHANNEL IGBT



■ DESCRIPTION

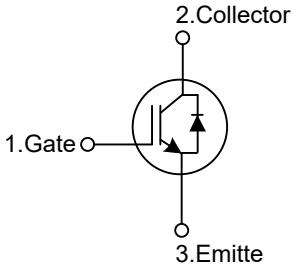
The UTC **UPGE145N33** is a N-channel IGBT. it uses UTC's advanced technology to provide customers with high input impedance, high switching speed and low conduction loss, etc.

The UTC **UPGE145N33** is suitable for high voltage switching, high frequency switch mode power supplies.

■ FEATURES

* High switching speed
* High avalanche ruggedness
* Low saturation voltage: $V_{CE(SAT).Typ.}$ = 1.57V @ I_C=72.5A, V_{GE}=15V (T_C =25°C)

■ SYMBOL



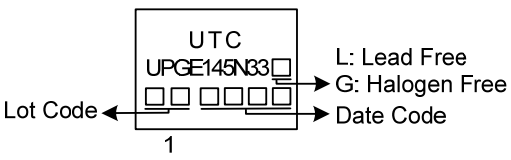
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UPGE145N33L-T47-T	UPGE145N33G-T47-T	TO-247	G	C	E	Tube

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

UPGE145N33G-T47-T (1)Packing Type (2)Package Type (3)Green Package	(1) T: Tube (2) T47: TO-247 (3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Collector-Emitter Voltage		V_{CES}	330	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	145	A
	T_C=100°C		72.5	A
Collector Current Pulsed (Note 1)		I_{CM}	290	A
Diode Forward Current	T_C=25°C	I_F	145	A
	T_C=100°C		72.5	A
Short Circuit Withstand Time V_{GE} = 15V, V_{CC} ≤ 200V Allowed number of short circuits < 1000 Time between short circuits: ≥ 1.0s T_{VJ} = 25°C		t_{SC}	10	μs
Power Dissipation (T_C=25°C)		P_D	310	W
Operating Junction Temperature		T_J	-40 ~ +175	°C
Storage Temperature Range		T_{STG}	-55 ~ +175	°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}	0.4	°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}			330			V
Collector Cut-Off Current	I_{CES}	V_{CE}=330V, V_{GE}=0V				5	μA
G-E Leakage Current	I_{GES}	V_{CE}=0V, V_{GE}=±20V				±400	nA
On Characteristics							
Gate to Emitter Threshold Voltage	$V_{GE(TH)}$	I_C=250μA, V_{CE}=V_{GE}		4.5		7.5	V
Collector to Emitter Saturation Voltage	$V_{CE(SAT)}$	I_C=72.5A, V_{GE}=15V	T_C=25°C		1.57	2.1	V
			T_C=125°C		1.9		V
Dynamic Characteristics							
Input Capacitance	C_{IES}	V_{CE}=25V, V_{GE}=0V, f=1MHz			5340		pF
Output Capacitance	C_{OES}				576.7		pF
Reverse Transfer Capacitance	C_{RES}				111.6		pF
Switching Characteristics							
Total Gate Charge	Q_G	V_{CE}=600V, I_C=72.5A, V_{GE}=15V			151		nC
Gate-Emitter Charge	Q_{GE}				38		nC
Gate-Collector Charge	Q_{GC}				60		nC
Turn-On Delay Time	$t_{DON)}$	V_{CC}=600V, I_C=72.5A, R_G=5Ω, V_{GE}=0~15V, L=500μH			81		ns
Rise Time	t_R				79		ns
Turn-Off Delay Time	$t_{DOFF)}$				518		ns
Fall Time	t_F				689		ns
Turn-On Switching Loss	E_{ON}				1.507		mJ
Turn-Off Switching Loss	E_{OFF}				5.581		mJ
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Forward Voltage Drop	V_F	I_F=72.5A				2.0	V
Reverse Recovery Time	t_{rr}	I_F=72.5A, dI/dt=100A/μS, V_{CC}=400V			30.4		ns
Reverse Recovery Charge	Q_{rr}				0.44		μC

■ TEST CIRCUIT AND WAVEFORMS

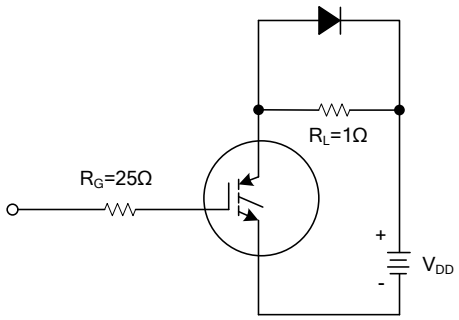


Fig 1. INDUCTIVE SWITCHING TEST CIRCUIT

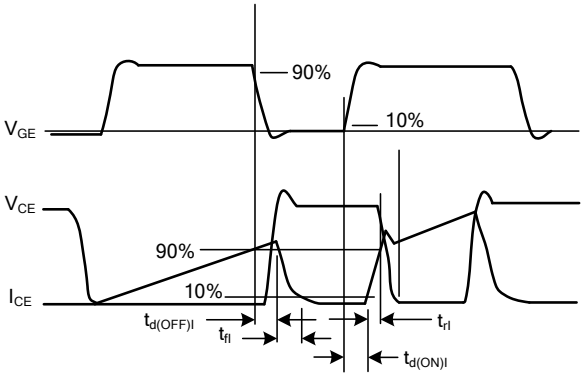


Fig 2. SWITCHING TEST WAVEFORMS