



UPG7N65

Preliminary

Insulated Gate Bipolar Transistor

650V, SMPS N-CHANNEL IGBT

DESCRIPTION

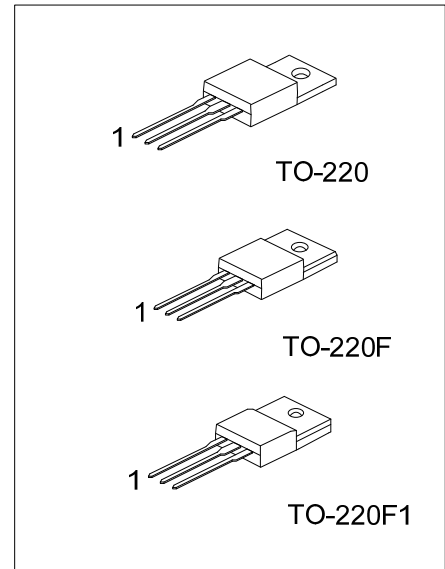
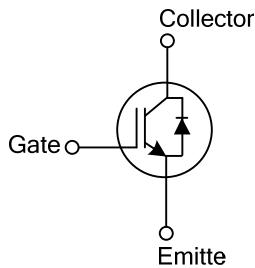
The UTC **UPG7N65** is a N-channel IGBT. it uses UTC's advanced technology to provide customers with high input impedance, high switching speed and low conduction loss, etc.

The UTC **UPG7N65** is suitable for high voltage switching, high frequency switch mode power supplies.

FEATURES

- * $V_{CE(SAT)} \leq 2.3\text{ V @ } I_C=7.0\text{A, } V_{GE}=15\text{V}$
- * High switching speed
- * High input impedance
- * Low conduction loss

SYMBOL



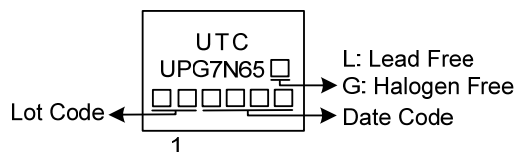
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UPG7N65L-TA3-T	UPG7N65G-TA3-T	TO-220	G	C	E	Tube
UPG7N65L-TF1-T	UPG7N65G-TF1-T	TO-220F1	G	C	E	Tube
UPG7N65L-TF3-T	UPG7N65G-TF3-T	TO-220F	G	C	E	Tube

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

<p>UPG7N65G-TA3-T</p>	<p>(1) T: Tube (2) TA3: TO-220, TF1: TO-220F1, TF3: TO-220F (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING



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

PARAMETER	SYMBOL	RATINGS	UNIT
Collector-Emitter Voltage	V_{CES}	650	V
Gate to Emitter Voltage Continuous	V_{GES}	± 20	V
Continuous Collector Current	I_C	$T_C=25^\circ\text{C}$	14
		$T_C=100^\circ\text{C}$	7
Collector Current Pulsed (Note 2)	I_{CM}	28	A
Short Circuit Withstand Time $V_{GE} = 15\text{V}$, $V_{CC} \leq 200\text{V}$ Allowed number of short circuits < 1000 Time between short circuits: $\geq 1.0\text{s}$ $T_{VJ} = 25^\circ\text{C}$	t_{SC}	5	μs
Power Dissipation	P_D	TO-220	86
		TO-220F	26
		TO-220F1	
Junction Temperature	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. Repetitive Rating: Pulse width limited by maximum junction temperature.

■ THERMAL DATA

PARAMETER	SYMBOL	RATING	UNIT
Junction to Ambient	θ_{JA}	62.5	$^\circ\text{C/W}$
Junction to Case	θ_{JC}	TO-220	1.45
		TO-220F	4.81
		TO-220F1	

■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Collector-Emitter Breakdown Voltage	BV _{CES}	I _C =250μA, V _{GE} =0V	650			V
Collector-Emitter Leakage Current	I _{CES}	V _{CE} =650V, V _{GE} =0V			10	μA
Gate to Emitter 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}	2.0		4.0	V
Collector-Emitter Saturation Voltage	V _{CE(SAT)}	I _C =7.0A, V _{GE} =15V	T _J =25°C		2.3	V
			T _J =150°C		2	V
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{IES}	V _{CE} =25V, V _{GE} =0V, f=1MHz		589.6		pF
Output Capacitance	C _{OES}			96.2		pF
Reverse Transfer Capacitance	C _{RES}			19		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge	Q _G	V _{CE} =520V, I _C =7A V _{GE} =0~15V, I _G =10mA, L=2mH		54		nC
Gate-Emitter Charge	Q _{GE}			21.5		nC
Gate-Collector Charge	Q _{GC}			9.2		nC
Current Turn-On Delay Time	t _{D(ON)}	V _{CE} =400V, I _C =7A V _{GE} =0~15V, R _G =25Ω, L=1mH		4.6		ns
Current Rise Time	t _R			13.6		ns
Current Turn-Off Delay Time	t _{D(OFF)}			61.3		ns
Current Fall Time	t _F			106.3		ns
DRAIN-SOURCE DIODE CHARACTERISTICS						
Forward Voltage Drop	V _{FM}	I _F =7.0A			1.4	V
Reverse Recovery Time	t _{rr}	I _F =7.0A, dI/dt=100A/μS, V _{CC} =400V		73		ns
Reverse Recovery Charge	Q _{rr}			115.5		nC

Note: Pulse Test: Pulse width ≤ 50μs.

■ TEST CIRCUIT AND WAVEFORMS

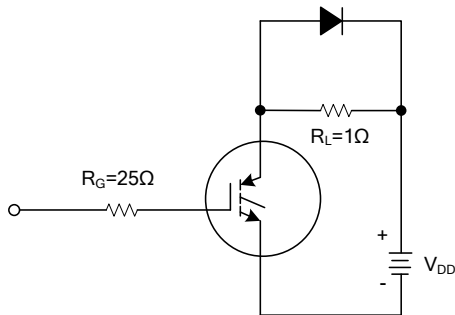


Fig 1. INDUCTIVE SWITCHING TEST CIRCUIT

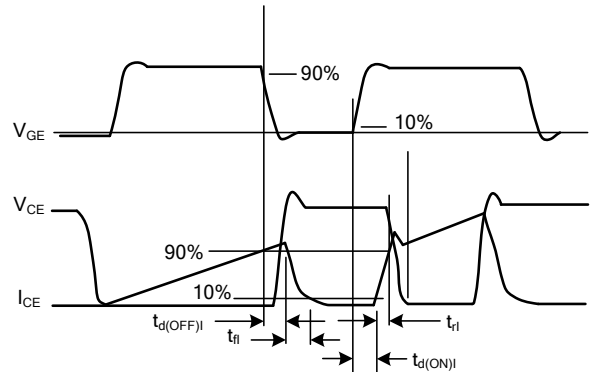


Fig 2. SWITCHING TEST WAVEFORMS

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