



UGP7N60

Preliminary

Insulated Gate Bipolar Transistor

600V, SMPS N-CHANNEL IGBT

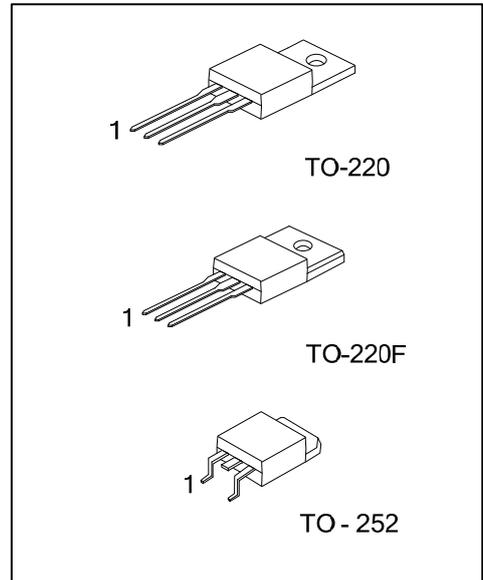
■ DESCRIPTION

The UTC **UGP7N60** is an N-channel IGBT. it uses UTC's advanced technology to provide customers with high input impedance, high switching speed and low conduction loss, etc.

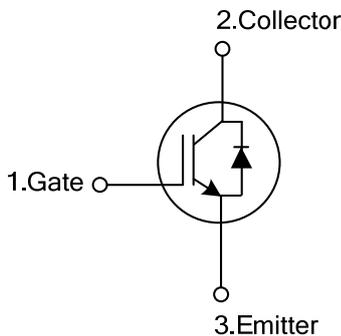
The UTC **UGP7N60** is suitable for high voltage switching, high frequency switch mode power supplies.

■ FEATURES

- * >100kHz Operation at 390V, 7A
- * 200kHz Operation at 390V, 5A
- * 600V Switching SOA Capability
- * High switching speed
- * High input impedance
- * Low conduction loss



■ SYMBOL



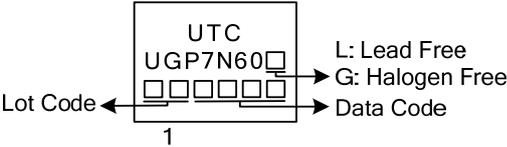
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UGP7N60L-TA3-T	UGP7N60G-TA3-T	TO-220	G	C	E	Tube
UGP7N60L-TF3-T	UGP7N60G-TF3-T	TO-220F	G	C	E	Tube
UGP7N60L-TN3-R	UGP7N60G-TN3-R	TO-252	G	C	E	Tape Reel

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

<p>UGP7N60L-TA3-T</p>	<p>(1) T: Tube, R: Tape Reel</p> <p>(2) TA3: TO-220, TF3: TO-220F, TN3: TO-252</p> <p>(3) L: Lead Free, G: Halogen Free and 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}	600	V
Continuous Collector Current	$T_C=25^\circ\text{C}$	I_C	34	A
	$T_C=110^\circ\text{C}$		14	A
Collector Current Pulsed (Note 2)		I_{CM}	56	A
Gate to Emitter Voltage Continuous		V_{GES}	± 20	V
Gate to Emitter Voltage Pulsed		V_{GEM}	± 30	V
Switching Safe Operating Area at $T_J=150^\circ\text{C}$		SSOA	35 (at 600V)	A
Single Pulse Avalanche Energy at $T_C=25^\circ\text{C}$		E_{AS}	25 (at 7A)	mJ
Power Dissipation Total at $T_C=25^\circ\text{C}$	TO-220/TO-252	P_D	125	W
	TO-220F		41.6	W
Power Dissipation Derating $T_C>25^\circ\text{C}$	TO-220/TO-252		1	W/ $^\circ\text{C}$
	TO-220F		3	W/ $^\circ\text{C}$
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. Pulse width limited by maximum junction temperature.

■ THERMAL CHARACTERISTICS

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Case	TO-220/TO-252	θ_{JC}	1	$^\circ\text{C}/\text{W}$
	TO-220F		3	$^\circ\text{C}/\text{W}$

■ ELECTRICAL CHARACTERISTICS ($T_J=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Collector-Emitter Breakdown Voltage	BV_{CES}	$I_C=250\mu\text{A}$, $V_{GE}=0\text{V}$	600			V
Emitter to Collector Breakdown Voltage	BV_{ECS}	$I_C=10\text{mA}$, $V_{GE}=0\text{V}$	20			V
Collector-Emitter Leakage Current	I_{CES}	$V_{CE}=600\text{V}$	$T_J=25^\circ\text{C}$		250	μA
			$T_J=125^\circ\text{C}$		2	mA
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	$I_C=7\text{A}$, $V_{GE}=15\text{V}$	$T_J=25^\circ\text{C}$	1.3	2.7	V
			$T_J=125^\circ\text{C}$	1	2.2	V
Gate to Emitter Threshold Voltage	$V_{GE(TH)}$	$I_C=250\mu\text{A}$	4.5	5.0	7.2	V
Gate to Emitter Leakage Current	I_{GES}	$V_{GE}=\pm 20\text{V}$			± 250	nA
Switching SOA	SSOA	$T_J=150^\circ\text{C}$, $R_G=25\Omega$, $V_{GE}=15\text{V}$ $L=100\mu\text{H}$, $V_{CE}=600\text{V}$	35			A
Pulsed Avalanche Energy	E_{AS}	$I_{CE}=7\text{A}$, $L=500\mu\text{H}$	25			mJ
Gate to Emitter Plateau Voltage	V_{GEP}	$I_C=7\text{A}$, $V_{CE}=80\text{V}$		10		V
On-State Gate Charge	$Q_{g(ON)}$	$I_C=7\text{A}$, $V_{CE}=300\text{V}$	$V_{GE}=15\text{V}$	37	45	nC
			$V_{GE}=20\text{V}$	48	60	nC
Current Turn-On Delay Time	$t_{d(ON)}$	IGBT and Diode at $T_J=25^\circ\text{C}$, $I_{CE}=7\text{A}$, $V_{GE}=13.5\text{V}$, $R_G=50\Omega$, $R_L=1\Omega$, Test Circuit (Note)		30		ns
Current Rise Time	t_{rl}			40		ns
Current Turn-Off Delay Time	$t_{d(OFF)}$			60		ns
Current Fall Time	t_{fl}			90		ns

Note: Pulse Test: Pulse width $\leq 50\mu\text{s}$.

■ TEST CIRCUIT AND WAVEFORMS

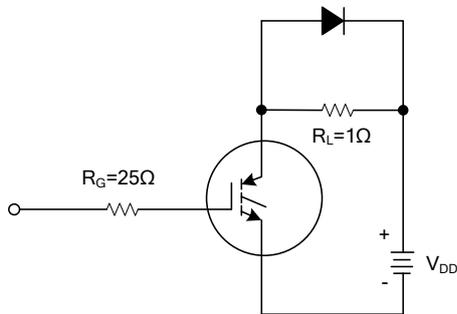


Fig 1. INDUCTIVE SWITCHING TEST CIRCUIT

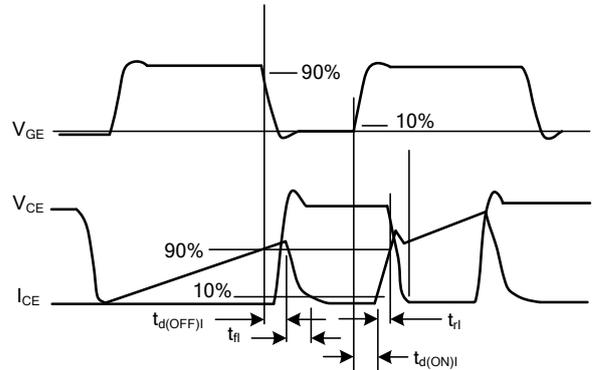


Fig 2. SWITCHING TEST WAVEFORMS

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