



UGV3040

Insulated Gate Bipolar Transistor

300mJ, 400V N-CHANNEL
IGNITION IGBT

■ DESCRIPTION

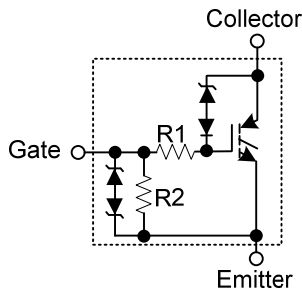
The UTC **UGV3040** is an N-channel ignition Insulated Gate Bipolar Transistor. It uses UTC's advanced technology to provide customers with outstanding SCIS capability.

The UTC **UGV3040** is suitable for Coil –On plug applications and Automotive Ignition Coil driver circuits, etc.

■ FEATURES

- * Outstanding SCIS capability
- * Logic level gate drive

■ SYMBOL

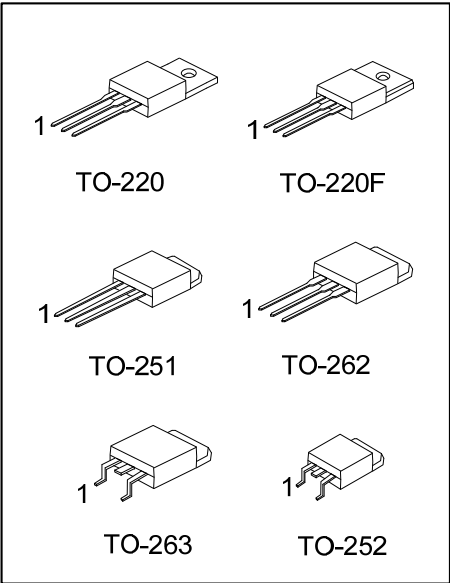


■ ORDERING INFORMATION

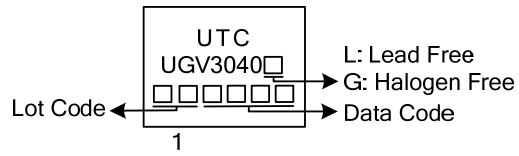
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UGV3040L-TA3-T	UGV3040G-TA3-T	TO-220	G	C	E	Tube
UGV3040L-TF3-T	UGV3040G-TF3-T	TO-220F	G	C	E	Tube
UGV3040L-TM3-T	UGV3040G-TM3-T	TO-251	G	C	E	Tube
UGV3040L-TN3-R	UGV3040G-TN3-R	TO-252	G	C	E	Tape Reel
UGV3040L-T2Q-T	UGV3040G-T2Q-T	TO-262	G	C	E	Tube
UGV3040L-TQ2-T	UGV3040G-TQ2-T	TO-263	G	C	E	Tube
UGV3040L-TQ2-R	UGV3040G-TQ2-R	TO-263	G	C	E	Tape Reel

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

<p>UGV3040G-TA3-T</p>	<p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Green Package</p>	<p>(1) T: Tube, R: Tape Reel</p> <p>(2) TA3: TO-220, TF3: TO-220F, TM3: TO-251 TN3: TO-252, T2Q: TO-262, TQ2: TO-263</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Collector to Emitter Breakdown Voltage		BV_{CER}	450	V
Emitter to Collector Voltage Reverse Battery Condition		BV_{ECS}	30	V
At Starting	$T_J=25^{\circ}\text{C}$, $I_{SCIS}=14.2\text{A}$, $L=3.0\text{mHy}$	E_{SCIS}	300	mJ
	$T_J=150^{\circ}\text{C}$, $I_{SCIS}=10.6\text{A}$, $L=3.0\text{mHy}$		170	mJ
Continuous Collector Current	$T_C=25^{\circ}\text{C}$	I_C	21	A
	$T_C=110^{\circ}\text{C}$		17	A
Gate to Emitter Voltage Continuous		V_{GEM}	± 10	V
Power Dissipation Total at $T_C=25^{\circ}\text{C}$	TO-220/TO-262	P_D	125	W
	TO-263			
	TO-220F		41.6	
	TO-251/TO-252		125	
Power Dissipation Derating $T_C>25^{\circ}\text{C}$	TO-220/TO-262	P_D	1	$\text{W}/^{\circ}\text{C}$
	TO-263			
	TO-220F		0.332	
	TO-251/TO-252		1	
Electrostatic Discharge Voltage at 100pF, 1500 Ω		ESD	4	kV
Junction Temperature		T_J	-40 ~ +175	$^{\circ}\text{C}$
Storage Temperature Range		T_{STG}	-40 ~ +175	$^{\circ}\text{C}$

Note: 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.

■ THERMAL CHARACTERISTICS

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Case	TO-220/TO-251	θ_{JC}	1.0	$^{\circ}\text{C}/\text{W}$
	TO-252/TO-262			
	TO-263		3.0	
	TO-220F			

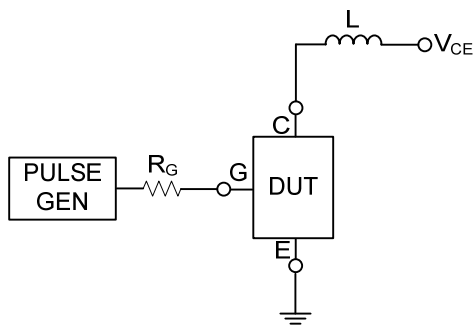
■ ELECTRICAL CHARACTERISTICS ($T_A=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Off State Characteristics							
Collector to Emitter Breakdown Voltage	BV_{CER}	$I_C=2\text{mA}$, $V_{GE}=0\text{V}$, $R_G=1\text{K}\Omega$, $T_J=-40\sim 150^\circ\text{C}$	350	400	450	V	
Collector to Emitter to Breakdown Voltage	BV_{CES}	$I_C=10\text{mA}$, $V_{GE}=0\text{V}$, $R_G=0$, $T_J=-40\sim 150^\circ\text{C}$	400	450	500	V	
Emitter to Collector Breakdown Voltage	BV_{ECS}	$I_C=-75\text{mA}$, $V_{GE}=0\text{V}$, $T_C=25^\circ\text{C}$	30			V	
Gate to Emitter Breakdown Voltage	BV_{GES}	$I_{GES}=\pm 2\text{mA}$	± 12	± 14		V	
Collector to Emitter Leakage Current	I_{CER}	$V_{CER}=250\text{V}$, $R_G=1\text{K}\Omega$	$T_C=25^\circ\text{C}$ $T_C=150^\circ\text{C}$		25 1	μA mA	
Emitter to Collector Leakage Current	I_{ECS}	$V_{EC}=24\text{V}$	$T_C=25^\circ\text{C}$ $T_C=150^\circ\text{C}$		1 40	mA mA	
Series Gate Resistance	R_1			70		Ω	
Gate to Emitter Resistance	R_2		10K		26K	Ω	
On State Characteristics							
Collector to Emitter Saturation Voltage	$V_{CE(SAT)}$	$I_C=6\text{A}$, $V_{GE}=4\text{V}$ $I_C=10\text{A}$, $V_{GE}=4.5\text{V}$ $I_C=15\text{A}$, $V_{GE}=4.5\text{V}$	$T_C=25^\circ\text{C}$ $T_C=150^\circ\text{C}$ $T_C=150^\circ\text{C}$		1.25 1.40 1.90	1.60 1.80 2.20	V V V
Dynamic Characteristics							
Gate Charge	$Q_{G(ON)}$	$I_C=10\text{A}$, $V_{CE}=12\text{V}$, $V_{GE}=5\text{V}$		17		nC	
Gate to Emitter Threshold Voltage	$V_{GE(TH)}$	$I_C=1.0\text{mA}$, $V_{CE}=V_{GE}$	1.3		2.2	V	
Gate to Emitter Plateau Voltage	V_{GEP}	$I_C=10\text{A}$, $V_{CE}=12\text{V}$		3.0		V	
Switching Characteristics							
Current Turn-On Delay Time-Resistive	$t_{d(ON)R}$	$V_{CE}=14\text{V}$, $R_L=1\Omega$, $V_{GE}=5\text{V}$, $R_G=1\text{K}\Omega$, $T_J=25^\circ\text{C}$		0.48	4	μs	
Current Rise Time-Resistive	t_{rR}			2.1	7	μs	
Current Turn-Off Delay Time-Inductive	$t_{d(OFF)L}$			1.4	15	μs	
Current Fall Time Inductive	t_{fL}			2.2	15	μs	
Self Clamped Inductive Switching	SCIS	$T_J=25^\circ\text{C}$, $L=3.0\text{mH}$, $R_G=1\text{K}\Omega$, $V_{GE}=5\text{V}$			300	mJ	

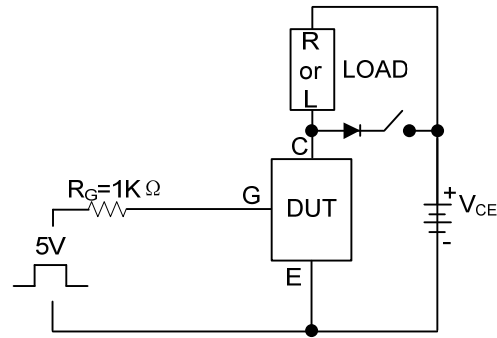
Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$

2. Essentially independent of operating temperature

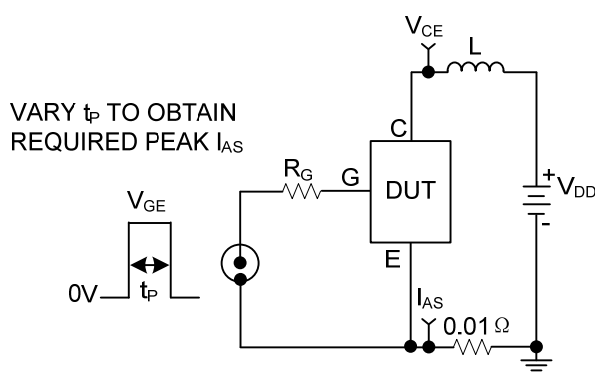
TEST CIRCUIT AND WAVEFORMS



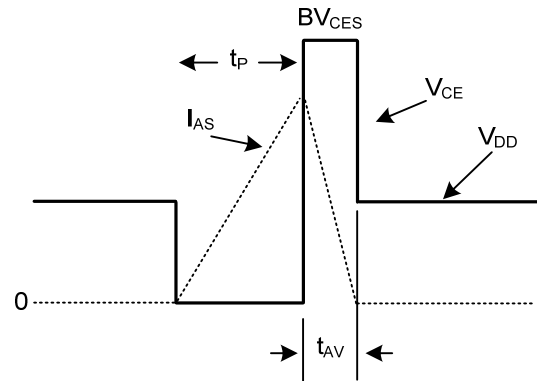
Inductive Switching Test Circuit



t_{ON} and t_{OFF} Switching Test Circuit



Energy Test Circuit



Energy Waveforms

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