

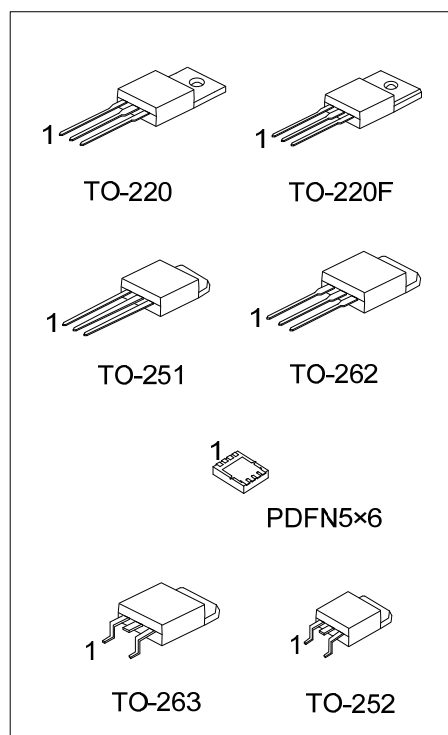
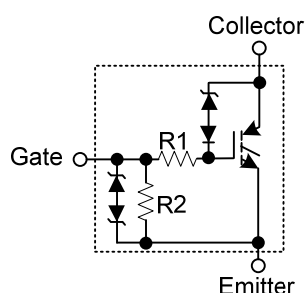
**UGV3040****Insulated Gate Bipolar Transistor****300mJ, 400V N-CHANNEL
IGNITION IGBT****DESCRIPTION**

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	4	5	6	7	8	
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
UT100N03L-P5060-R	UT100N03G-P5060-R	PDFN5x6	S	S	S	G	D	D	D	D	Tape Reel

Note: Pin Assignment: G: Gate D: Drain S: Source

UGV3040G-TA3-T	(1)Packing Type	(1) T: Tube, R: Tape Reel
	(2)Package Type	(2) TA3: TO-220, TF3: TO-220F, TM3: TO-251, TN3: TO-252, T2Q: TO-262, TQ2: TO-263, P5060: PDFN5x6
	(3)Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free

MARKING

TO-220 / TO-220F / TO-251 TO-252 / TO-252D / TO-263	PDFN5×6
UTC UGV3040 Lot Code ← [][][][][] → Date Code 1 L: Lead Free G: Halogen Free	UTC UGV 3040 Lot Code ← []•[][][][] → Date Code

■ **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	$T_J=25^\circ\text{C}$, $I_{\text{SCIS}}=14.2\text{A}$, $L=3.0\text{mHy}$	E_{SCIS}	300	mJ
	$T_J=150^\circ\text{C}$, $I_{\text{SCIS}}=10.6\text{A}$, $L=3.0\text{mHy}$		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/TO-263	P_D	125	W
	TO-220F		41.6	W
	TO-251/TO-252		70	W
	PDFN5×6		45	W
Power Dissipation Derating $T_C>25^\circ\text{C}$	TO-220/TO-262/TO-263		1	W/°C
	TO-220F		0.332	W/°C
	TO-251/TO-252		0.56	W/°C
	PDFN5×6		0.36	W/°C
Electrostatic Discharge Voltage at 100pF, 1500Ω		ESD	4	kV
Junction Temperature		T_J	$-40 \sim +175$	°C
Storage Temperature Range		T_{STG}	$-40 \sim +175$	°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-262/TO-263	θ_{JC}	1.0	°C/W
	TO-220F		3.0	°C/W
	TO-251/TO-252		2.14	°C/W
	PDFN5×6		2.78	°C/W

Note: Device mounted on FR-4 substrate P_C board, 2oz copper, with 1inch square copper plate.

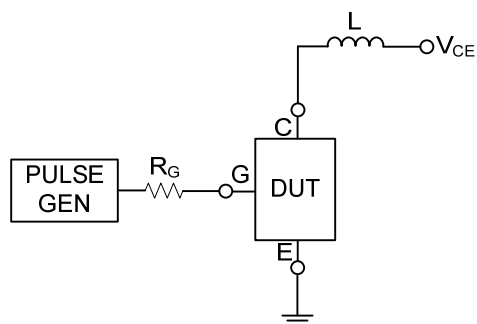
ELECTRICAL CHARACTERISTICS ($T_A=25^\circ\text{C}$, unless otherwise specified)

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

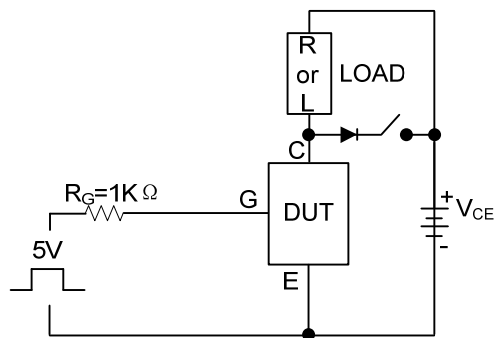
Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$

2. Essentially independent of operating temperature

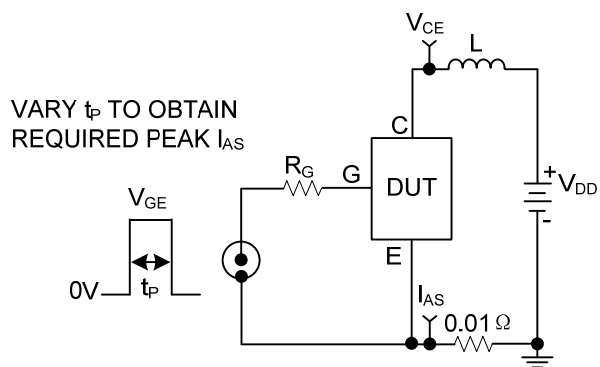
■ TEST CIRCUIT AND WAVEFORMS



Inductive Switching Test Circuit

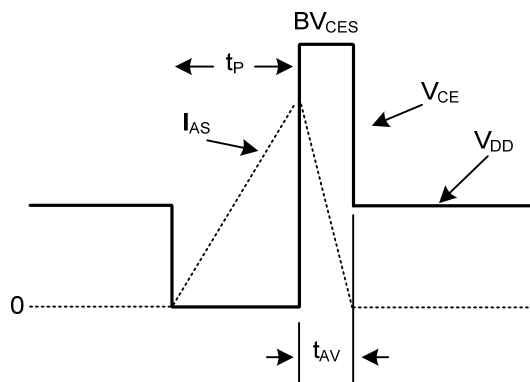


t_{ON} and t_{OFF} Switching Test Circuit



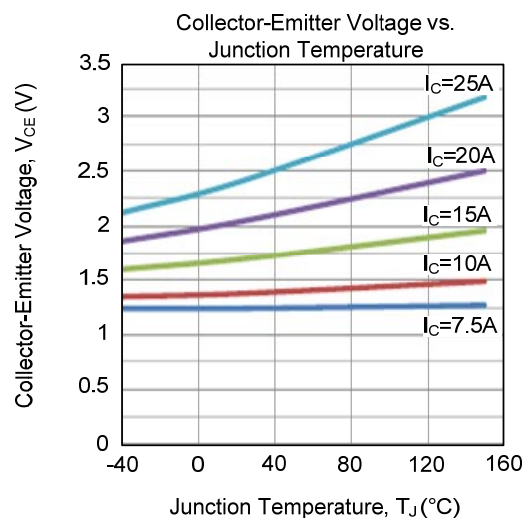
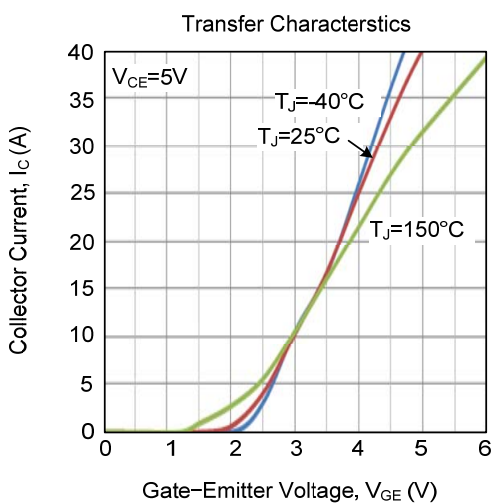
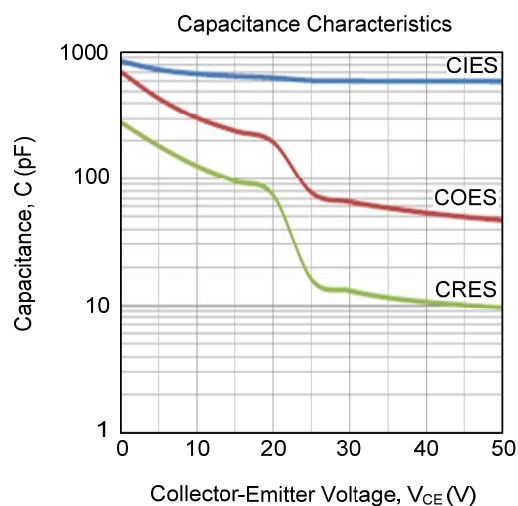
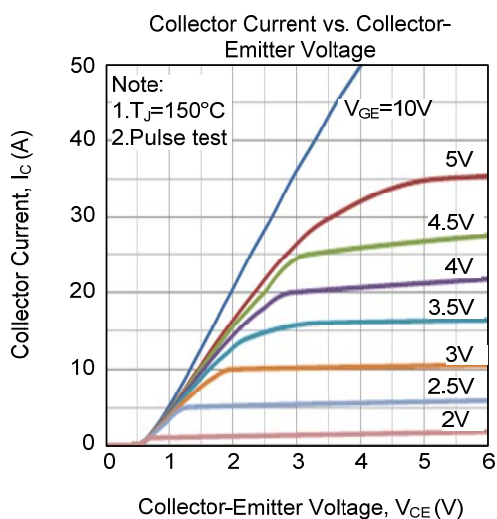
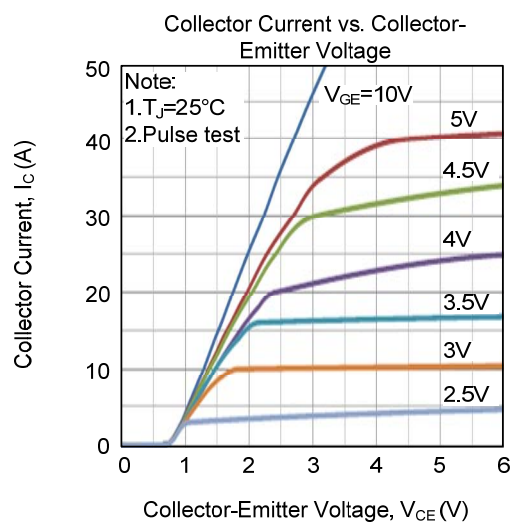
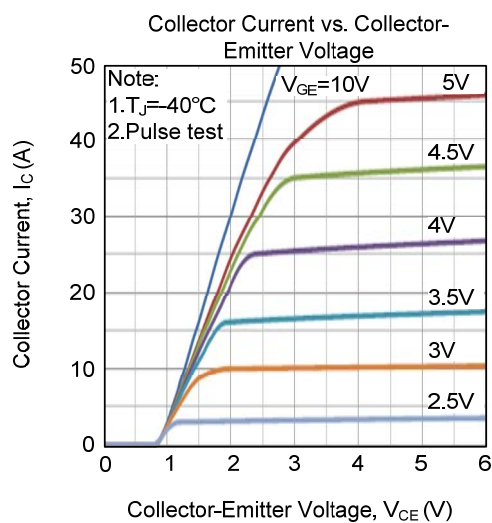
VARY t_p TO OBTAIN
REQUIRED PEAK I_{AS}

Energy Test Circuit

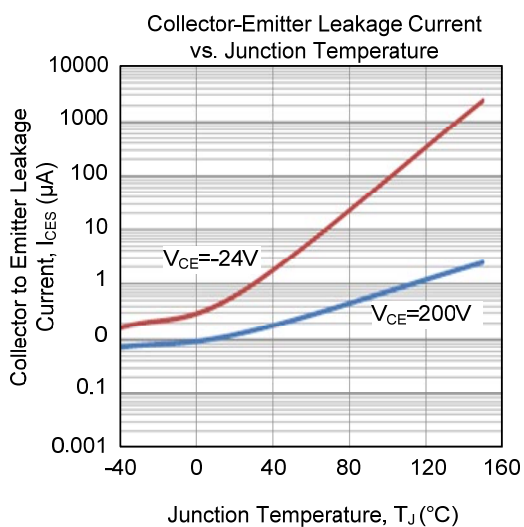


Energy Waveforms

■ TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS



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