



## UGV3045

*Insulated Gate Bipolar Transistor*

### 300mJ, 450V N-CHANNEL IGNITION IGBT

#### DESCRIPTION

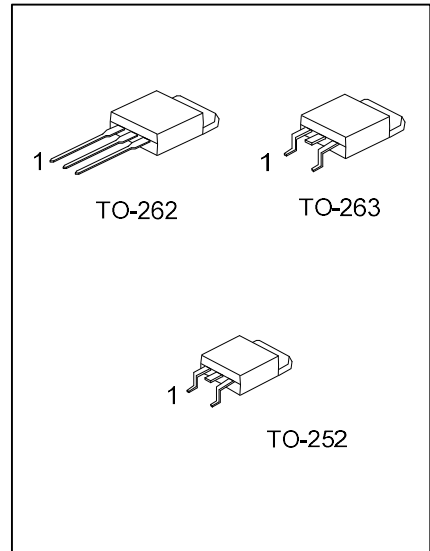
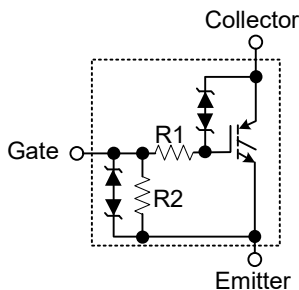
The UTC **UGV3045** is an N-channel ignition Insulated Gate Bipolar Transistor. It uses UTC's advanced technology to provide customers with outstanding SCIS capability, for suitable for Coil -On plug applications and Automotive Ignition Coil driver circuits, etc.

UTC **UGV3045** show very low on-state voltage and very high SCIS energy capability over a wide operating temperature range. Moreover, ESD-protected logic level gate input and an integrated gate resistor means no external protection circuitry is required.

#### FEATURES

- \* ESD gate-emitter protection
- \* Gate-collector high voltage clamping
- \* Logic level gate drive
- \* Very low saturation voltage
- \* High pulsed current capability
- \* Gate and gate-emitter resistor

#### SYMBOL



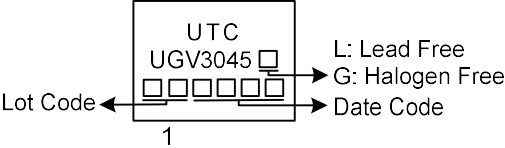
#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UGV3045L-TN3-R	UGV3045G-TN3-R	TO-252	G	C	E	Tape Reel
UGV3045L-T2Q-T	UGV3045G-T2Q-T	TO-262	G	C	E	Tube
UGV3045L-TQ2-T	UGV3045G-TQ2-T	TO-263	G	C	E	Tube
UGV3045L-TQ2-R	UGV3045G-TQ2-R	TO-263	G	C	E	Tape Reel

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

<p>UGV3045G-TN3-R</p>	<p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Green Package</p>	<p>(1) R: Tape Reel, T: Tube</p> <p>(2) 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**



### ■ ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT	
Collector to Emitter Breakdown Voltage	BV <sub>CER</sub>	450	V	
Emitter to Collector Voltage Reverse Battery Condition	BV <sub>ECS</sub>	30	V	
At Starting	E <sub>SCIS</sub>	T <sub>J</sub> =25°C, I <sub>SCIS</sub> =14.2A, L=3.0mHy	300	mJ
		T <sub>J</sub> = 150°C, I <sub>SCIS</sub> =10.6A, L=3.0mHy	170	mJ
Continuous Collector Current	I <sub>C</sub>	T <sub>C</sub> =25°C	21	A
		T <sub>C</sub> =110°C	17	A
Gate to Emitter Voltage Continuous	V <sub>GEM</sub>	±10	V	
Power Dissipation Total at T <sub>C</sub> =25°C	P <sub>D</sub>	80	W	
Power Dissipation Derating T <sub>C</sub> >25°C		1.56	W/°C	
Electrostatic Discharge Voltage at 100pF, 1500Ω	ESD	4	kV	
Junction Temperature	T <sub>J</sub>	-40 ~ +175	°C	
Storage Temperature Range	T <sub>STG</sub>	-40 ~ +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 DATA

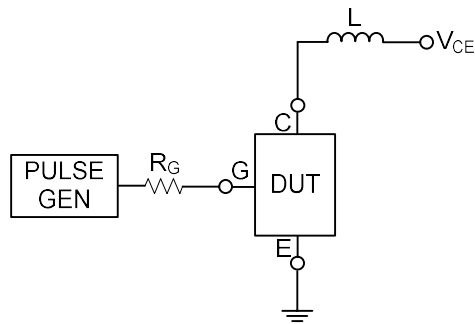
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Case	θ <sub>JC</sub>	1.56	°C/W

### ■ ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C, unless otherwise specified)

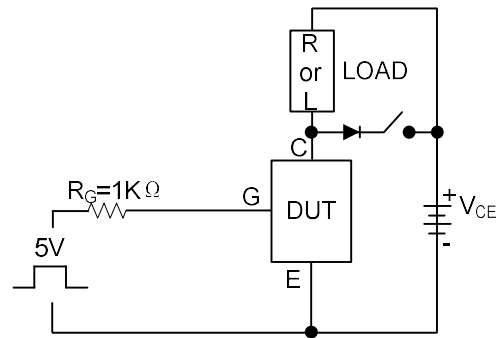
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
<b>Off State Characteristics</b>							
Collector to Emitter Breakdown Voltage	BV <sub>CER</sub>	I <sub>C</sub> =2mA, V <sub>GE</sub> =0V, R <sub>G</sub> =1KΩ, T <sub>J</sub> =-40~150°C	400	450	500	V	
Collector to Emitter to Breakdown Voltage	BV <sub>CES</sub>	I <sub>C</sub> =10mA, V <sub>GE</sub> =0V, R <sub>G</sub> =0, T <sub>J</sub> =-40~150°C	400	450	500	V	
Emitter to Collector Breakdown Voltage	BV <sub>ECS</sub>	I <sub>C</sub> =-75mA, V <sub>GE</sub> =0V, T <sub>C</sub> =25°C	30			V	
Gate to Emitter Breakdown Voltage	BV <sub>GES</sub>	I <sub>GES</sub> =±2mA	±12	±14		V	
Collector to Emitter Leakage Current	I <sub>CER</sub>	V <sub>CER</sub> =250V, R <sub>G</sub> =1KΩ	T <sub>C</sub> =25°C		25	μA	
			T <sub>C</sub> =150°C		1	mA	
Emitter to Collector Leakage Current	I <sub>ECS</sub>	V <sub>EC</sub> =24V	T <sub>C</sub> =25°C		1	mA	
			T <sub>C</sub> =150°C		40	mA	
Series Gate Resistance	R <sub>1</sub>			70		Ω	
Gate to Emitter Resistance	R <sub>2</sub>		10		26	KΩ	
<b>On State Characteristics</b>							
Collector to Emitter Saturation Voltage	V <sub>CE(SAT)</sub>	I <sub>C</sub> =6A, V <sub>GE</sub> =4V	T <sub>C</sub> =25°C		1.35	1.7	V
		I <sub>C</sub> =10A, V <sub>GE</sub> =4.5V	T <sub>C</sub> =150°C		1.5	1.9	V
		I <sub>C</sub> =15A, V <sub>GE</sub> =4.5V	T <sub>C</sub> =150°C		2	2.3	V
<b>Dynamic Characteristics</b>							
Gate Charge	Q <sub>G(ON)</sub>	I <sub>C</sub> =10A, V <sub>CE</sub> =12V, V <sub>GE</sub> =5V		33		nC	
Gate to Emitter Threshold Voltage	V <sub>GE(TH)</sub>	I <sub>C</sub> =1.0mA, V <sub>CE</sub> =V <sub>GE</sub>	1.3		2.2	V	
Gate to Emitter Plateau Voltage	V <sub>GEP</sub>	I <sub>C</sub> =10A, V <sub>CE</sub> =12V		3		V	
<b>Switching Characteristics</b>							
Current Turn-On Delay Time-Resistive	t <sub>d(ON)R</sub>	V <sub>CE</sub> =300V, V <sub>GE</sub> =10V, I <sub>C</sub> =10A, L=500μH, R <sub>G</sub> =10Ω		15		ns	
Current Rise Time-Resistive	t <sub>r</sub>			21		ns	
Current Turn-Off Delay Time-Inductive	t <sub>d(OFF)L</sub>			0.9		μs	
Current Fall Time Inductive	t <sub>f</sub>			4.3		μs	
Self Clamped Inductive Switching	SCIS	T <sub>J</sub> = 25°C, L=3.0mHy, R <sub>G</sub> =1KΩ, V <sub>GE</sub> =5V			300	mJ	

Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.  
2. Essentially independent of operating temperature.

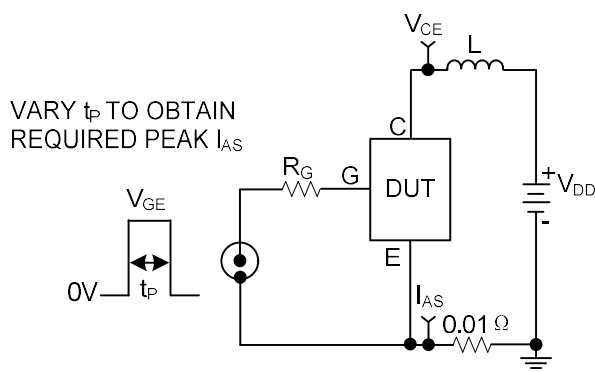
### ■ TEST CIRCUIT AND WAVEFORMS



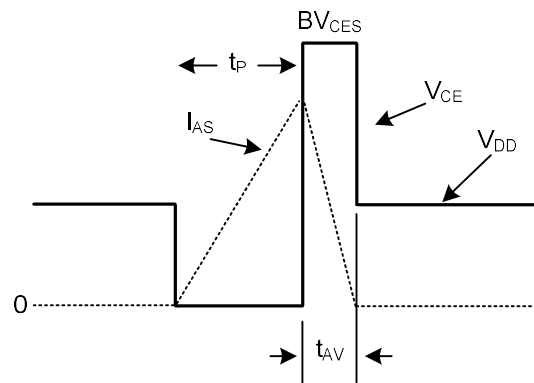
Inductive Switching Test Circuit



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

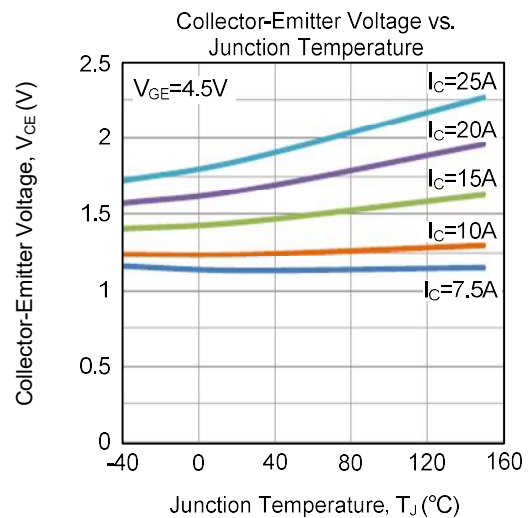
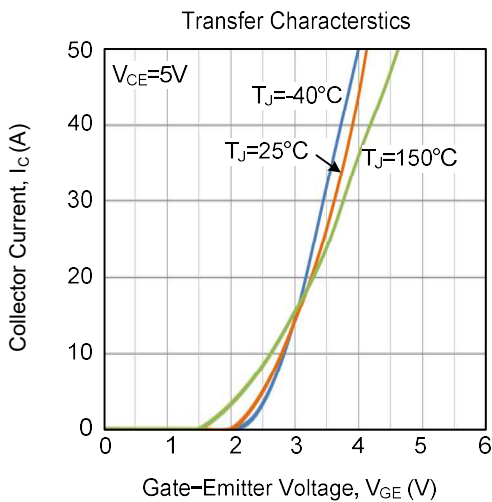
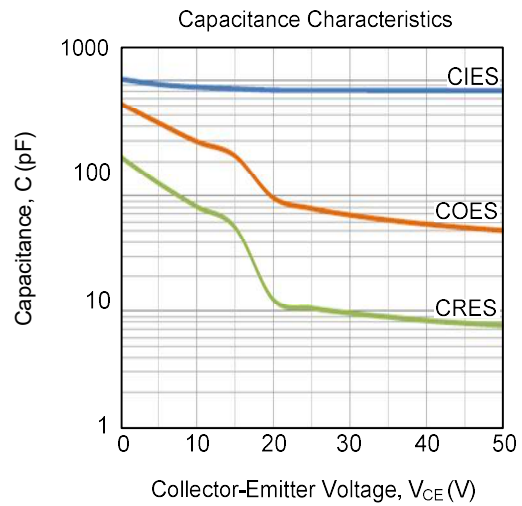
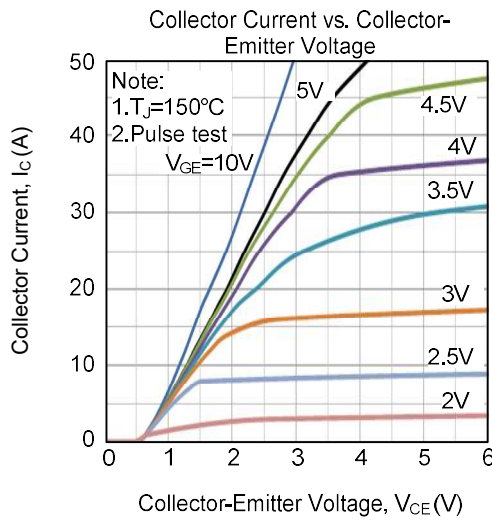
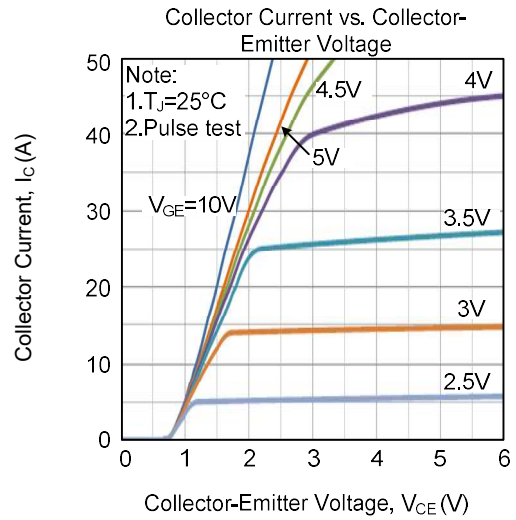
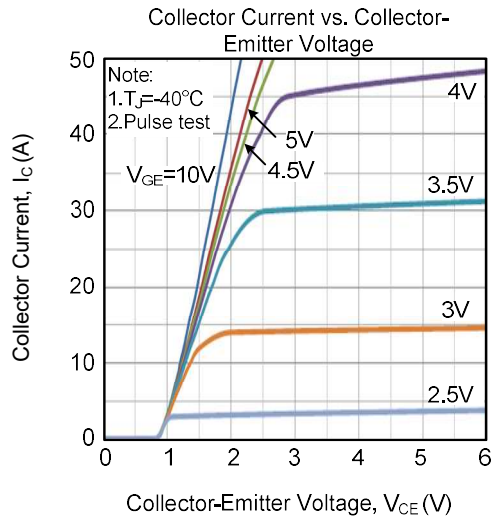


Energy Test Circuit

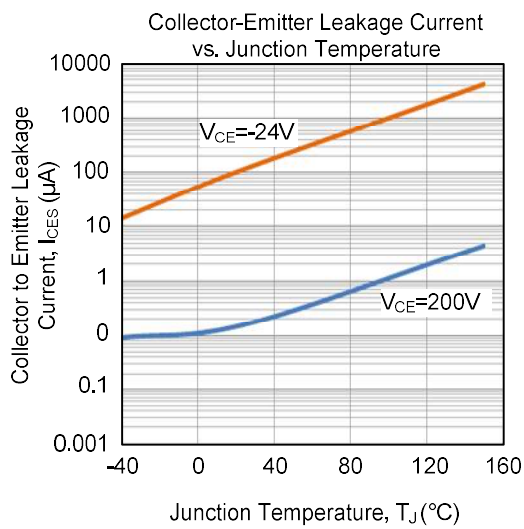


Energy Waveforms

## ■ TYPICAL CHARACTERISTICS



### ■ TYPICAL CHARACTERISTICS



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