



**UGV3545**

Preliminary

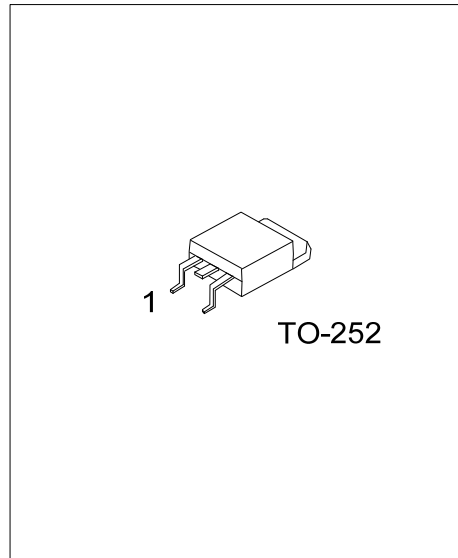
*Insulated Gate Bipolar Transistor*

**200mJ, 450V N-CHANNEL  
IGNITION IGBT**

■ DESCRIPTION

The UTC **UGV3545** 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.

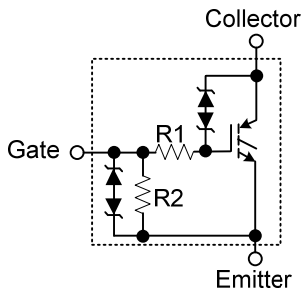
UTC **UGV3545** show very low on-state voltage and very high SCIS energy capability over a wide operating temperature range. Moreover, ESD-protected logic level gate input and an integrated gate resistor means no external protection circuitry is required.



■ 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



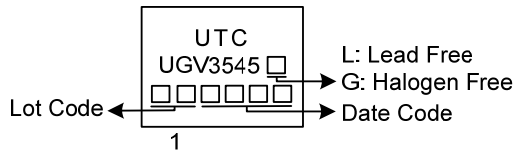
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UGV3545L-TN3-R	UGV3545G-TN3-R	TO-252	G	C	E	Tape Reel

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

<p>UGV3545G-TN3-R</p> <ul style="list-style-type: none"> <li>(1)Packing Type</li> <li>(2)Package Type</li> <li>(3)Green Package</li> </ul>	<ul style="list-style-type: none"> <li>(1) R: Tape Reel</li> <li>(2) TN3: TO-252</li> <li>(3) G: Halogen Free and Lead Free, L: Lead Free</li> </ul>
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■ MARKING



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

PARAMETER	SYMBOL	RATINGS	UNIT	
Collector to Emitter Breakdown Voltage	$BV_{\text{CER}}$	450	V	
Emitter to Collector Voltage Reverse Battery Condition	$BV_{\text{ECS}}$	30	V	
At Starting	$E_{\text{SCIS}}$	$T_J=25^\circ\text{C}$ , $I_{\text{SCIS}}=11.6\text{A}$ , $L=3.0\text{mHy}$	200	mJ
		$T_J=150^\circ\text{C}$ , $I_{\text{SCIS}}=8.8\text{A}$ , $L=3.0\text{mHy}$	116	mJ
Continuous Collector Current	$I_{\text{C}}$	$T_C=25^\circ\text{C}$	35	A
		$T_C=110^\circ\text{C}$	21	A
Gate to Emitter Voltage Continuous	$V_{\text{GEM}}$	$\pm 10$	V	
Power Dissipation Total at $T_C=25^\circ\text{C}$	$P_{\text{D}}$	125	W	
Power Dissipation Derating $T_C>25^\circ\text{C}$		1	W/ $^\circ\text{C}$	
Electrostatic Discharge Voltage at 100pF, 1500 $\Omega$	ESD	4	kV	
Junction Temperature	$T_J$	-40 ~ +175	$^\circ\text{C}$	
Storage Temperature Range	$T_{\text{STG}}$	-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 DATA

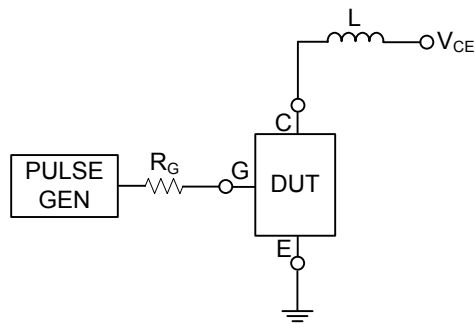
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Case	$\theta_{\text{JC}}$	1.0	$^\circ\text{C/W}$

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

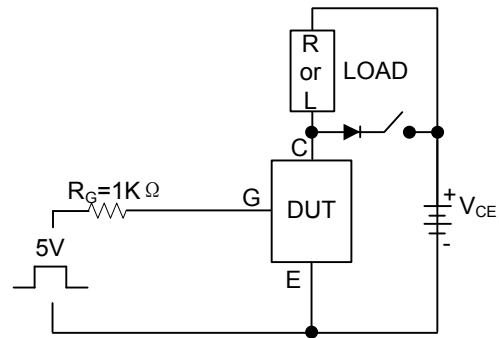
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
<b>Off State Characteristics</b>							
Collector to Emitter Breakdown Voltage	$BV_{\text{CER}}$	$I_{\text{C}}=2\text{mA}$ , $V_{\text{GE}}=0\text{V}$ , $R_{\text{G}}=1\text{K}\Omega$ , $T_J=-40\sim 150^\circ\text{C}$	400	450	500	V	
Collector to Emitter to Breakdown Voltage	$BV_{\text{CES}}$	$I_{\text{C}}=10\text{mA}$ , $V_{\text{GE}}=0\text{V}$ , $R_{\text{G}}=0$ , $T_J=-40\sim 150^\circ\text{C}$	400	450	500	V	
Emitter to Collector Breakdown Voltage	$BV_{\text{ECS}}$	$I_{\text{C}}=-75\text{mA}$ , $V_{\text{GE}}=0\text{V}$ , $T_C=25^\circ\text{C}$	30			V	
Gate to Emitter Breakdown Voltage	$BV_{\text{GES}}$	$I_{\text{GES}}=\pm 2\text{mA}$	$\pm 12$	$\pm 14$		V	
Collector to Emitter Leakage Current	$I_{\text{CER}}$	$V_{\text{CER}}=350\text{V}$ , $R_{\text{G}}=1\text{K}\Omega$	$T_C=25^\circ\text{C}$		25	$\mu\text{A}$	
			$T_C=150^\circ\text{C}$		1	mA	
Emitter to Collector Leakage Current	$I_{\text{ECS}}$	$V_{\text{EC}}=24\text{V}$	$T_C=25^\circ\text{C}$		1	mA	
			$T_C=150^\circ\text{C}$		40	mA	
Series Gate Resistance	$R_1$			70		$\Omega$	
Gate to Emitter Resistance	$R_2$		10		26	K $\Omega$	
<b>On State Characteristics</b>							
Collector to Emitter Saturation Voltage	$V_{\text{CE(SAT)}}$	$I_{\text{C}}=6\text{A}$ , $V_{\text{GE}}=4\text{V}$	$T_C=25^\circ\text{C}$		1.0	1.3	V
		$I_{\text{C}}=10\text{A}$ , $V_{\text{GE}}=4.5\text{V}$	$T_C=150^\circ\text{C}$		1.2	1.55	V
		$I_{\text{C}}=15\text{A}$ , $V_{\text{GE}}=4.5\text{V}$	$T_C=150^\circ\text{C}$		1.5	1.9	V
<b>Dynamic Characteristics</b>							
Gate Charge	$Q_{\text{G(ON)}}$	$I_{\text{C}}=10\text{A}$ , $V_{\text{CE}}=12\text{V}$ , $V_{\text{GE}}=5\text{V}$		14.7		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	$V_{\text{GEP}}$	$I_{\text{C}}=10\text{A}$ , $V_{\text{CE}}=12\text{V}$		2.6		V	
<b>Switching Characteristics</b>							
Current Turn-On Delay Time-Resistive	$t_{\text{d(ON)R}}$	$V_{\text{CE}}=300\text{V}$ , $V_{\text{GE}}=10\text{V}$ , $I_{\text{C}}=10\text{A}$ , $L=500\mu\text{H}$ , $R_{\text{G}}=10\Omega$		16		ns	
Current Rise Time-Resistive	$t_{\text{r}}$			17		ns	
Current Turn-Off Delay Time-Inductive	$t_{\text{d(OFF)L}}$			0.97		$\mu\text{s}$	
Current Fall Time Inductive	$t_{\text{fL}}$			4.26		$\mu\text{s}$	
Self Clamped Inductive Switching	SCIS	$T_J=25^\circ\text{C}$ , $L=3.0\text{mHy}$ , $R_{\text{G}}=1\text{K}\Omega$ , $V_{\text{GE}}=5\text{V}$			200	mJ	

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

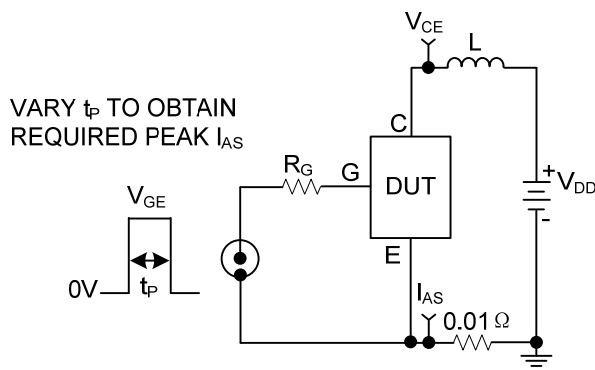
■ TEST CIRCUIT AND WAVEFORMS



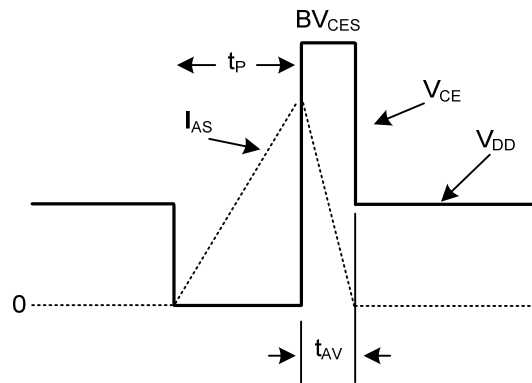
Inductive Switching Test Circuit



t<sub>ON</sub> and t<sub>OFF</sub> Switching Test Circuit



Energy Test Circuit



Energy Waveforms

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