



UGV4045

Preliminary

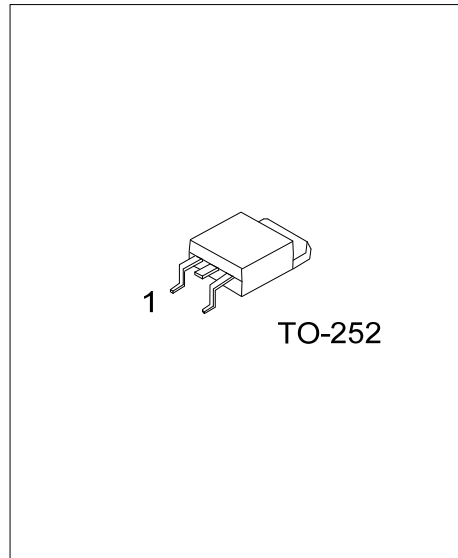
Insulated Gate Bipolar Transistor

270mJ, 450V N-CHANNEL IGNITION IGBT

DESCRIPTION

The UTC **UGV4045** 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.

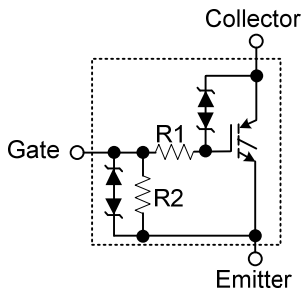
UTC **UGV4045** show very low on-state voltage and very high SCIS energy capability over a wide operating temperature range. Moreover, ESD-protected logic level gate input and an integrated gate resistor means no external protection circuitry is required.



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



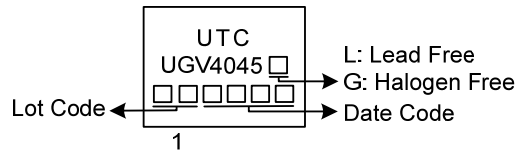
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UGV4045L-TN3-R	UGV4045G-TN3-R	TO-252	G	C	E	Tape Reel

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

<p>UGV4045G-TN3-R</p> <ul style="list-style-type: none"> (1)Packing Type (2)Package Type (3)Green Package 	<ul style="list-style-type: none"> (1) R: Tape Reel (2) TN3: TO-252 (3) G: Halogen Free and Lead Free, L: Lead Free
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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_{CER}	450	V	
Emitter to Collector Voltage Reverse Battery Condition	BV_{ECS}	30	V	
At Starting	E_{SCIS}	$T_J=25^\circ\text{C}$, $I_{\text{SCIS}}=13.4\text{A}$, $L=3.0\text{mHy}$	270	mJ
		$T_J=150^\circ\text{C}$, $I_{\text{SCIS}}=10.2\text{A}$, $L=3.0\text{mHy}$	157	mJ
Continuous Collector Current	I_{C}	$T_C=25^\circ\text{C}$	40	A
		$T_C=110^\circ\text{C}$	24	A
Gate to Emitter Voltage Continuous	V_{GEM}	± 10	V	
Power Dissipation Total at $T_C=25^\circ\text{C}$	P_{D}	125	W	
Power Dissipation Derating $T_C>25^\circ\text{C}$		1	W/ $^\circ\text{C}$	
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 DATA

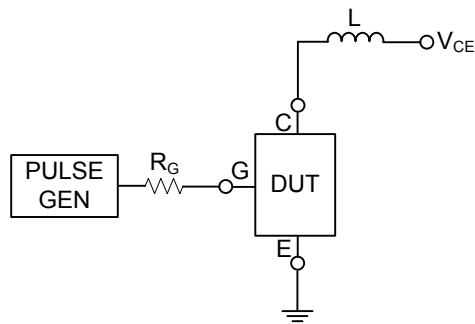
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Case	θ_{JC}	1.0	$^\circ\text{C/W}$

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

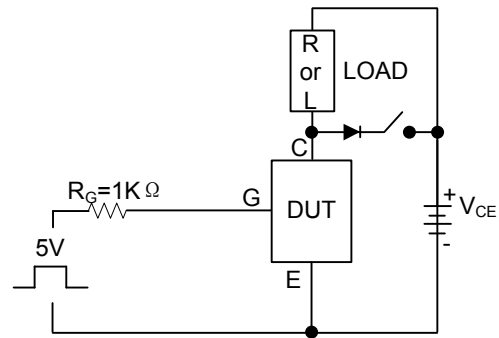
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Off State Characteristics							
Collector to Emitter Breakdown Voltage	BV_{CER}	$I_{\text{C}}=2\text{mA}$, $V_{\text{GE}}=0\text{V}$, $R_{\text{G}}=1\text{K}\Omega$, $T_J=-40\sim 150^\circ\text{C}$	400	450	500	V	
Collector to Emitter to Breakdown Voltage	BV_{CES}	$I_{\text{C}}=10\text{mA}$, $V_{\text{GE}}=0\text{V}$, $R_{\text{G}}=0$, $T_J=-40\sim 150^\circ\text{C}$	400	450	500	V	
Emitter to Collector Breakdown Voltage	BV_{ECS}	$I_{\text{C}}=-75\text{mA}$, $V_{\text{GE}}=0\text{V}$, $T_C=25^\circ\text{C}$	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}	$V_{\text{CER}}=350\text{V}$, $R_{\text{G}}=1\text{K}\Omega$	$T_C=25^\circ\text{C}$		25	μA	
			$T_C=150^\circ\text{C}$		1	mA	
Emitter to Collector Leakage Current	I_{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		Ω	
Gate to Emitter Resistance	R_2		10		26	K Ω	
On State Characteristics							
Collector to Emitter Saturation Voltage	$V_{\text{CE(SAT)}}$	$I_{\text{C}}=6\text{A}$, $V_{\text{GE}}=4\text{V}$	$T_C=25^\circ\text{C}$		0.95	1.2	V
		$I_{\text{C}}=10\text{A}$, $V_{\text{GE}}=4.5\text{V}$	$T_C=150^\circ\text{C}$		1.15	1.5	V
		$I_{\text{C}}=15\text{A}$, $V_{\text{GE}}=4.5\text{V}$	$T_C=150^\circ\text{C}$		1.4	1.8	V
Dynamic Characteristics							
Gate Charge	$Q_{\text{G(ON)}}$	$I_{\text{C}}=10\text{A}$, $V_{\text{CE}}=12\text{V}$, $V_{\text{GE}}=5\text{V}$		18.5		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}	$I_{\text{C}}=10\text{A}$, $V_{\text{CE}}=12\text{V}$		2.4		V	
Switching Characteristics							
Current Turn-On Delay Time-Resistive	$t_{\text{d(ON)R}}$	$V_{\text{CE}}=300\text{V}$, $V_{\text{GE}}=10\text{V}$, $I_{\text{C}}=10\text{A}$, $L=500\mu\text{H}$, $R_{\text{G}}=10\Omega$		25		ns	
Current Rise Time-Resistive	t_{r}			21		ns	
Current Turn-Off Delay Time-Inductive	$t_{\text{d(OFF)L}}$			1.47		μs	
Current Fall Time Inductive	t_{fL}			4.25		μs	
Self Clamped Inductive Switching	SCIS	$T_J=25^\circ\text{C}$, $L=3.0\text{mHy}$, $R_{\text{G}}=1\text{K}\Omega$, $V_{\text{GE}}=5\text{V}$			270	mJ	

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

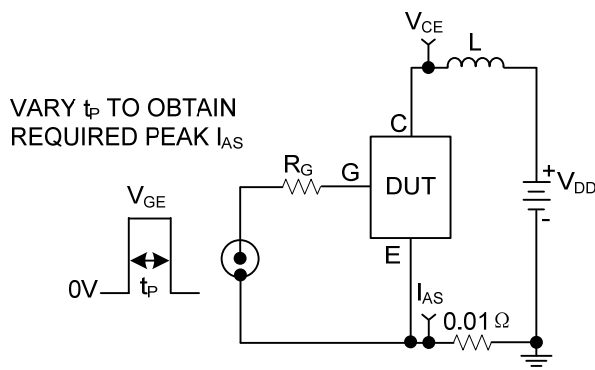
■ TEST CIRCUIT AND WAVEFORMS



Inductive Switching Test Circuit

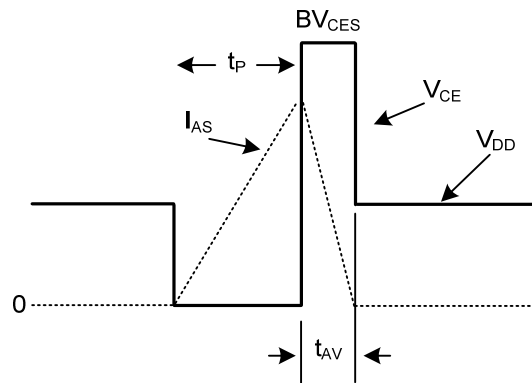


t_{ON} and t_{OFF} Switching Test Circuit



VARY t_p TO OBTAIN
REQUIRED PEAK I_{AS}

Energy Test Circuit



Energy Waveforms

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