



UG15N41

Insulated Gate Bipolar Transistor

15A, 410V NPT SERIES N-CHANNEL IGBT

DESCRIPTION

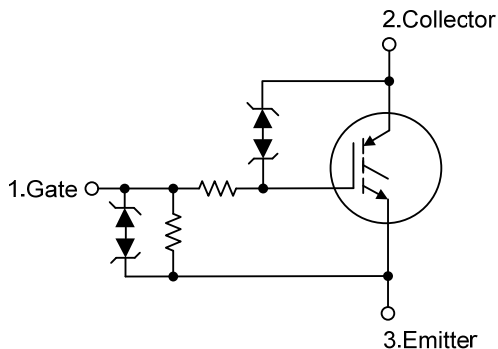
The UTC **UG15N41** is a Logic Level Insulated Gate Bipolar Transistor features monolithic circuitry integrating ESD and Over-Voltage clamped protection for use in inductive coil drivers applications. it uses UTC's advanced technology to provide the customers with a minimum on-state resistance, etc.

The UTC **UG15N41** is suitable for AC and DC motor controls, power supplies, and drivers for solenoids, relays and contactors, etc.

FEATURES

- * Temperature Compensated Gate-Collector Voltage Clamp
Limits Stress Applied to Load Devices
- * Low Saturation Voltage
- * High Pulsed Current Capability

SYMBOL

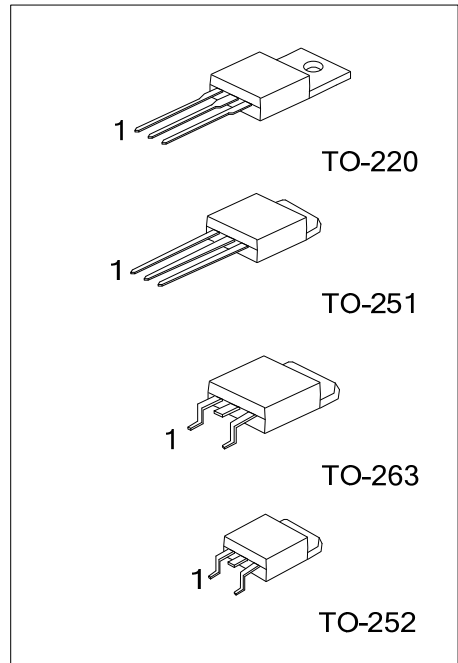


ORDERING INFORMATION

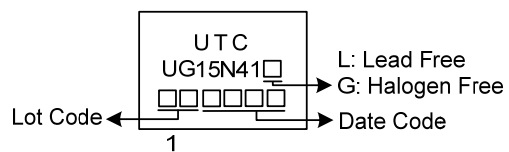
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UG15N41L-TA3-T	UG15N41G-TA3-T	TO-220	G	C	E	Tube
UG15N41L-TM3-T	UG15N41G-TM3-T	TO-251	G	C	E	Tube
UG15N41L-TN3-R	UG15N41G-TN3-R	TO-252	G	C	E	Tape Reel
UG15N41L-TQ2-T	UG15N41G-TQ2-T	TO-263	G	C	E	Tube
UG15N41L-TQ2-R	UG15N41G-TQ2-R	TO-263	G	C	E	Tape Reel

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

UG15N41G-TA3-T (1) Packing Type (2) Package Type (3) Green Package		(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TM3: TO-251, TN3: TO-252 TQ2: TO-263 (3) G: Halogen Free and Lead Free, L: Lead Free
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■ MARKING



■ **ABSOLUTE MAXIMUM RATING** ($T_J = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Collector to Emitter Voltage		V_{CES}	440	V
Collector to Gate Voltage		V_{GER}	440	V
Gate to Emitter Voltage		V_{GE}	15	V
Collector Current to Continuous	$T_J=25^{\circ}\text{C}$	I_C	15	A
Collector Emitter Avalanche Energy		EAS	200	mJ
Power Dissipation	$T_C=25^{\circ}\text{C}$	TO-220	110	W
		TO-251	107	W
		TO-252		
	TO-263	0.76	W/ $^{\circ}\text{C}$	
	Derate above 25°C			TO-220
				TO-252
TO-263				
Operating Junction Temperature Range		T_J	-55 ~ +175	$^{\circ}\text{C}$
Storage Temperature Range		T_{STG}	-55 ~ +175	$^{\circ}\text{C}$

Notes: 1. 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.

2. Pulse width limited by maximum junction temperature.

3. $V_{CC} = 50\text{V}$, $V_{GE} = 5.0\text{V}$, $P_k I_L = 11\text{A}$, $L = 3\text{mH}$, Starting $T_J = 25^\circ\text{C}$.

■ **THERMAL DATA**

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220	θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
	TO-251		100	$^\circ\text{C}/\text{W}$
	TO-252			
	TO-263		50	$^\circ\text{C}/\text{W}$
Junction to Case	TO-220	θ_{JC}	1.13	$^\circ\text{C}/\text{W}$
	TO-251		1.40	$^\circ\text{C}/\text{W}$
	TO-252			
	TO-263		1.16	$^\circ\text{C}/\text{W}$

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

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Collector to Emitter Breakdown Voltage	BV _{CES}	I _C =2.0mA, V _{GE} =0V	T _J =-40°C~150°C	380		440	V
		I _C =10mA, V _{GE} =0V		380		440	V
Collector to Emitter Leakage Current	I _{CES}	V _{CE} =350V, V _{GE} =0V	T _J =25°C		2.0	20	μA
			T _J =125°C		10	40 (Note 3)	μA
			T _J =-40°C		1.0	10	μA
Collector to Emitter Leakage Current	I _{ECS}	V _{CE} =-24V	T _J =25°C		0.7	2.0	mA
			T _J =125°C		12	25 (Note 3)	mA
			T _J =-40°C		0.1	1.0	mA
Collector to Emitter Clamp Voltage	BV _{ECS}	I _C =-75mA	T _J =25°C	35	50	65	V
			T _J =125°C	38	54	68	V
			T _J =-40°C	31	45	63	V
Gate to Emitter Clamp Voltage	BV _{GES}	I _G =5.0mA	T _J =-40°C~150°C	11	14	16	V
Gate to Emitter Leakage Current	I _{GES}	V _{GE} =10V	T _J =-40°C~150°C	384	640	1000	μA
Gate Resistor	R _G		T _J =-40°C~150°C		70		Ω
Gate Emitter Resistor	R _{GE}		T _J =-40°C~150°C	10	16	26	kΩ
ON CHARACTERISTICS (Note 2)							
Gate to Emitter Threshold Voltage	V _{GE(TH)}	I _C =1mA, V _{CE} =V _{GE}	T _J =25°C	1.2	1.45	1.7	V
			T _J =125°C	0.75	1.1	1.4	V
			T _J =-40°C	1.2	1.7	2.1 (Note 3)	V
Threshold Temperature Coefficient					3.4		mV/°C

■ ELECTRICAL CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
ON CHARACTERISTICS (Note 3)							
Collector to Emitter On Voltage	$V_{CE(ON)}$	$I_C=6.0A, V_{GE}=4.0V$	$T_J=25^{\circ}C$	0.9	1.1	1.8	V
			$T_J=150^{\circ}C$		0.9	1.8	V
			$T_J=-40^{\circ}C$		1.2	1.9 (Note 3)	V
		$I_C=10A, V_{GE}=4.0V$	$T_J=25^{\circ}C$	1.2	1.35	2.2	V
			$T_J=150^{\circ}C$		1.5	2.3 (Note 3)	V
			$T_J=-40^{\circ}C$		1.4	2.2	V
		$I_C=10A, V_{GE}=4.5V$	$T_J=25^{\circ}C$	1.1	1.3	2.2	V
			$T_J=150^{\circ}C$		1.5	2.1	V
			$T_J=-40^{\circ}C$		1.6	2.1 (Note 3)	V
Forward Transconductance	g_{FS}	$V_{CE}=5.0V, I_C=6.0A$	$T_J=-40^{\circ}C\sim 150^{\circ}C$	8.0	15	25	S
DYNAMIC CHARACTERISTICS							
Input Capacitance	C_{ISS}	$V_{CC}=25V, V_{GE}=0V, f=1.0\text{ MHz}$	$T_J=-25^{\circ}C$		550		pF
Output Capacitance	C_{OSS}				165		pF
Reverse Transfer Capacitance	C_{RSS}				75		pF
SWITCHING CHARACTERISTICS							
Turn-Off Delay Time (Inductive)	$t_{d(OFF)}$	$V_{CC}=300V, I_C=6.5A$ $R_G=1.0k\Omega, R_L=300\mu H$	$T_J=25^{\circ}C$		4.0	10	μS
			$T_J=150^{\circ}C$		4.5	10	μS
		$V_{CC}=300V, I_C=6.5A$ $R_G=1.0k\Omega, R_L=46\Omega$	$T_J=25^{\circ}C$		3.0	10	μS
			$T_J=150^{\circ}C$		3.4	10	μS
Turn-On Delay Time	$t_{d(ON)}$	$V_{CC}=10V, I_C=6.5A$ $R_G=1.0k\Omega, R_L=1.5\Omega$	$T_J=25^{\circ}C$		0.7	4.0	μS
			$T_J=150^{\circ}C$		0.7	4.0	μS
Fall Time (Inductive)	t_F	$V_{CC}=300V, I_C=6.5A$ $R_G=1.0k\Omega, R_L=300\mu H$	$T_J=25^{\circ}C$		6.0	12	μS
			$T_J=150^{\circ}C$		10	12	μS
Fall Time (Resistive)	t_F	$V_{CC}=300V, I_C=6.5A$ $R_G=1.0k\Omega, R_L=46\Omega$	$T_J=25^{\circ}C$		8.0	15	μS
			$T_J=150^{\circ}C$		12	15	μS
Rise Time	t_F	$V_{CC}=10V, I_C=6.5A$ $R_G=1.0k\Omega, R_L=1.5\Omega$	$T_J=25^{\circ}C$		4.0	7.0	μS
			$T_J=150^{\circ}C$		5.0	7.0	μS

Notes: 1. When surface mounted to an FR4 board using the minimum recommended pad size.

2. Pulse Test: Pulse Width $\leq 300 \mu S$, Duty Cycle $\leq 2\%$.

3. Maximum Value of Characteristic across Temperature Range.

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