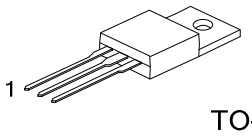
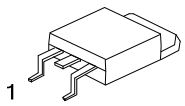
UG15N41

Insulated Gate Bipolar Transistor

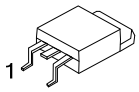
15A, 410V NPT SERIES N-CHANNEL IGBT



TO-220



TO-263



TO-252

■ DESCRIPTION

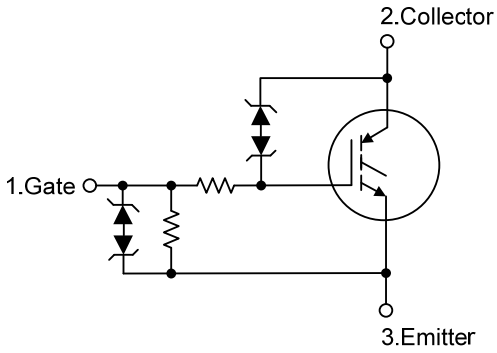
The UTC **UG15N41** is a Logic Level Insulated Gate Bipolar Transistor features monolithic circuitry integrating ESD and Over−Voltage clamped protection for use in inductive coil drivers applications. it uses UTC's advanced technology to provide the customers with a minimum on-state resistance, etc.

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

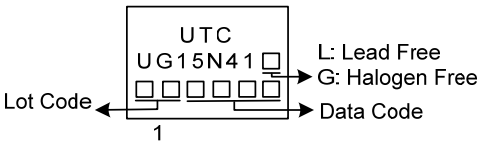
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UG15N41L-TA3-T	UG15N41G-TA3-T	TO-220	G	C	E	Tube
UG15N41L-TN3-R	UG15N41G-TN3-R	TO-252	G	C	E	Tape Reel
UG15N41L-TQ2-T	UG15N41G-TQ2-T	TO-263	G	C	E	Tube
UG15N41L-TQ2-R	UG15N41G-TQ2-R	TO-263	G	C	E	Tape Reel

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

UG15N41L-TA3-T

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

■ MARKING



■ ABSOLUTE MAXIMUM RATING (T_J=25°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°C	I_C	15	A
Collector Emitter Avalanche Energy		T_J=25°C	EAS	200	mJ
Power Dissipation	T_C=25°C	TO-220	P_D	110	W
		TO-252 TO-263		107	W
	Derate above 25°C	TO-220		0.76	W/°C
		TO-252 TO-263		0.71	W/°C
Operating Junction Temperature Range			T_J	-55 ~ +175	°C
Storage Temperature Range			T_{STG}	-55 ~ +175	°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}=50V, V_{GE}=5.0V, Pk I_L=11A, L=3mH, Starting T_J=25°C.

■ THERMAL CHARACTERISTICS

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220	θ_{JA}	62.5	°C/W
	TO-252		100	°C/W
	TO-263		50	°C/W
Junction to Case	TO-220	θ_{JC}	1.13	°C/W
	TO-252		1.40	°C/W
	TO-263		1.16	°C/W

■ ELECTRICAL CHARACTERISTICS (T_J=25°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	39	42	V
			T_J=125°C	38	42	45	V
			T_J=-40°C	31	35	40	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°C	0.9	1.1	1.8	V
			T_J=150°C		0.9	1.8	V
			T_J=-40°C		1.2	1.9 (Note 3)	V
		I_C=10A, V_{GE}=4.0V	T_J=25°C	1.2	1.35	2.2	V
			T_J=150°C		1.5	2.3 (Note 3)	V
			T_J=-40°C		1.4	2.2	V
		I_C=10A, V_{GE}=4.5V	T_J=25°C	1.1	1.3	2.2	V
			T_J=150°C		1.5	2.1	V
			T_J=-40°C		1.6	2.1 (Note 3)	V
Forward Transconductance	g_{FS}	V_{CE}=5.0V, I_C=6.0A	T_J=-40°C~150°C	8.0	15	25	S
DYNAMIC CHARACTERISTICS							
Input Capacitance	C_{ISS}	V_{CC}=25V, V_{GE}=0V, f=1.0 MHz	T_J=-25°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=1.0kΩ, R_L =300μH	T_J=25°C		4.0	10	μS
			T_J=150°C		4.5	10	μS
		V_{CC}=300V, I_C=6.5A R_G=1.0kΩ, R_L=46Ω	T_J=25°C		3.0	10	μS
			T_J=150°C		3.4	10	μS
Turn−On Delay Time	$t_{d(ON)}$	V_{CC}=10V, I_C=6.5A R_G=1.0kΩ, R_L=1.5Ω	T_J=25°C		0.7	4.0	μS
			T_J=150°C		0.7	4.0	μS
Fall Time (Inductive)	t_F	V_{CC}=300V, I_C=6.5A R_G=1.0kΩ, R_L=300μH	T_J=25°C		6.0	12	μS
			T_J=150°C		10	12	μS
Fall Time (Resistive)	t_F	V_{CC}=300V, I_C=6.5A R_G=1.0kΩ, R_L=46Ω	T_J=25°C		8.0	15	μS
			T_J=150°C		12	15	μS
Rise Time	t_F	V_{CC}=10V, I_C=6.5A R_G=1.0kΩ, R_L=1.5Ω	T_J=25°C		4.0	7.0	μS
			T_J=150°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 ≤ 300 μS, Duty Cycle ≤ 2%.
3. Maximum Value of Characteristic across Temperature Range.