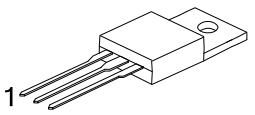
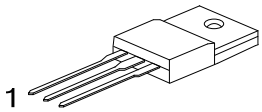
UPG15N60

Preliminary ***Insulated Gate Bipolar Transistor***

600V, SMPS N-CHANNEL IGBT



TO-220



TO-220F1

■ DESCRIPTION

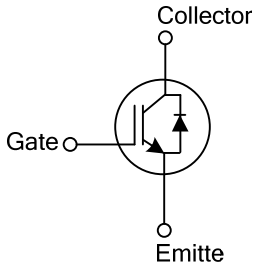
Ths UPG15N60 is a Insulated Gate Bipolar Transistor (IGBT) features a robust and cost effective Non−Punch Through (NPT) Trench construction, and provides superior performance in demanding switching applications.

Offering both low on state voltage and minimal switching loss, the IGBT is well suited for motor drive control and other hard switching applications.

■ FEATURES

* $V_{CE(SAT)}$ ≤ 1.7V @ I_C=15A, V_{GE}=15V
* 600V Switching SOA Capability
* Low Saturation Voltage Resulting in Low Conduction Loss
* Low Switching Loss in Higher Frequency Applications
* 5μs Short Circuit Capability
* Excellent Current

■ SYMBOL



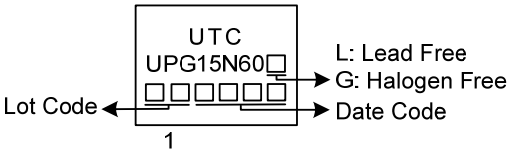
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UPG15N60L-TA3-T	UPG15N60G-TA3-T	TO-220	G	C	E	Tube
UPG15N60L-TF1-T	UPG15N60G-TF1-T	TO-220F1	G	C	E	Tube

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

UPG15N60G-TA3-T (1)Packing Type	(1) T: Tube
(2)Package Type	(2) TA3: TO-220, TF1: TO-220F1
(3)Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



■ ABSOLUTE MAXIMUM RATINGS (T_C=25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Collector-Emitter Voltage		V_{CES}	600	V
Gate to Emitter Voltage Continuous		V_{GES}	±20	V
Continuous Collector Current	T_C=25°C	I_C	30	A
	T_C=100°C		15	A
Collector Current Pulsed (Note 2)		I_{CM}	60	A
Peak Diode Recovery dv/dt (Note 3)		dv/dt	6.4	V/ns
Power Dissipation	TO-220	P_D	24	W
	TO-220F1		30	W
Junction Temperature		T_J	-55 ~ +150	°C
Storage Temperature Range		T_{STG}	-55 ~ +150	°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. Repetitive Rating: Pulse width limited by maximum junction temperature.
3. I_F ≤8A, di/dt ≤200A/μs, V_{CC} ≤ BV_{CES}, Starting T_J=25°C

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Case	TO-220	θ_{JC}	4.0	°C/W
	TO-220F1		4.17	°C/W

■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Collector-Emitter Breakdown Voltage	BV_{CES}	I_C=250μA, V_{GE}=0V		600			V
Collector-Emitter Leakage Current	I_{CES}	V_{CE}=600V, V_{GE}=0V				200	μA
Gate to Emitter Leakage Current	I_{GES}	V_{GE}=20V, V_{GE}=0V				±400	nA
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	I_C=15A, V_{GE}=15V	T_J=25°C		2	2.5	V
			T_J=125°C		2.4		V
Gate to Emitter Threshold Voltage	$V_{GE(TH)}$	I_C=250μA, V_{CE}= V_{GE}		4.0	5.7	7.0	V
Input Capacitance	C_{IES}	V_{CE}=30V, V_{GE}=0V, f=1MHz			1230		pF
Output Capacitance	C_{OES}				160		pF
Reverse Transfer Capacitance	C_{RES}				28		pF
Total Gate Charge	Q_G	V_{CE}=480V, V_{GE}=15V, I_C=15A			48		nC
Gate-Emitter Charge	Q_{GE}				15		nC
Gate-Collector Charge	Q_{GC}				23		nC
Current Turn-On Delay Time	$t_{D(ON)}$	V_{CE}=100V, V_{GE}=15V, I_C=15A, R_G=24Ω			32		ns
Current Rise Time	t_R				38		ns
Current Turn-Off Delay Time	$t_{D(OFF)}$				100		ns
Current Fall Time	t_F				58		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Forward Voltage Drop	V_{FM}	I_F=12A	T_J=25°C		1.9	2.6	V
			T_J=125°C		1.5		V
Reverse Recovery Time	t_{rr}	I_F=12A, dI/dt=100A/μS, V_{CC}=50V			75		ns
Reverse Recovery Charge	Q_{rr}				170		nC

Note: Pulse Test: Pulse width≦50μs.

■ TEST CIRCUIT AND WAVEFORMS

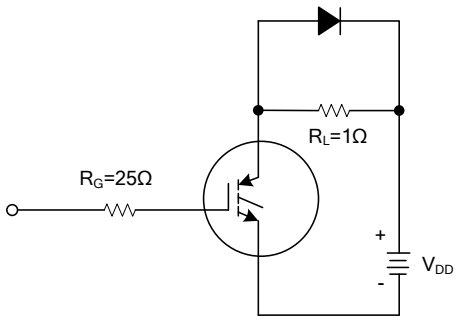


Fig 1. INDUCTIVE SWITCHING TEST CIRCUIT

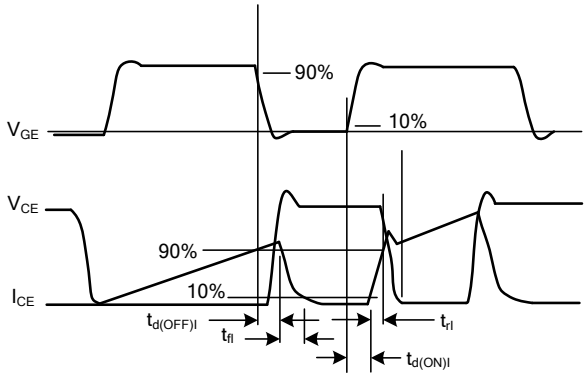


Fig 2. SWITCHING TEST WAVEFORMS