



UPG90N60E

Insulated Gate Bipolar Transistor

600V, SMPS N-CHANNEL IGBT

DESCRIPTION

The UTC **UPG90N60E** is a N-channel IGBT. it uses UTC's advanced technology to provide customers with high input impedance, high switching speed and low conduction loss, etc.

The UTC **UPG90N60E** is suitable for high voltage switching, high frequency switch mode power supplies.

FEATURES

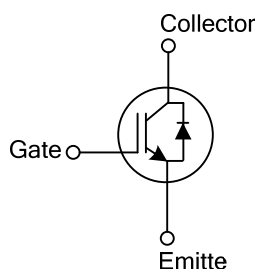
* $V_{CE(SAT)} \leq 2.3V$ @ $I_C=90A$, $V_{GE}=15V$

* High switching speed

* High input impedance

* Low conduction loss

SYMBOL



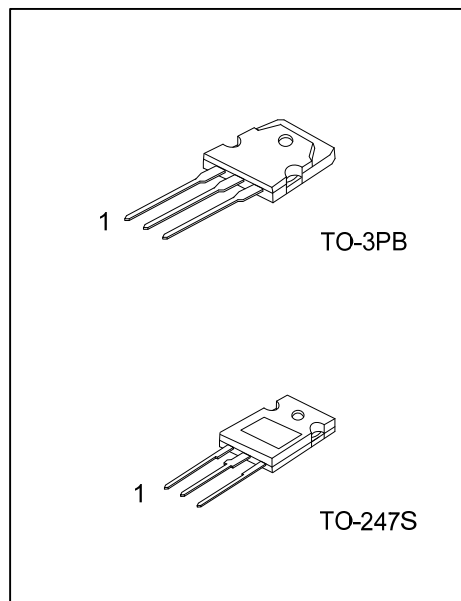
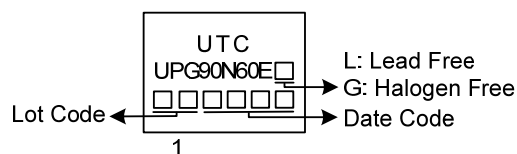
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UPG90N60EL-T3B-T	UPG90N60EG-T3B-T	TO-3PB	G	C	E	Tube
UPG90N60EL-T47S-T	UPG90N60EG-T47S-T	TO-247S	G	C	E	Tube

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

UPG90N60EG-T3B-T	(1)Packing Type	(1) T: Tube
	(2)Package Type	(2) T3B: TO-3PB, T47S: TO-247S
	(3)Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free

MARKING



■ ABSOLUTE MAXIMUM RATINGS ($T_C=25^{\circ}\text{C}$, 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	$T_C=25^{\circ}\text{C}$	I_C	180	A
	$T_C=100^{\circ}\text{C}$		90	A
Collector Current Pulsed (Note 2)		I_{CM}	270	A
Continuous Forward Current	$T_C=25^{\circ}\text{C}$	I_F	90	A
	$T_C=100^{\circ}\text{C}$		45	A
Forward Current Pulsed		I_{FM}	144	A
Peak Diode Recovery dv/dt (Note 3)		dv/dt	6.8	V/ns
Power Dissipation	TO-247S	P_D	350	W
	TO-3PB		375	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. $I_F \leq 30\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{CC} \leq BV_{CES}$, Starting $T_J=25^{\circ}\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Case	TO-247S	θ_{JC}	0.36	°C/W
	TO-3PB		0.33	°C/W

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
OFF CHARACTERISTICS							
Collector-Emitter Breakdown Voltage	BV_{CES}	$I_C=250\mu A$, $V_{GE}=0V$	600			V	
Collector-Emitter Leakage Current	I_{CES}	$V_{CE}=600V$, $V_{GE}=0V$			10	μA	
Gate to Emitter Leakage Current	I_{GES}	$V_{CE}=0V$, $V_{GE}=\pm 20V$			± 400	nA	
ON CHARACTERISTICS							
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	$I_C=90A$, $V_{GE}=15V$	$T_J=25^{\circ}C$		1.8	2.3	V
			$T_J=150^{\circ}C$		2.0		V
Gate to Emitter Threshold Voltage	$V_{GE(TH)}$	$I_C=250\mu A$, $V_{CE}=V_{GE}$	4.0		6.5	V	
DYNAMIC CHARACTERISTICS							
Input Capacitance	C_{IES}	$V_{CE}=30V$, $V_{GE}=0V$, $f=1MHz$		3730		pF	
Output Capacitance	C_{OES}			350		pF	
Reverse Transfer Capacitance	C_{RES}			64		pF	
SWITCHING CHARACTERISTICS							
Total Gate Charge	Q_G	$I_C=90A$, $V_{CE}=100V$, $V_{GE}=10V$		121		nC	
Gate-Emitter Charge	Q_{GE}			46		nC	
Gate-Collector Charge	Q_{GC}			52		nC	
Current Turn-On Delay Time	$t_{D(ON)}$	$I_C=90A$, $V_{CE}=50V$, $V_{GE}=15V$, $R_G=10\Omega$		24		ns	
Current Rise Time	t_R			31		ns	
Current Turn-Off Delay Time	$t_{D(OFF)}$			114		ns	
Current Fall Time	t_F			190		ns	
DRAIN-SOURCE DIODE CHARACTERISTICS							
Forward Voltage Drop	V_{FM}	$I_F=12A$			3	V	
Reverse Recovery Time	t_{rr}	$I_F=12A$, $dI/dt=100A/\mu S$, $V_{CC}=400V$		104		ns	
Reverse Recovery Charge	Q_{rr}			160		nC	

Note: Pulse Test: Pulse width $\leq 50\mu\text{s}$.

■ TEST CIRCUIT AND WAVEFORMS

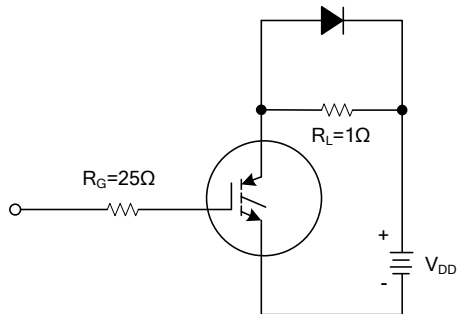


Fig 1. INDUCTIVE SWITCHING TEST CIRCUIT

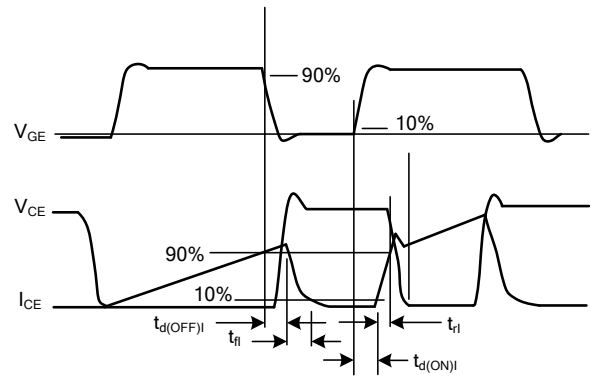
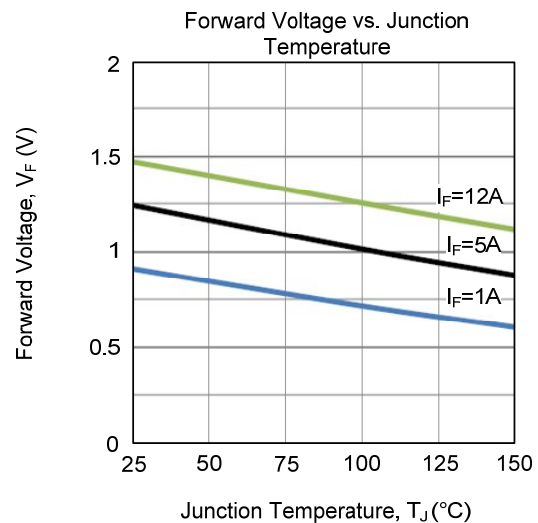
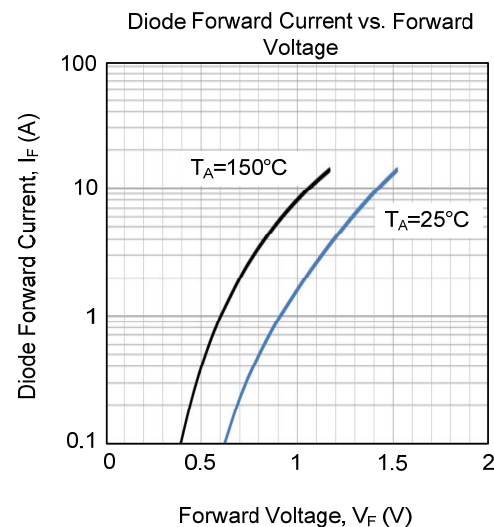
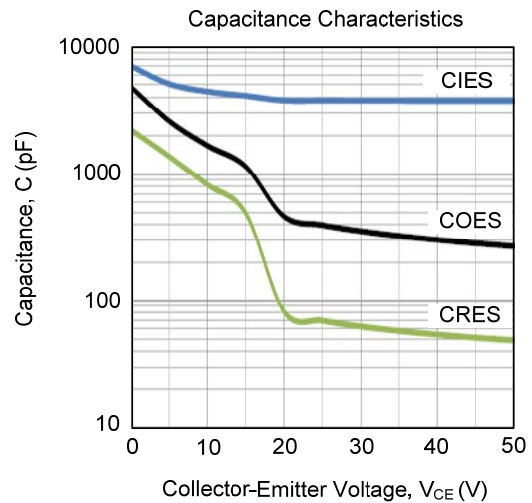
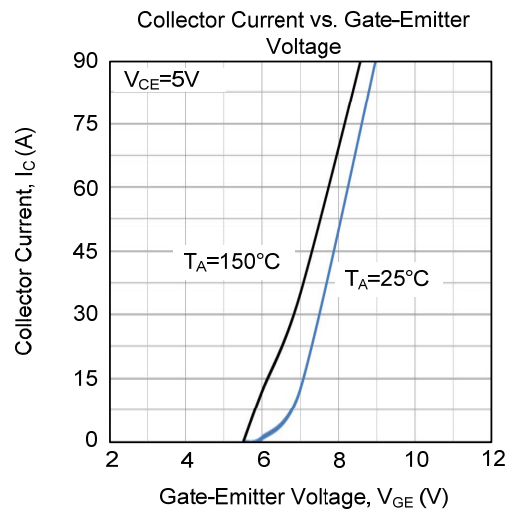
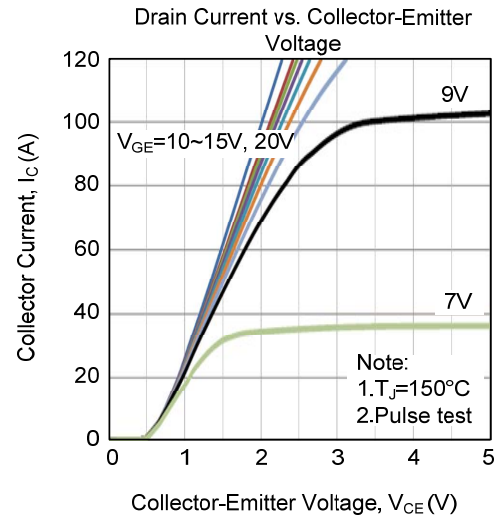
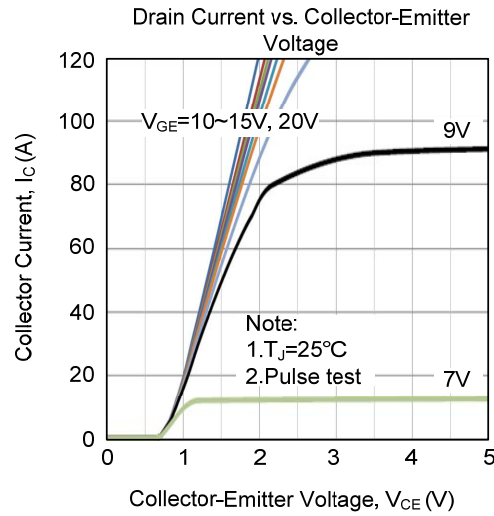
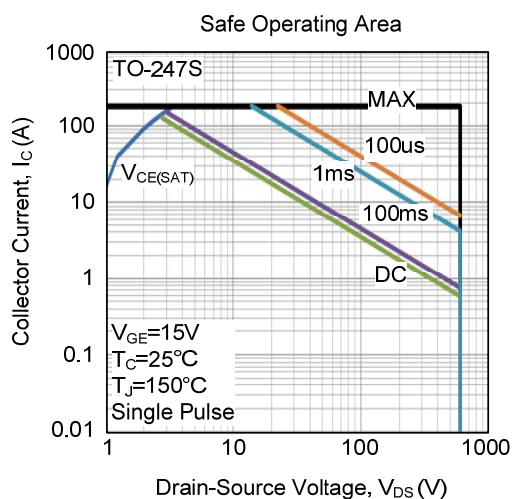
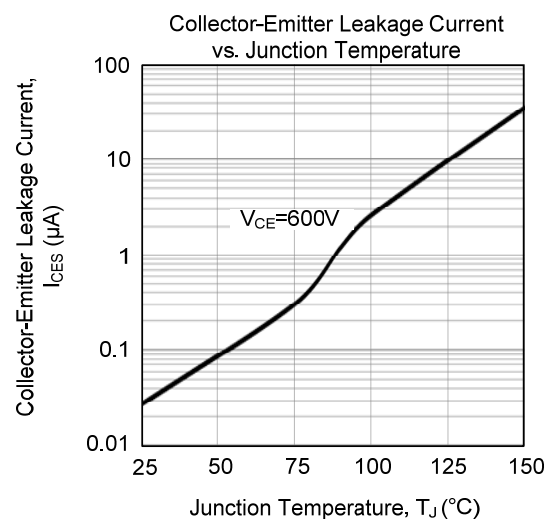
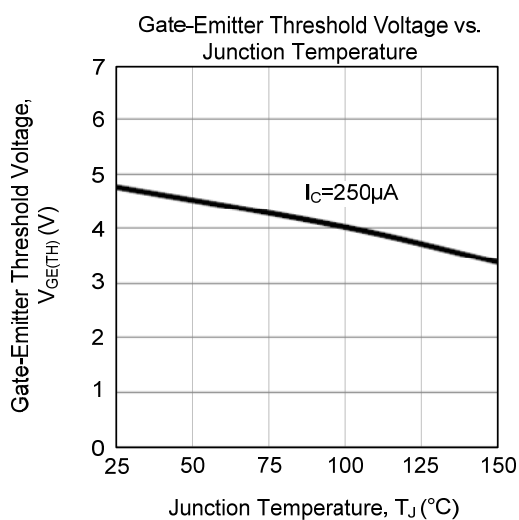
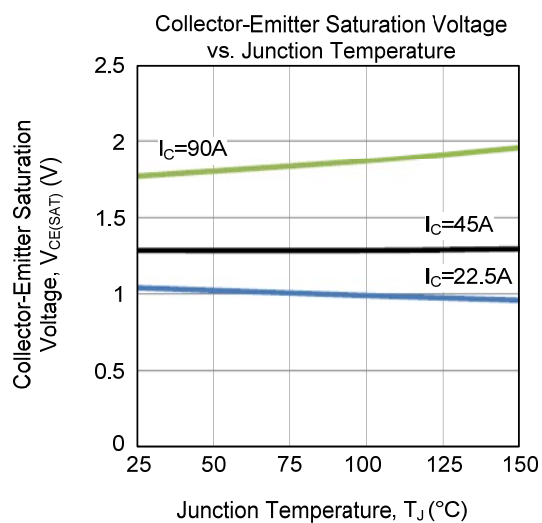
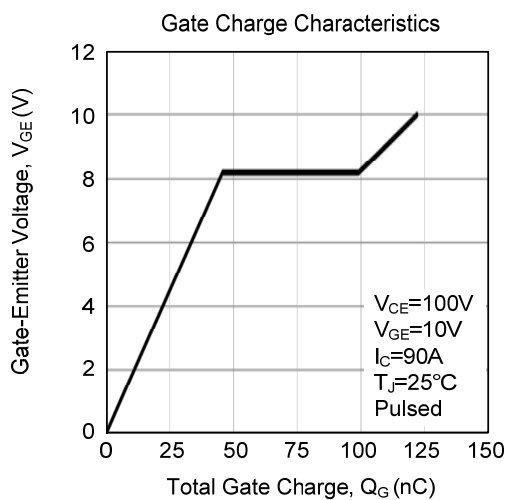


Fig 2. SWITCHING TEST WAVEFORMS

■ TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



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