

Descriptions

This is 650V 60A Trench FS Technology IGBT in a TO-247 Plastic Package.

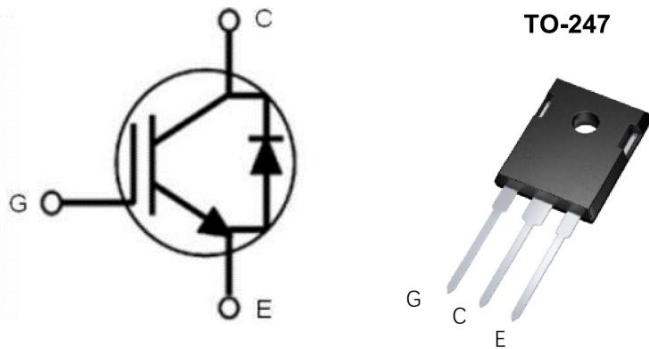
Features

- Field Stop Trench Technology
- $V_{CE(sat)}=2.0V@I_C=60A$
- $t_{rr}=36ns$ (typ.)
- High Speed Switching & Low Power Loss
- High Input Impedance

Applications

- PFC (Power Factor Correction)
- UPS (Uninterruptible Power Supply)
- Welder
- PV Inverter
- Solar Inverter

Equivalent Circuit & Pinning



Marking

See Marking Instructions

Maximum Ratings

Collector to Emitter Voltage	V_{CES}		650	V
Gate to Emitter Voltage	V_{GES}		± 20	V
Collector Current	I_C	$T_C=25^\circ\text{C}$	120	A
		$T_C=100^\circ\text{C}$	60	A
Pulsed Collector Current	I_{CM}		180	A
Diode Continuous Forward Current	I_F	$T_C=100^\circ\text{C}$	30	A
Diode Maximum Forward Current	I_{FM}		90	A
Maximum Power Dissipation	P_D	$T_C=25^\circ\text{C}$	280	W
		$T_C=100^\circ\text{C}$	166	W
Operating Junction Temperature Range	T_J		-50~+175	$^\circ\text{C}$
Storage Temperature Range	T_{STG}		-50~+150	$^\circ\text{C}$
Thermal Resistance, Junction to case for IGBT	$R_{th(J-C)}$		0.45	$^\circ\text{C/W}$
Thermal Resistance, Junction to case for Diode	$R_{th(J-C)}$		1.17	$^\circ\text{C/W}$

Electrical Characteristics of IGBT

				Min	typ	max	
Collector to Emitter Breakdown Voltage	BV_{CES}	$I_C=250\mu A, V_{GE}=0V$	$T_C=25^\circ C$	650	-	-	V
Collector to Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=60A, V_{GE}=15V$	$T_C=25^\circ C$	-	2.0	-	V
			$T_C=125^\circ C$	-	2.5	-	V
Gate Threshold Voltage	$V_{GE(th)}$	$I_C=250\mu A, V_{CE}=V_{GE}$	$T_C=25^\circ C$	4.0	5.0	6.0	V
Zero Gate Voltage Collector current	I_{CES}	$V_{CE}=V_{CES}, V_{GS}=0V$	$T_C=25^\circ C$	-	-	200	μA
Gate to Emitter Leakage Current	I_{GES}	$V_{GE}=V_{GES}, V_{CE}=0V$	$T_C=25^\circ C$	-	-	± 400	nA
Input Capacitance	C_{ies}	$f=1MHz, V_{CE}=30V, V_{GE}=0V$	$T_C=25^\circ C$	-	6730	-	pF
Output Capacitance	C_{oes}			-	132	-	pF
Reverse Transfer Capacitance	C_{res}			-	62	-	pF
Gate charge	Q_G	$V_{CE}=400V, I_C=60A, V_G=15V$	$T_C=25^\circ C$	-	210	-	nC
Gate-Emitter Charge	Q_{GE}			-	65	-	nC
Gate-Collector Charge	Q_{GC}			-	70	-	nC
Turn-on Delay Time	$t_{d(on)}$	$V_{CC}=400V, I_C=60A, V_{GE}=15V, R_G=10\Omega,$	$T_C=25^\circ C$	-	70	-	ns
Rising Time	t_r		$T_C=25^\circ C$	-	160	-	ns
Turn-off Delay Time	$t_{d(off)}$		$T_C=25^\circ C$	-	190	-	ns
Falling Time	t_f		$T_C=25^\circ C$	-	140	-	ns
Turn-on Switching Loss	E_{on}		$T_C=25^\circ C$	-	3.8	-	mJ
Turn-off Switching Loss	E_{off}	$T_C=25^\circ C$	-	1.5	-	mJ	

Electrical Characteristics of Diode

				Min	typ	max	
Diode Forward Voltage	V_F	$I_F=30A$	$T_C=25^\circ C$	-	1.97	-	V
			$T_C=125^\circ C$	-	1.65	-	V
Diode Reverse Recovery Time	t_{rr}	$I_F=30A, di/dt=200A/\mu s$	$T_C=25^\circ C$	-	36	-	ns
Diode Reverse Recovery Charge	Q_{rr}		$T_C=25^\circ C$	-	80	-	nC

Typical Performance

Fig.1 Typical Output Characteristics

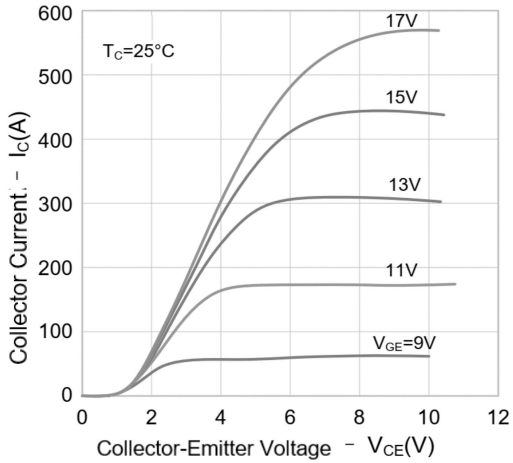


Fig.2 Typical Saturation Voltage Characteristics

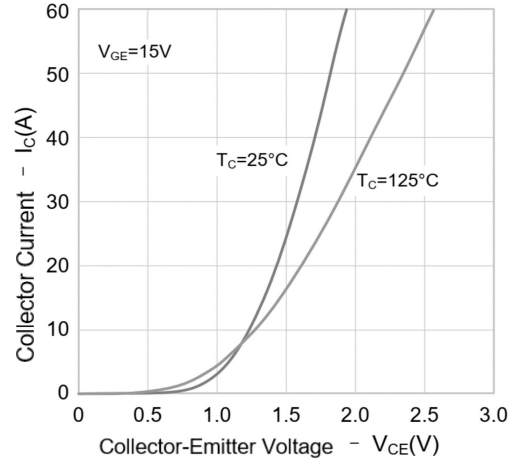


Fig.3 Typical Saturation Voltage vs. T_C

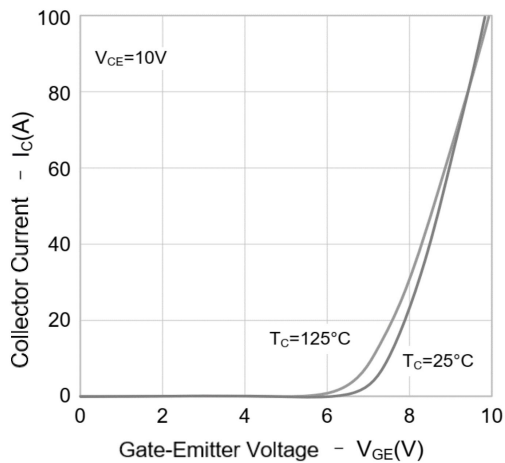


Fig.4 Typical collector-emitter saturation voltage as a function of junction temperature ($V_{GE}=15\text{V}$)

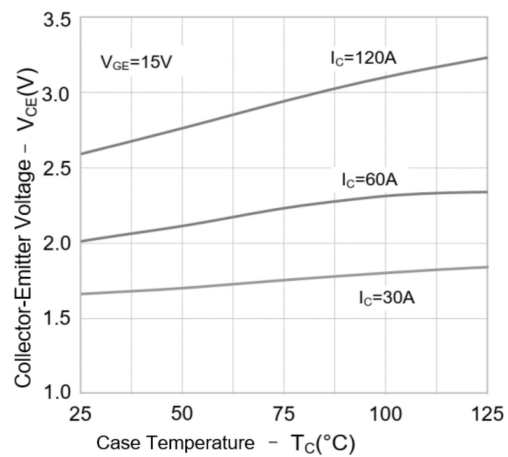


Fig.5 Typical Capacitance Characteristics

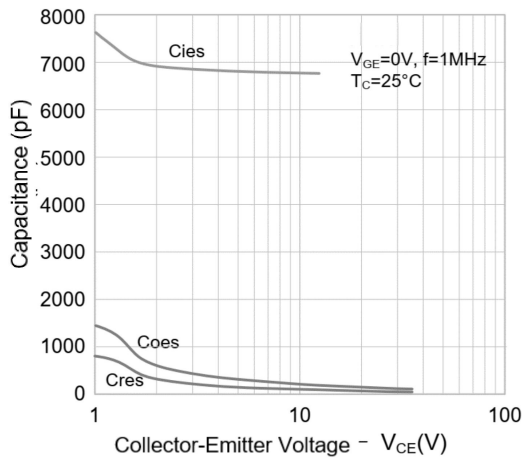
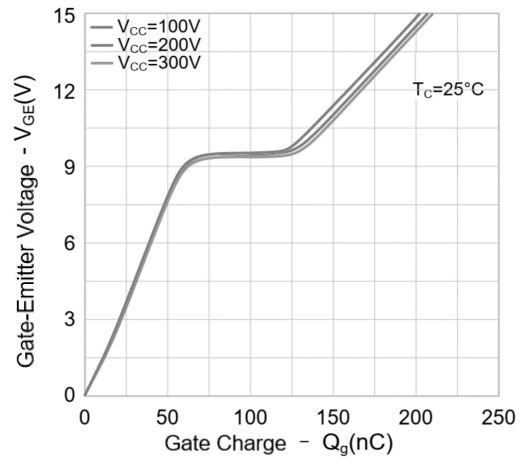


Fig.6 Typical gate charge



Typical Performance

Fig.7 Typical switching energy losses as a function of collector current

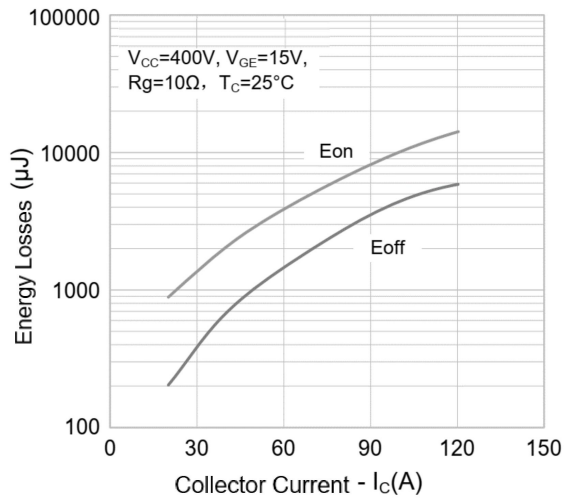


Fig.8 Typical diode forward current as a function of forward voltage

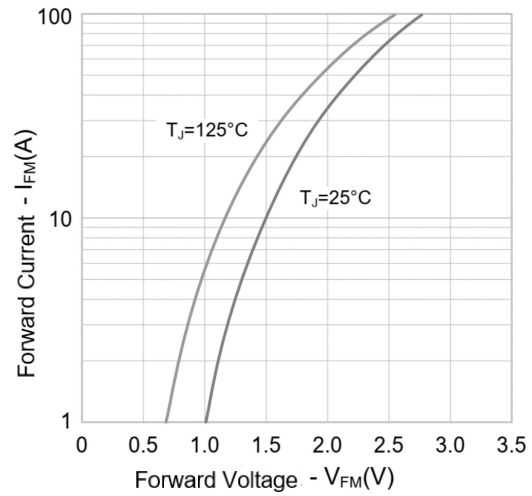
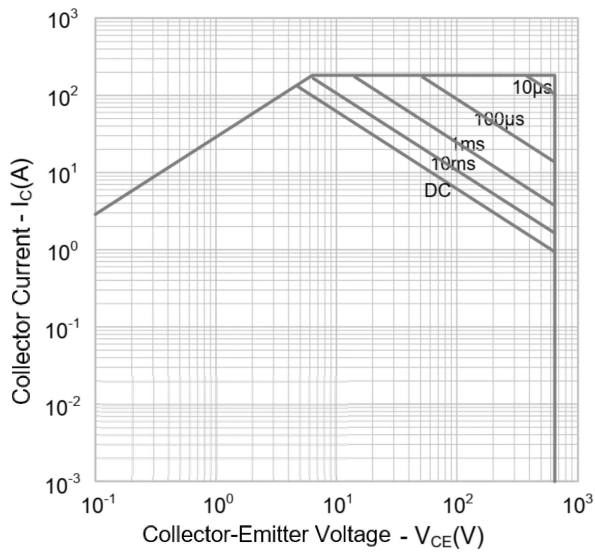


Fig.9 Forward bias safe operating area



Marking Information



Note:

COT: Company

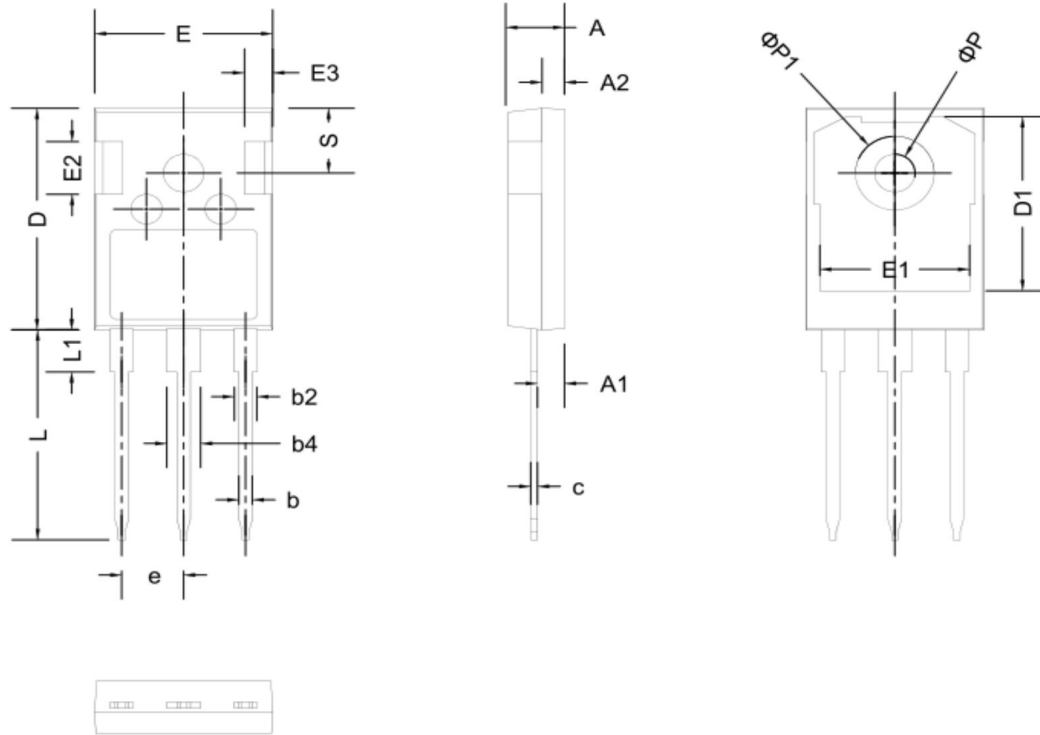
GB60N65: Product Type.

*****: *: Inner Code * : Year Code **: Week Code **: Lot Code

Ordering Information

Part	Package	Marking	Packing method
CTGB60N65	TO-247-3	60N65	Tube

Mechanical Dimensions for TO-247



SYMBOL	mm		
	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.21	2.41	2.59
A2	1.85	2.00	2.15
b	1.11	1.21	1.36
b2	1.91	2.01	2.21
b4	2.91	3.01	3.21
c	0.51	0.61	0.75
D	20.80	21.00	21.30
D1	16.25	16.55	16.85
E	15.50	15.80	16.10
E1	13.00	13.30	13.60
E2	4.80	5.00	5.20
E3	2.30	2.50	2.70
e	5.44 BSC		
L	19.62	19.92	20.22
L1	-	-	4.30
φ P	3.40	3.60	3.80
φ P1	-	-	7.30
S	6.16 BSC		