

## 1. Description

BLG40T120FUK is obtained by advanced Trench Field Stop (T-FS) technology which reduces the conduction loss, improve switching performance, and enhance the avalanche energy. The IGBT is suitable device for UPS, Welding, and high-speed switching.

### KEY CHARACTERISTICS

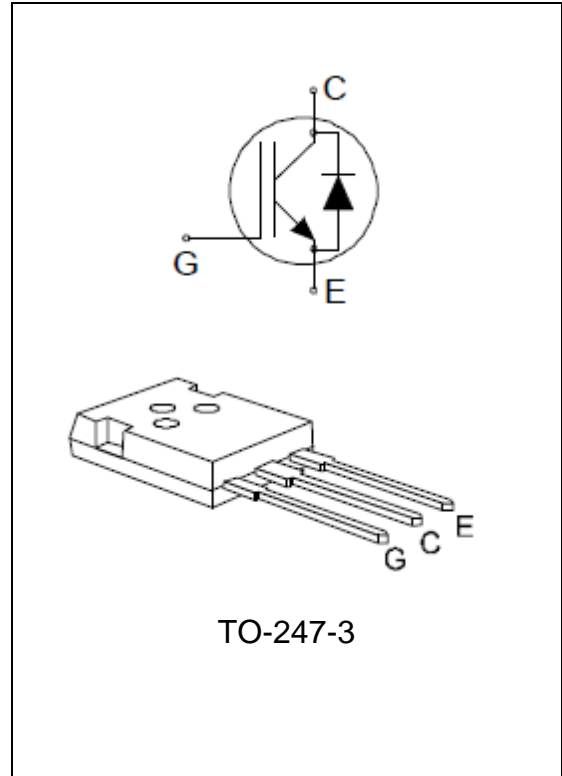
Parameter	Value	Unit
$V_{CES}$	1200	V
$I_C$	40	A
$V_{CE(sat).typ}$	2.1	V
$P_D (T_C=25^\circ C)$	367	W

### FEATURES

- Fast Switching
- Low  $V_{CE(sat)}$
- Positive temperature coefficient
- Very soft, fast recovery anti-parallel I diode
- RoHS product

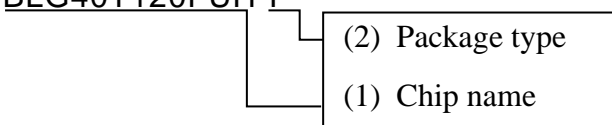
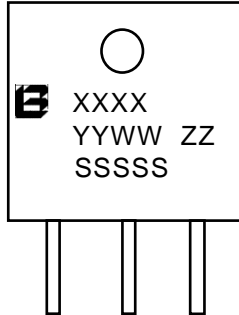
### APPLICATIONS

- UPS
- Welding Converters
- Converters with high switching frequency



## ORDERING INFORMATION

Ordering Codes	Package	Product Code	Packing
BLG40T120FUH-F	TO-247	G40T120FUH	Tube

<p>BLG40T120FUH-F</p>  <p>(1) BLG40T120FUH: 1200V 40A (2) F:TO-247</p>	 <p>XXXX: Product Code YYWW: Year &amp; Week ZZ: Assembly Code SSSSS: Lot Code</p>
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## 2. ABSOLUTE RATINGS

at  $T_C = 25^\circ\text{C}$ , unless otherwise specified

Symbol	Parameter	Rating	Units
$V_{CES}$	Collector-Emitter Voltage	1200	V
$I_C$	Collector Current @ $T_C=25^\circ\text{C}$	80	A
	Collector Current @ $T_C=100^\circ\text{C}$	40	A
$I_{CM}$	Pulsed Collector Current (Note1) @ $T_C=25^\circ\text{C}$	160	A
$I_F$	Diode Continuous Forward Current @ $T_C=25^\circ\text{C}$	40	A
	Diode Continuous Forward Current @ $T_C=100^\circ\text{C}$	20	A
$I_{FM}$	Diode Maximum Forward Current @ $T_C=25^\circ\text{C}$	80	A
$V_{GES}$	Gate-Emitter Voltage	$\pm 20$	V
$P_D$	Power Dissipation @ $T_C=25^\circ\text{C}$	367	W
$T_{Jmax}, T_{stg}$	Operating Junction and Storage Temperature Range	150, -55 to 150	$^\circ\text{C}$
$T_L$	Maximum Temperature for Soldering	260	$^\circ\text{C}$

## 3. Thermal characteristics

Symbol	Parameter	RATINGS	Units
$R_{\theta JC}$	Junction-to-Case (IGBT)	0.34	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Junction-to-Case (Diode)	0.8	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Junction-to-Ambient	40	$^\circ\text{C}/\text{W}$

## 4. Electrical Characteristics

at  $T_C = 25^\circ\text{C}$ , unless otherwise specified

OFF Characteristics						
Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
$V_{CES}$	Collector-Emitter Breakdown Voltage	$V_{GE}=0\text{V}$ , $I_C=250\mu\text{A}$	1200	--	--	V
$I_{CES}$	Collector-Emitter Leakage Current	$V_{CE}=1200\text{V}$ , $V_{GE}=0\text{V}$	--	--	250	$\mu\text{A}$
$I_{GES(F)}$	Gate-Emitter Leakage Current	$V_{GE}=+20\text{V}$	--	--	600	nA
$I_{GES(R)}$	Gate-Emitter Reverse Leakage	$V_{GE}=-20\text{V}$	--	--	-600	nA

### ON Characteristics

Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$V_{GE} = 15V$ , $I_C = 40A$	--	2.1	2.6	V
$V_{GE(TH)}$	Gate Threshold Voltage	$V_{CE} = V_{GE}$ , $I_C = 1mA$	5.0	5.8	6.5	V

Pulse width  $t_p \leq 300\mu s$ ,  $\delta \leq 2\%$

### Dynamic Characteristics

Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
$C_{iss}$	Input Capacitance	$V_{GE}=0V$ $V_{CE}=25V$ $f=1.0MHz$	--	3633	--	pF
$C_{oss}$	Output Capacitance		--	150	--	
$C_{rss}$	Reverse Transfer Capacitance		--	90	--	
$Q_g$	Total Gate Charge	$I_C=40A$ , $V_{CE}=960V$ $V_{GE}=15V$	--	270	--	nC

### Switching Characteristics

Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	$I_C = 40A$ $V_{CE} = 600V$ $V_{GE} = 15V$ $R_G = 10\Omega$ $T_J = 25^\circ C$ Inductive Load	--	54	--	ns
$t_r$	Rise Time		--	100	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	245	--	
$t_f$	Fall Time		--	33	--	
$E_{on}$	Turn-On Switching Loss		--	5.5	--	mJ
$E_{off}$	Turn-Off Switching Loss		--	1.1	--	
$E_{ts}$	Total Switching Loss		--	6.6	--	

### Diode Characteristics

Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
$V_F$	Diode Forward Voltage	$I_F=20A$	--	2	2.5	V
$T_{rr}$	Reverse Recovery Time	$I_F=20A$ $di/dt=200A/\mu s$ $T_J=25^\circ C$	--	60	--	ns
$Q_{rr}$	Reverse Recovery Charge		--	413	--	nC
$I_{rrm}$	Reverse Recovery Current		--	12.3	--	A

Note1: Pulse width limited by maximum junction temperature

## 5. Characteristics Curves

Figure 1. Forward Bias Safe Operating Area

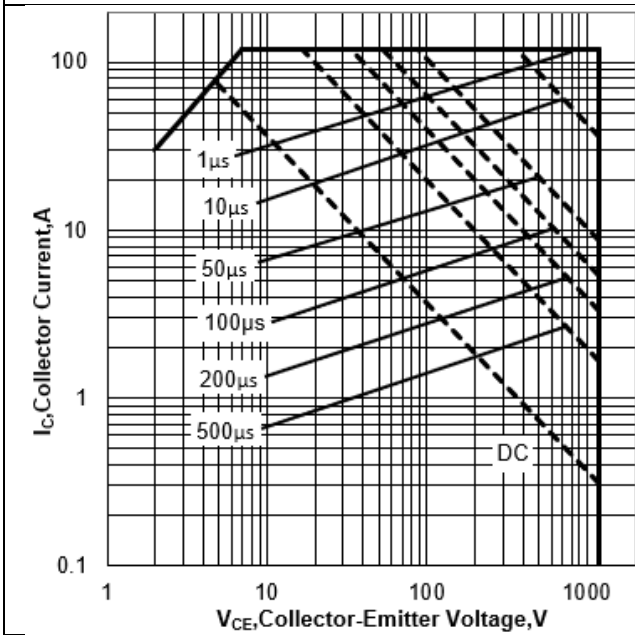


Figure 2. Power Dissipation vs Case Temperature

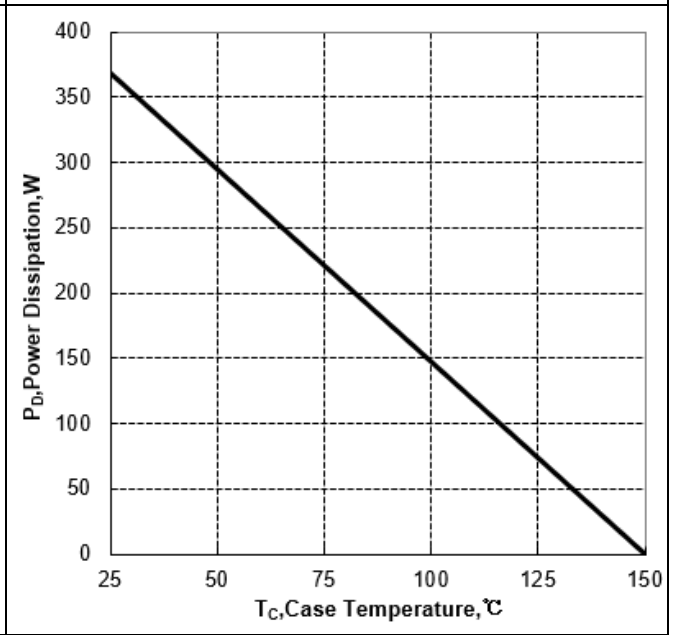


Figure 3. Collector Current vs Case Temperature

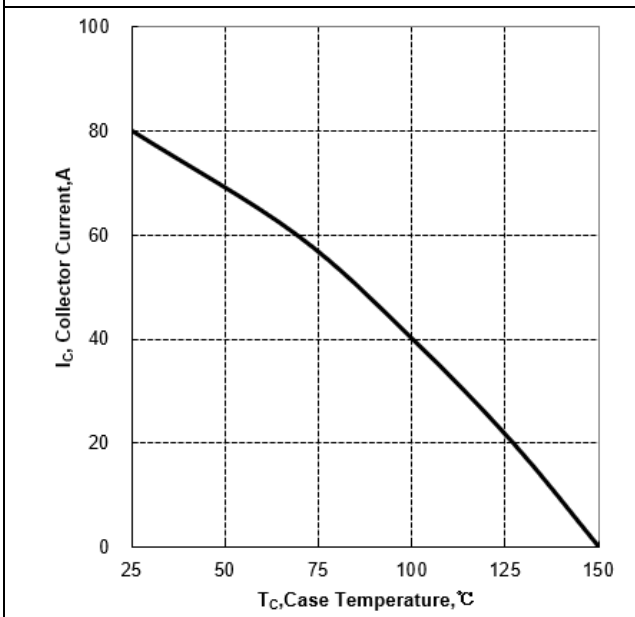
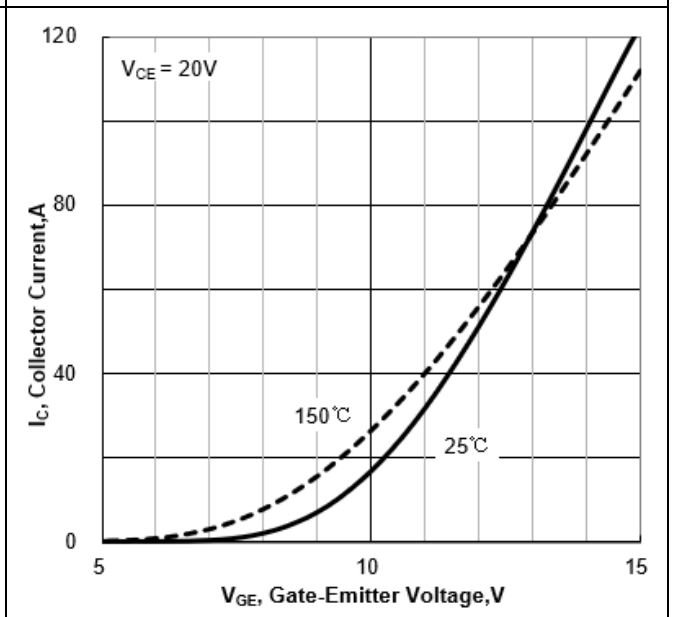
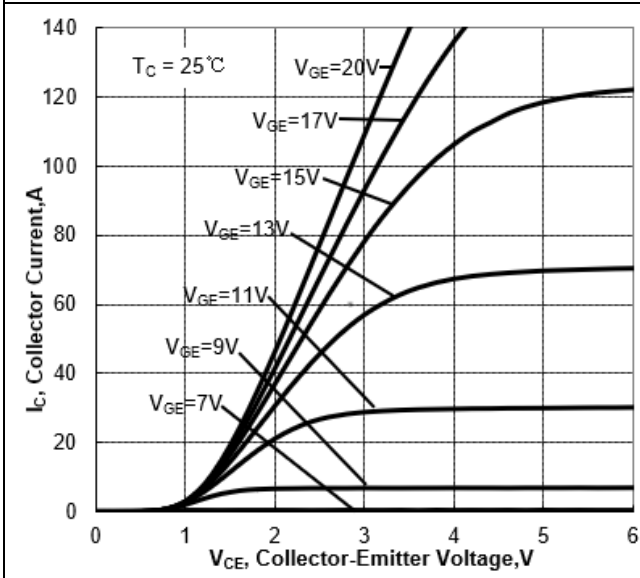


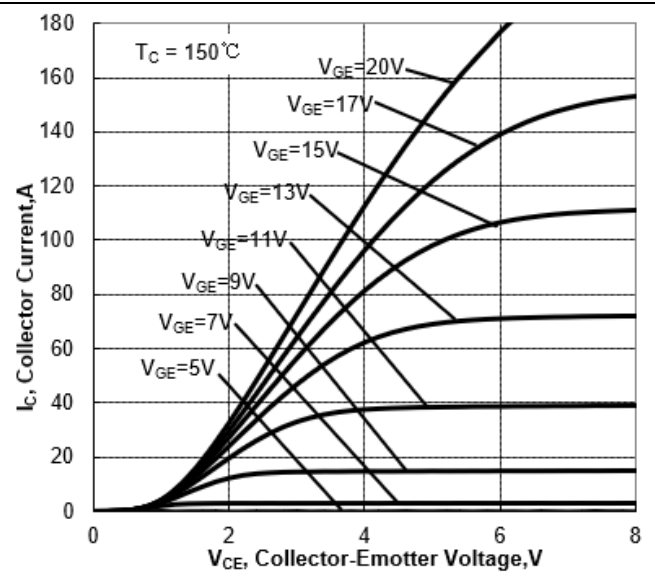
Figure 4. Typical Transfer Characteristics



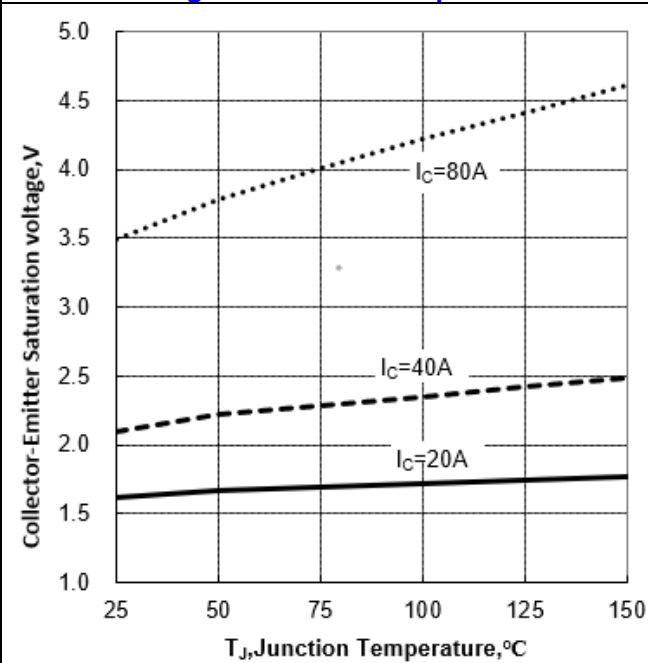
**Figure 5. Typical Output Characteristics(T=25°C)**



**Figure 6. Typical Output Characteristics(T=150°C)**



**Figure 7. Typical Collector-Emmitter Saturation Voltage vs Junction Temperature**



**Figure 8. Typical Transfer Characteristics**

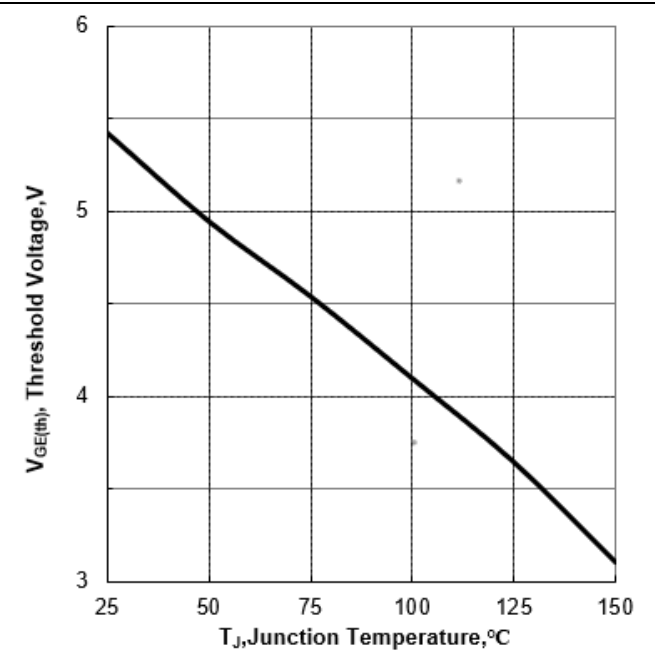


Figure 9. Typical Gate Charge

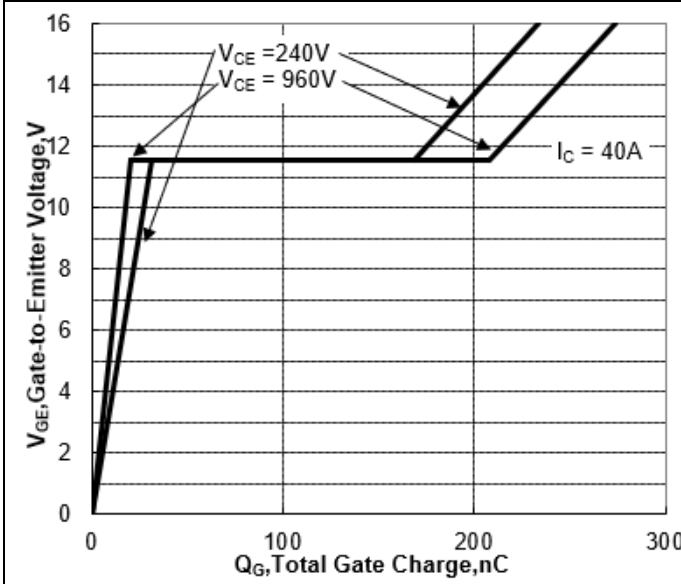


Figure 10. Typical Capacitance vs Collector-Emitter Voltage

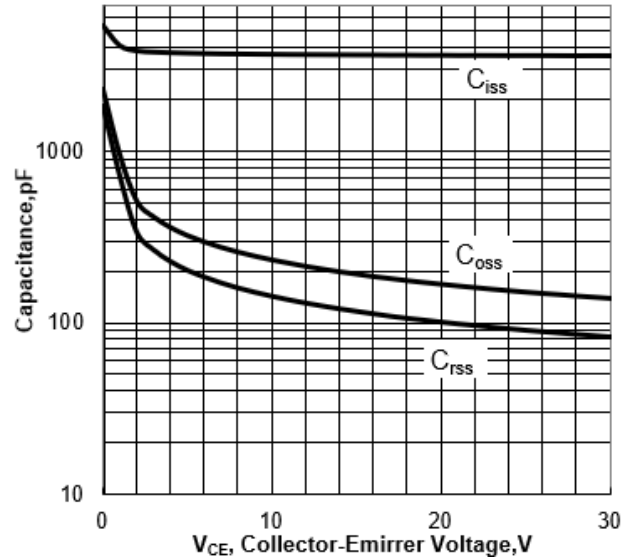


Figure 11. IGBT Transient Thermal Impedance vs Pulse Width

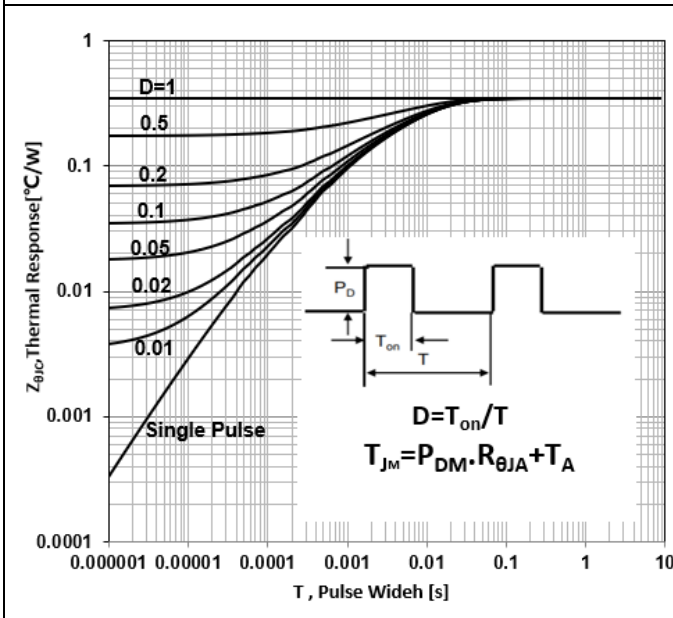


Figure 12. Diode Transient Thermal Impedance vs Pulse Width

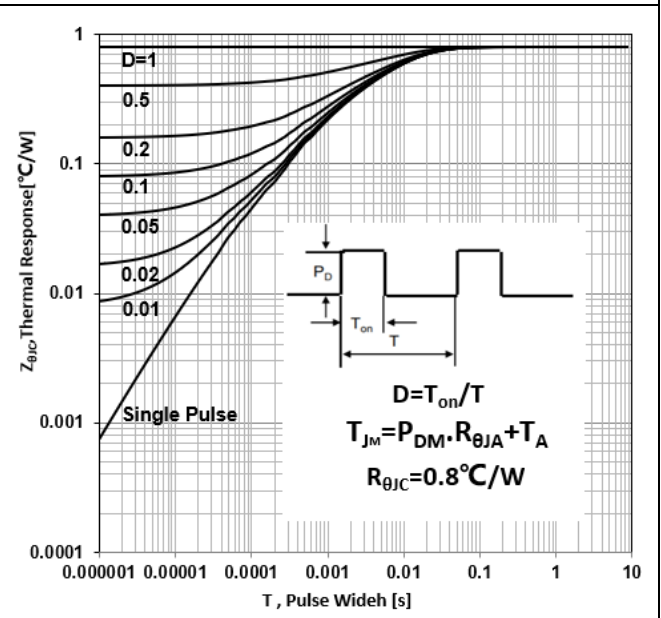
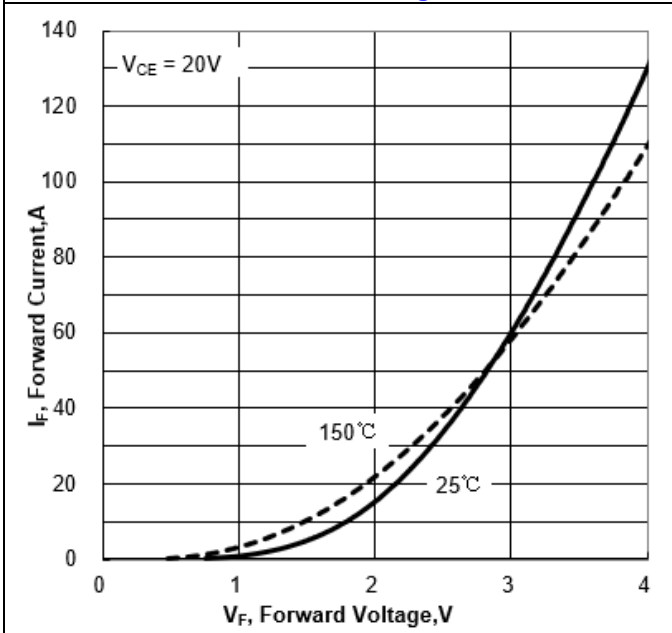
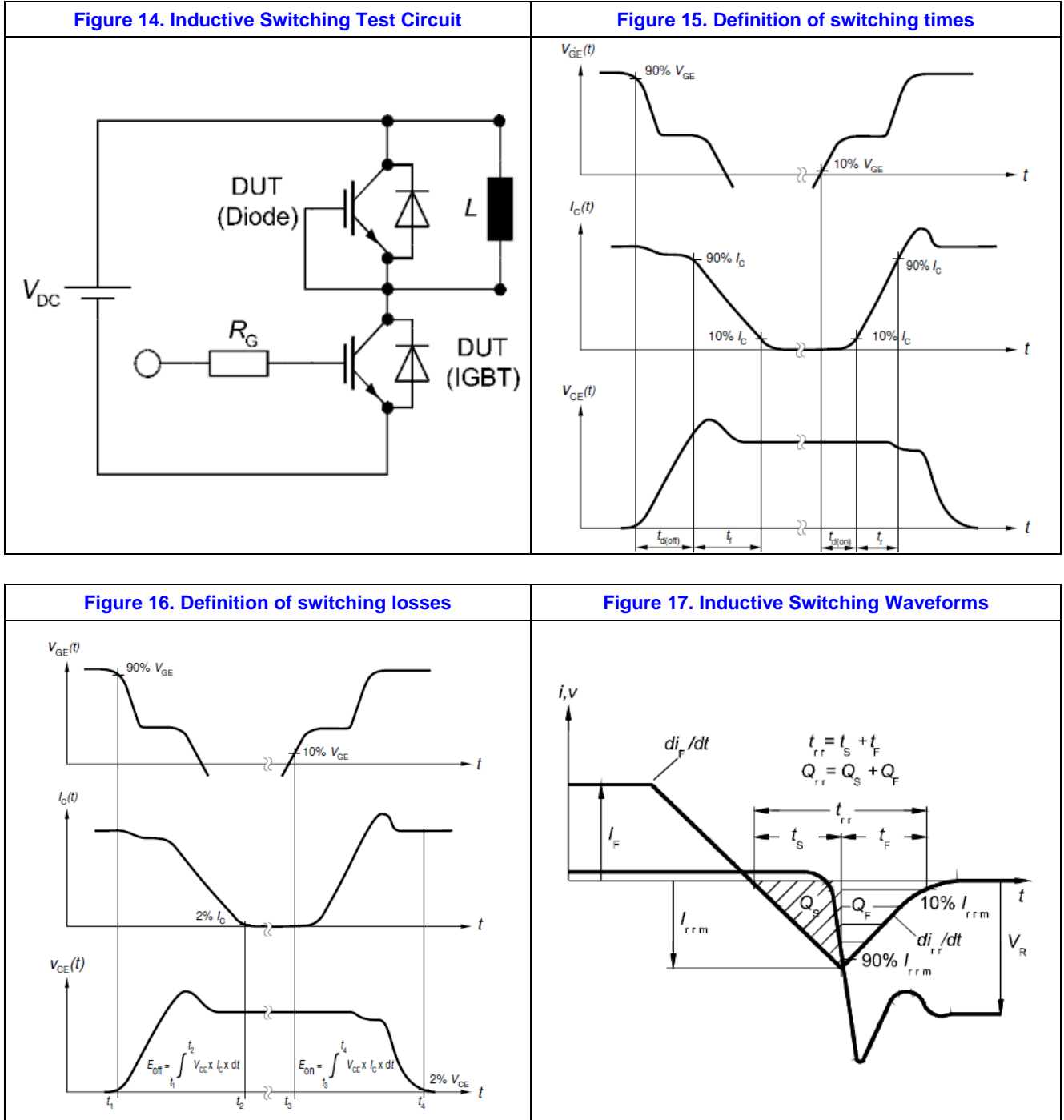


Figure 13. Typical Diode Forward Current vs Forward Voltage

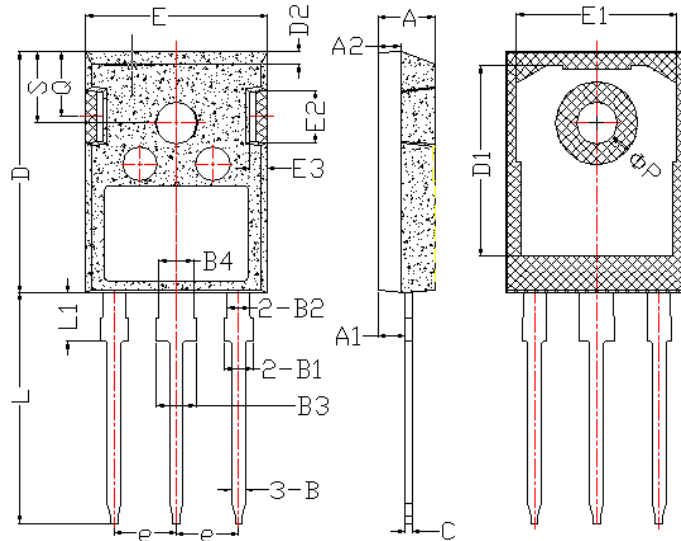


## 6. Test Circuit and Waveform





## 7. Package Description



Items	Values(mm)	
	MIN	MAX
A	4.90	5.16
A1	2.27	2.53
A2	1.85	2.11
B	1.07	1.33
B1	1.90	2.41
B2	1.75	2.15
B3	2.87	3.38
B4	2.87	3.13
C	0.55	0.68
D	20.82	21.10
D1	16.25	17.65
D2	1.05	1.35
E	15.70	16.03
E1	13.10	14.15
E2	3.68	5.10
E3	1.68	2.60
e	5.44	
L	19.80	20.31
L1	4.17	4.47
ΦP	3.50	3.70
Q	5.49	6.00
S	6.04	6.30

TO-247 Package

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