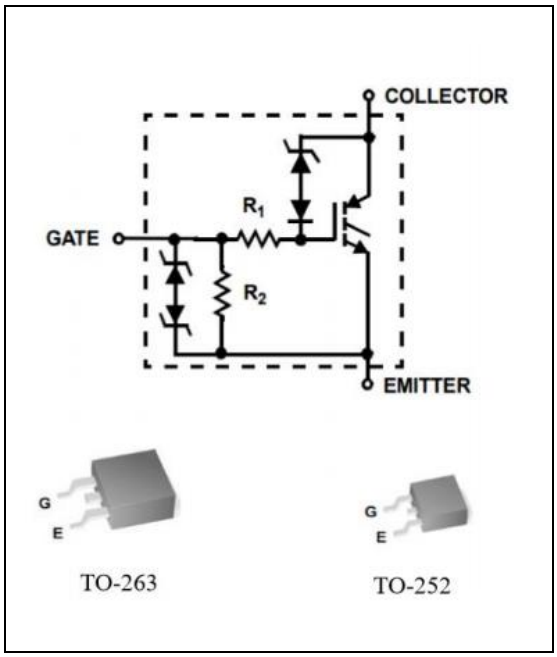
BLG3040 platform

IGBT

1. Description

➢ Advantages

BLG3040 product platform is obtained by advanced ignition IGBTs technology which reduce the conduction loss, enhance the SCIS capability. Internally integrated diodes can provide the voltage clamping without the need for external components. The IGBT is suitable device for automotive ignition circuits, specifically as a coil driver.



➢ Key Characteristics

Parameter	BLG3040	BLQG 3040	BLQG 3040A	Unit
$V_{CES.Typ}$	425	400	400	V
$V_{CE(sat).Typ}$	1.25	1.2	1.12	V
E_{SCIS}@TJ=25 ℃	300	300	300	mJ
ESD	4	4	4	kV

➢ Features

- Low V_{CEsat}
- High SCIS Energy
- Logic Level Gate Drive
- AEC-Q101 Qualified

➢ Applications

- Automotive ignition Coil Driver Circuits
- Coil-On Plug Application

➢ Ordering Informations

Product Code	Ordering Codes	Package	Device Marking	Packing
BLG3040	BLG3040-D	TO-252	G3040	Tape Reel
	BLG3040-B	TO-263		Tape Reel
BLQG3040	BLQG3040-D	TO-252	QG3040	Tape Reel
	BLQG3040-B	TO-263		Tape Reel
BLQG3040A	BLQG3040A-D	TO-252	QG3040A	Tape Reel
	BLQG3040A-B	TO-263		Tape Reel

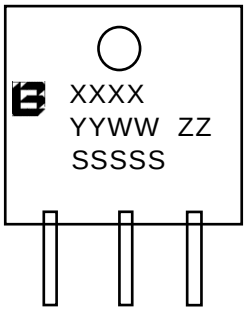
BLG3040-D,B
BLQG3040-B,D
BLQG3040A-D

(2) Package type

(1) Chip name

(1) BLG3040:425V 300mJ;
BLQG3040:400V 300mJ;
BLQG3040A: 400V 300mJ

(2) B:TO-263 D:TO-252



XXXX：Device Marking

YYWW：Year & Week

ZZ：Assembly Code

SSSSS：Lot Code

2. Absolute Ratings

at T_C = 25°C, unless otherwise specified

Symbol	Parameter	BLG3040	BLQG3040	BLQG3040A	Units
V_{CES}	Collector-Emitter Voltage（I_C=2mA, R_G=1kΩ）	455	430	430	V
V_{ECS}	Emitter to Collector Voltage（I_C=10mA）	24	24	24	V
E_{SCIS}	SCIS Energy@ T_J=25 °C,I_{SCIS}=14.2A,L=3mH,Rg=1KΩ	300	300	300	mJ
	SCIS Energy@ T_J=150 °C,I_{SCIS}=10.6A,L=3mH,Rg=1KΩ	170	170	170	mJ
I_C	Collector Current @T_C=25 °C	21	21	21	A
	Collector Current @T_C=100 °C	17	17	17	A
ESD	Electrostatic Discharge Voltage (HBM) at 100pF,1500Ω	4	4	4	kV
V_{GEM}	Gate- Emitter Voltage Continuous	±10	±10	±10	V
P_D	Power Dissipation @TC = 25 °C	150	150	150	W
T_J，T_{stg}	Operating Junction and Storage Temperature Range	175, -40 to 175	175, -40 to 175	175, -40 to 175	°C
T_L	Maximum Temperature for Soldering	260	260	260	°C

3. Thermal Characteristics

Symbol	Parameter	Package	RATINGS	Units
$R_{\theta JC}$	Junction-to-Case	TO-252/TO-263	1.0	°C /W

4. Electrical Characteristics

T_C = 25°C, unless otherwise specified

BLG3040 OFF Characteristics

Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
BV_{CER}	Collector to Emitter Breakdown Voltage	V_{GE}=0V, I_C=2mA, R_G=1kΩ	395	425	455	V
BV_{CES}	Collector to Emitter Breakdown Voltage	V_{GE}=0V, I_C =10mA, R_G=0Ω	410	440	470	V
BV_{ECS}	Emitter to Collector Breakdown Voltage	V_{GE}=0V, I_C=-75mA	30	--	--	V
BV_{GES}	Gate to Emitter Breakdown Voltage	I_{GES}=±2mA	±12	±14		V
I_{CER}	Collector to Emitter Leakage Current	V_{CE}=250V, R_G=1kΩ, T_J=25°C	--	--	25	μA
		V_{CE}=250V, R_G=1kΩ, T_J=150°C	--	--	1	mA
I_{ECS}	Emitter to Collector Leakage Current	V_{EC}=24V, T_J=25°C	--	--	1	mA
		V_{EC}=24V, T_J=150°C			40	mA
R_1	Series Gate Resistance		--	70		Ω
R_2	Gate to Emitter Resistance		10		26	kΩ

BLQG3040 OFF Characteristics						
Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
BV_{CER}	Collector to Emitter Breakdown Voltage	V_{GE}=0V, I_C=2mA, R_G=1kΩ	370	400	430	V
BV_{CES}	Collector to Emitter Breakdown Voltage	V_{GE}=0V, I_C =10mA, R_G=0Ω	390	410	450	V
BV_{ECS}	Emitter to Collector Breakdown Voltage	V_{GE}=0V, I_C=-75mA	30	--	--	V
BV_{GES}	Gate to Emitter Breakdown Voltage	I_{GES}=±2mA	±12	±14		V
I_{CER}	Collector to Emitter Leakage Current	V_{CE}=250V, R_G=1kΩ, T_J=25°C	--	--	25	μA
		V_{CE}=250V, R_G=1kΩ, T_J=150°C	--	--	1	mA
I_{ECS}	Emitter to Collector Leakage Current	V_{EC}=24V, T_J=25°C	--	--	1	mA
		V_{EC}=24V, T_J=150°C	--	--	40	mA
R_1	Series Gate Resistance		--	70	--	Ω
R_2	Gate to Emitter Resistance		10		26	kΩ

BLQG3040A OFF Characteristics						
Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
BV_{CER}	Collector to Emitter Breakdown Voltage	V_{GE}=0V, I_C=2mA, R_G=1kΩ	370	400	430	V
BV_{CES}	Collector to Emitter Breakdown Voltage	V_{GE}=0V, I_C =10mA, R_G=0Ω	390	410	450	V
BV_{ECS}	Emitter to Collector Breakdown Voltage	V_{GE}=0V, I_C=-75mA	30	--	--	V
BV_{GES}	Gate to Emitter Breakdown Voltage	I_{GES}=±2mA	±12	±14		V
I_{CER}	Collector to Emitter Leakage Current	V_{CE}=250V, R_G=1kΩ, T_J=25°C	--	--	25	μA
		V_{CE}=250V, R_G=1kΩ, T_J=150°C	--	--	1	mA
I_{ECS}	Emitter to Collector Leakage Current	V_{EC}=24V, T_J=25°C	--	--	1	mA
		V_{EC}=24V, T_J=150°C			40	mA
R_1	Series Gate Resistance		--	82		Ω
R_2	Gate to Emitter Resistance		10		26	kΩ

BLG3040 ON Characteristics						
Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	V_{GE}=4V, I_C=6A, T_J=25°C	--	1.20	1.60	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	V_{GE}=4.5V,I_C=10A,T_J=175°C	--	1.52	1.80	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	V_{GE}=4.5V,I_C=15A,T_J=175°C	--	1.90	2.20	V
$V_{GE(TH)}$	Gate Threshold Voltage	V_{CE} = V_{GE}, I_C = 1mA	1.30	--	2.20	V
Pulse width tp≤300μs, δ≤2%						

BLQG3040 ON Characteristics						
Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	V_{GE}=4V, I_C=6A, T_J=25°C	--	1.20	1.60	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	V_{GE}=4.5V,I_C=10A,T_J=175°C	--	1.35	1.80	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	V_{GE}=4.5V,I_C=15A,T_J=175°C	--	1.80	2.20	V
$V_{GE(TH)}$	Gate Threshold Voltage	V_{CE} = V_{GE}, I_C = 1mA	1.30	--	2.20	V
Pulse width tp≤300μs, δ≤2%						

BLQG3040A ON Characteristics						
Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	V_{GE}=4V, I_C=6A, T_J=25°C	--	1.12	1.40	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	V_{GE}=4.5V,I_C=10A,T_J=175°C	--	1.40	1.70	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	V_{GE}=4.5V,I_C=15A,T_J=175°C	--	1.80	2.10	V
$V_{GE(TH)}$	Gate Threshold Voltage	V_{CE} = V_{GE}, I_C = 1mA	1.30	--	2.20	V
Pulse width tp≤300μs, δ≤2%						

BLG3040 Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
C_{iss}	Input Capacitance	V_{GE} = 0V V_{CE} = 25V f=1.0MHz	--	1250	--	pF
C_{oss}	Output Capacitance		--	69	--	
C_{rss}	Reverse Transfer Capacitance		--	15	--	
Q_g	Total Gate Charge	I_C=10A, V_{CE}=12V, V_{GE}=5V	--	7.2	--	nC

BLQG3040 Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
C_{iss}	Input Capacitance	V_{GE} = 0V V_{CE} = 25V f=1.0MHz	--	1165	--	pF
C_{oss}	Output Capacitance		--	68	--	
C_{rss}	Reverse Transfer Capacitance		--	8	--	
Q_g	Total Gate Charge	I_C=10A, V_{CE}=12V, V_{GE}=5V	--	7.5	--	nC
BLQG3040A Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
C_{iss}	Input Capacitance	V_{GE} = 0V V_{CE} = 25V f=1.0MHz	--	1050	--	pF
C_{oss}	Output Capacitance		--	62	--	
C_{rss}	Reverse Transfer Capacitance		--	7.5	--	
Q_g	Total Gate Charge	I_C=10A, V_{CE}=12V, V_{GE}=5V	--	6.8	--	nC

BLG3040 Switching Characteristics						
Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	V_{CE} = 14V, RL=1Ω, V_{GE} = 5V, R_G =1kΩ, T_J=25°C	--	0.85	4	μs
tr	Rise Time		--	2.50	7	
$t_{d(OFF)}$	Turn-Off Delay Time	V_{CE} = 300V, L=500μH, V_{GE} = 5V, R_G =1kΩ, T_J=25°C	--	4.40	15	
t_f	Fall Time		--	1.90	15	
BLQG3040 Switching Characteristics						
Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	V_{CE} = 14V, RL=1Ω, V_{GE} = 5V, R_G =1kΩ, T_J=25°C	--	1	4	μs
tr	Rise Time		--	2.6	7	
$t_{d(OFF)}$	Turn-Off Delay Time	V_{CE} = 300V, L=500μH, V_{GE} = 5V, R_G =1kΩ, T_J=25°C	--	6.5	15	
t_f	Fall Time		--	2.8	15	
BLQG3040A Switching Characteristics						
Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	V_{CE} = 14V, RL=1Ω, V_{GE} = 5V, R_G =1kΩ, T_J=25°C	--	0.5	4	μs
tr	Rise Time		--	3	7	
$t_{d(OFF)}$	Turn-Off Delay Time	V_{CE} = 300V, L=500μH, V_{GE} = 5V, R_G =1kΩ, T_J=25°C	--	5.5	15	
t_f	Fall Time		--	3	15	

5. Characteristics Curves
BLG3040

Figure 1 Collector-Emitter Saturation Voltage vs Junction Temperature

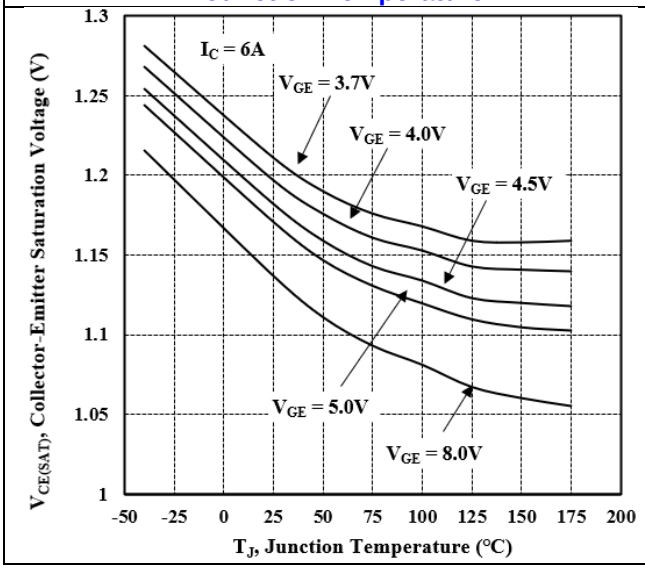


Figure 2 Collector-Emitter Saturation Voltage vs Junction Temperature

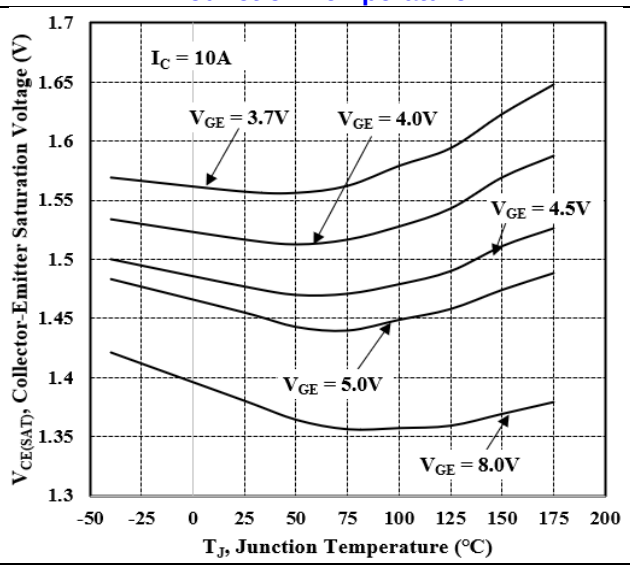


Figure 3 Self Clamped Inductive Switching Current vs Inductance

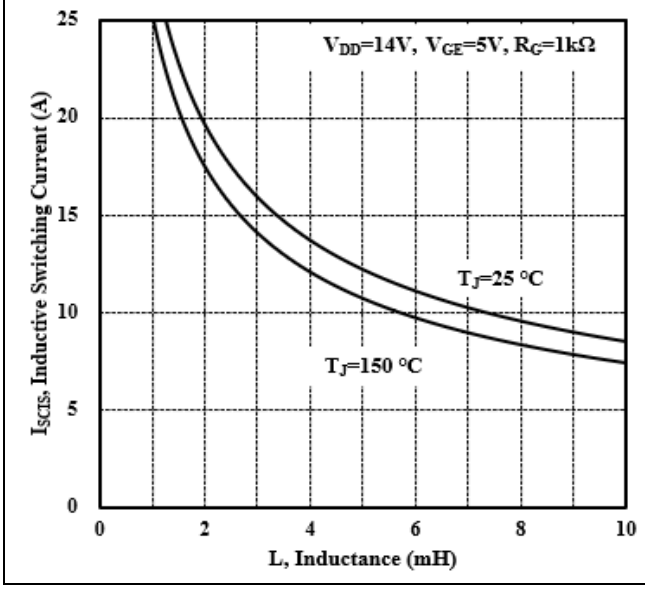


Figure 4 Self Clamped Inductive Switching Current vs Inductance

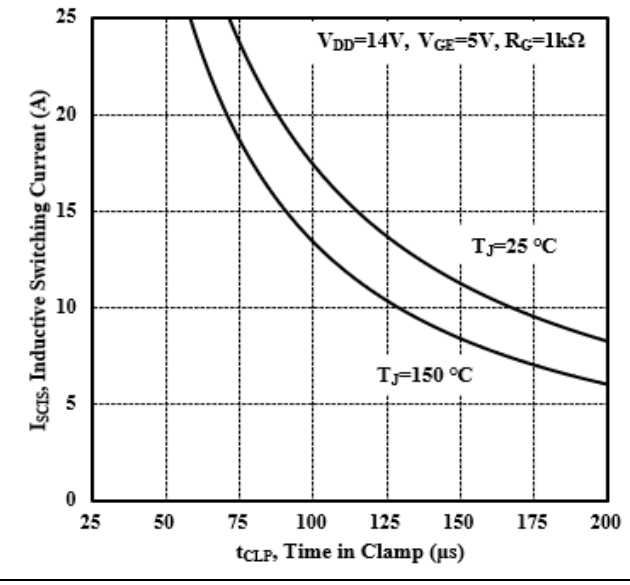


Figure 5 Power Dissipation vs Case Temperature

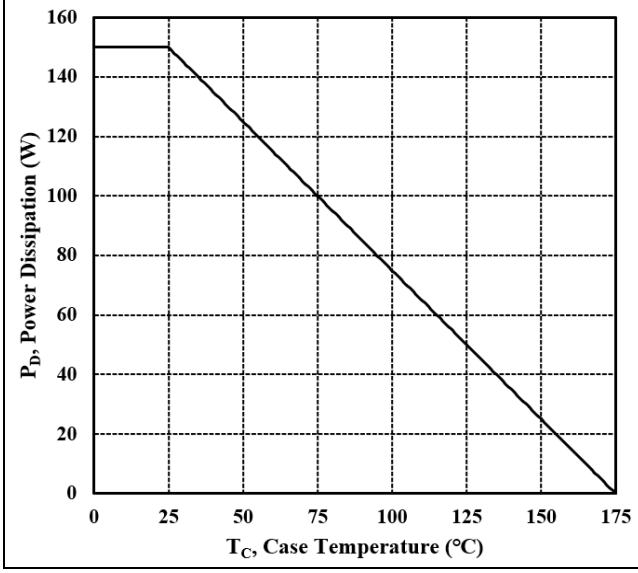


Figure 6. DC Collector Current vs Case Temperature

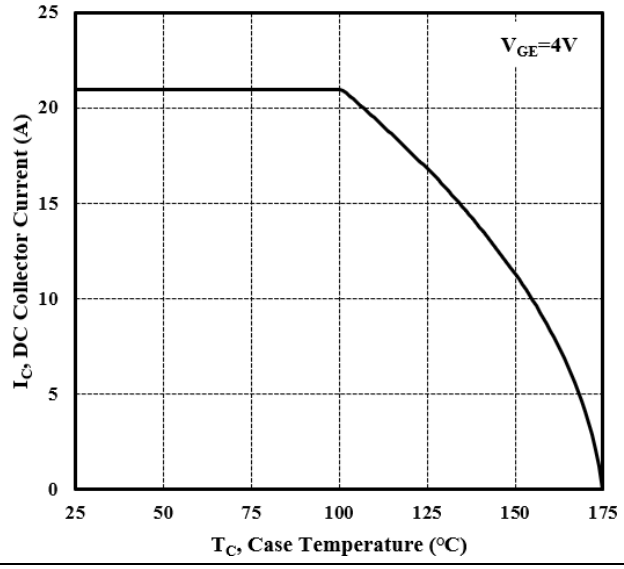


Figure 7 Threshold Voltage vs Junction Temperature

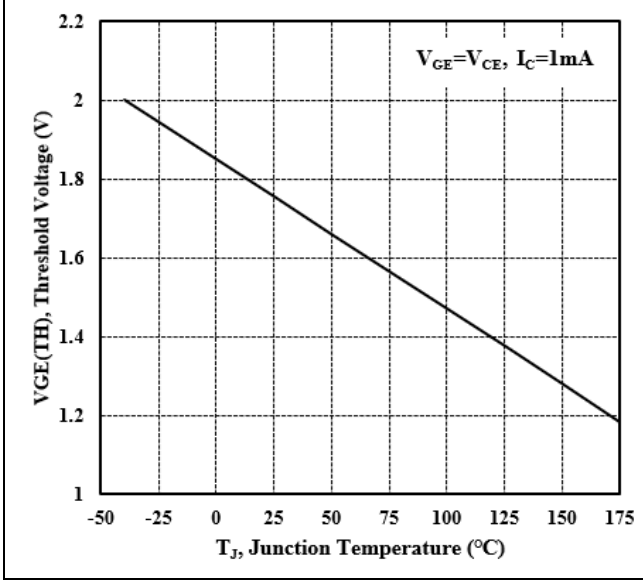


Figure 8 Breakdown Voltage vs Series Gate Resistance

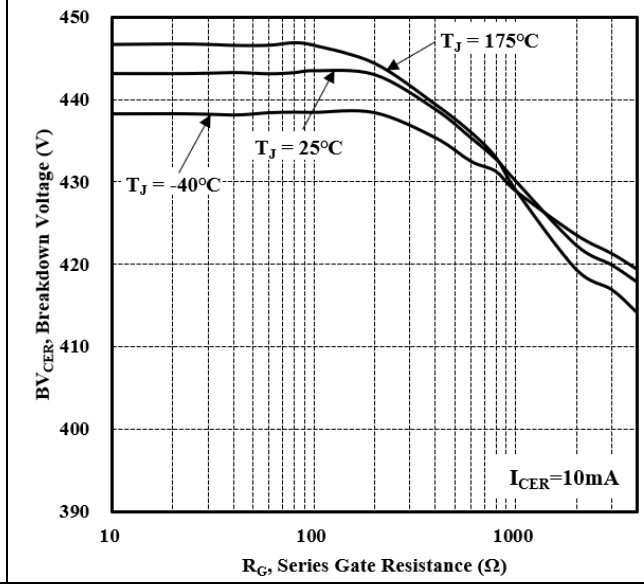


Figure 9 Leakage Current vs Junction Temperature

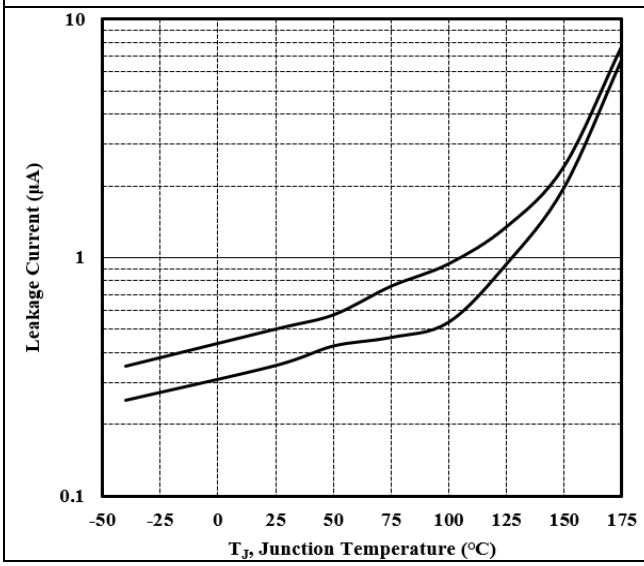


Figure 10 Collector-Emitter Voltage vs Collector Current

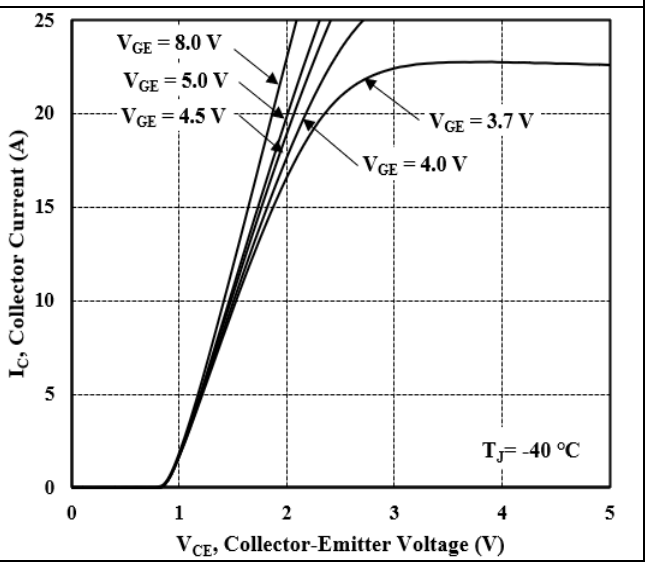


Figure 11 Collector-Emitter Voltage vs Collector Current

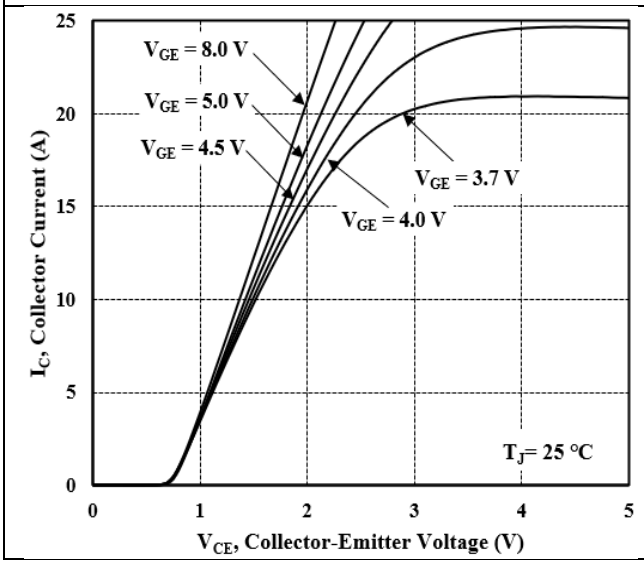


Figure 12 Collector-Emitter Voltage vs Collector Current

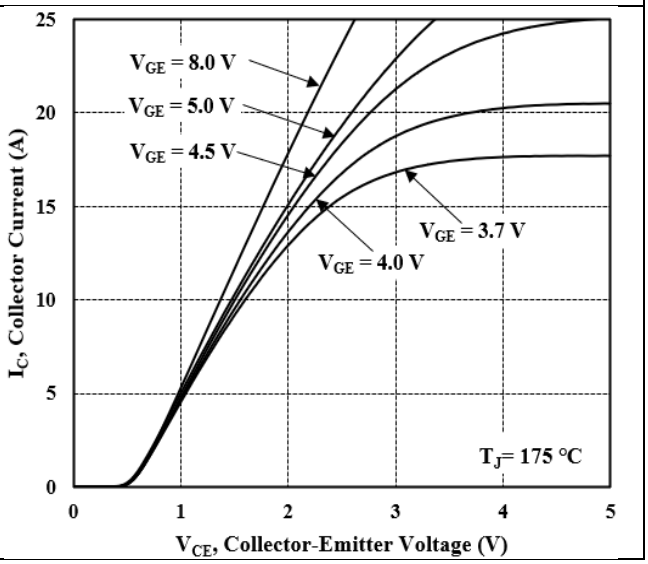


Figure 13 Transfer Characteristics

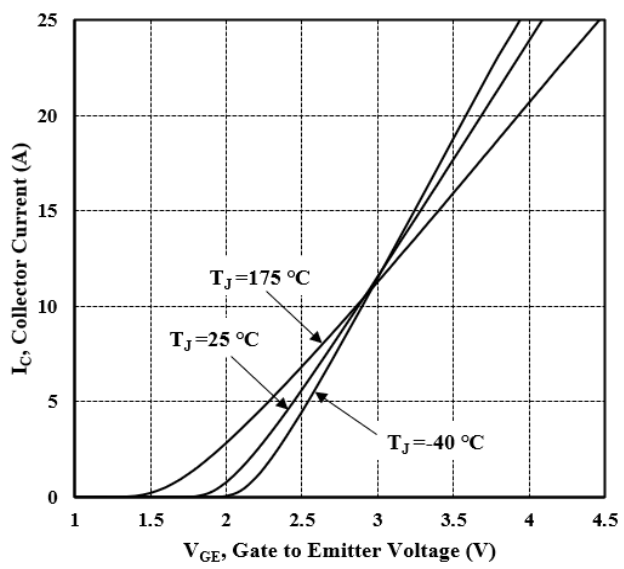


Figure 14 Capacitance vs Collector to Emitter Voltage

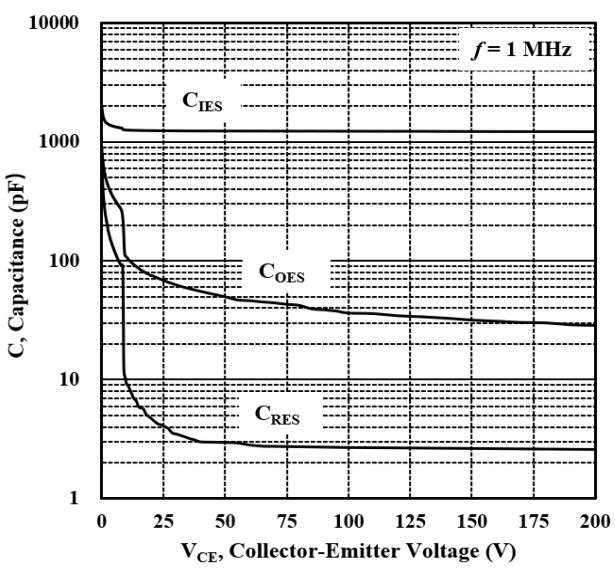


Figure 15 Gate Charge vs Gate to Emitter Voltage

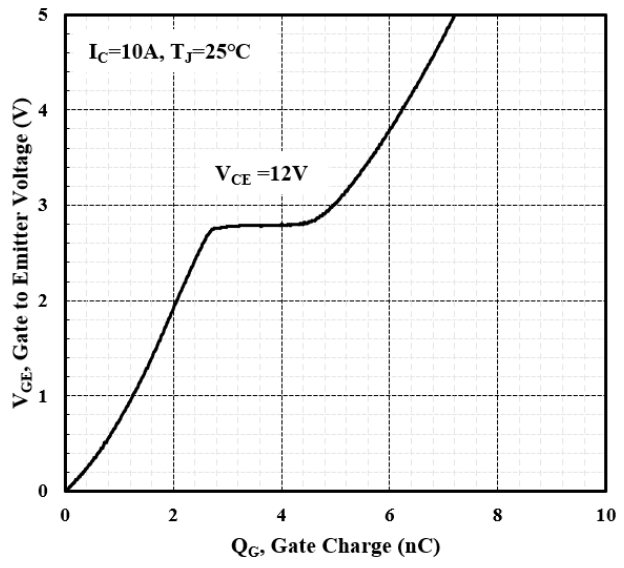


Figure 16 Switching Time vs Junction Temperature

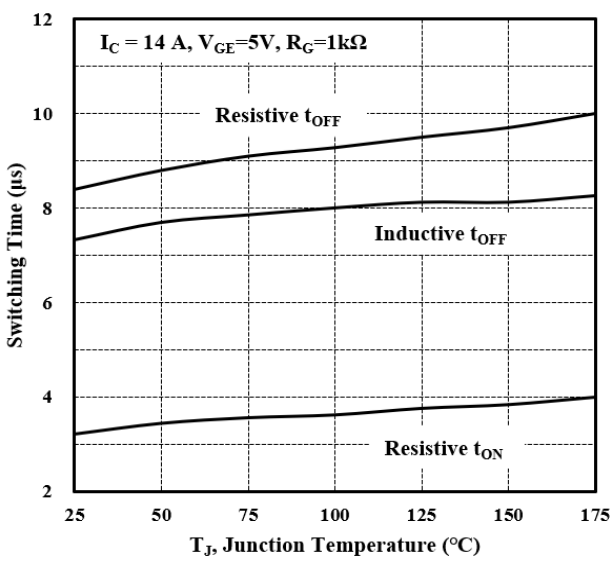
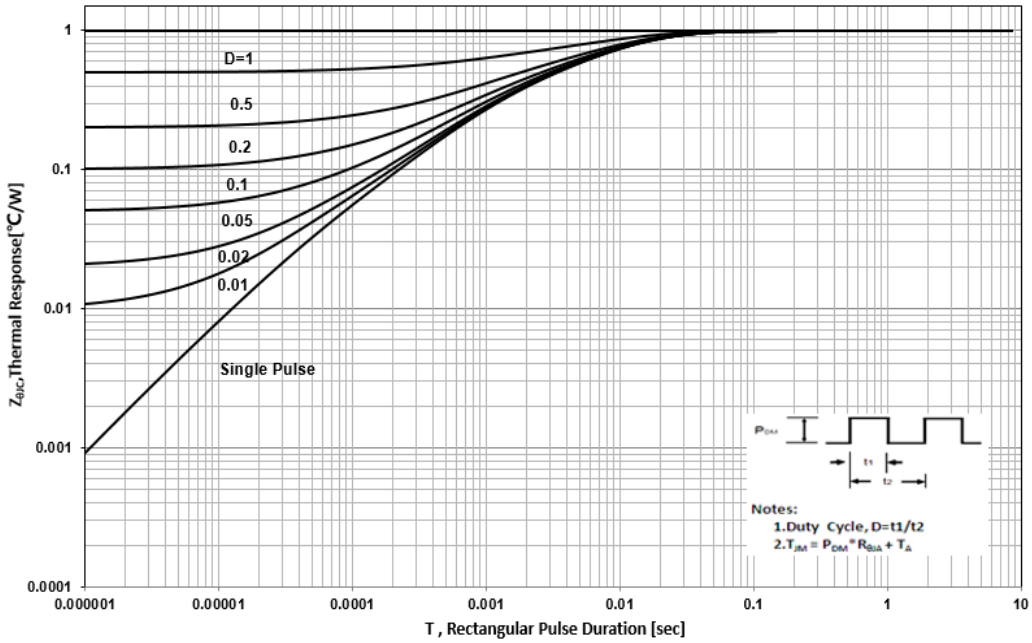


Figure 17 Transient Thermal Impedance, Junction to Case



BLQG3040

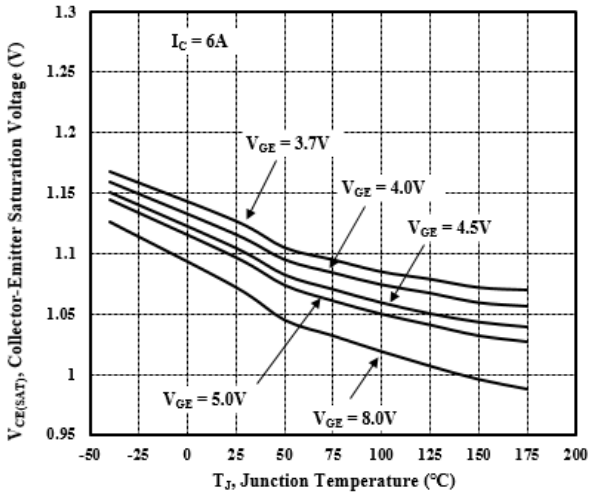
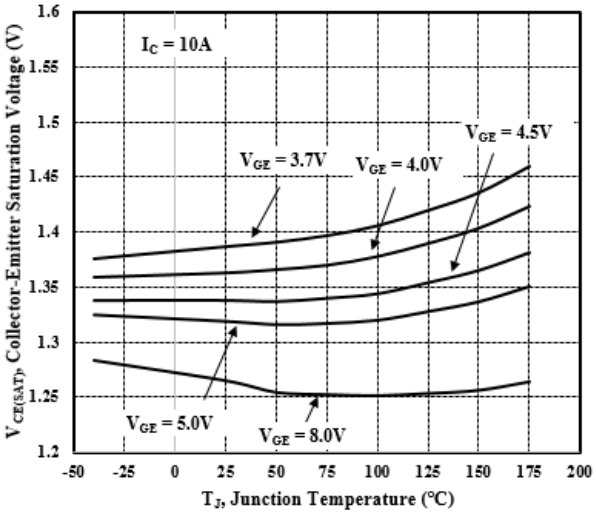
Figure 1 Collector-Emitter Saturation Voltage vs Junction Temperature	Figure 2 Collector-Emitter Saturation Voltage vs Junction Temperature
	

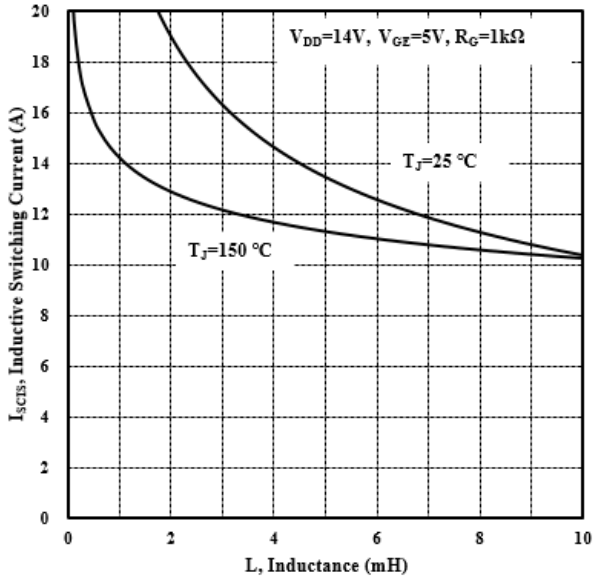
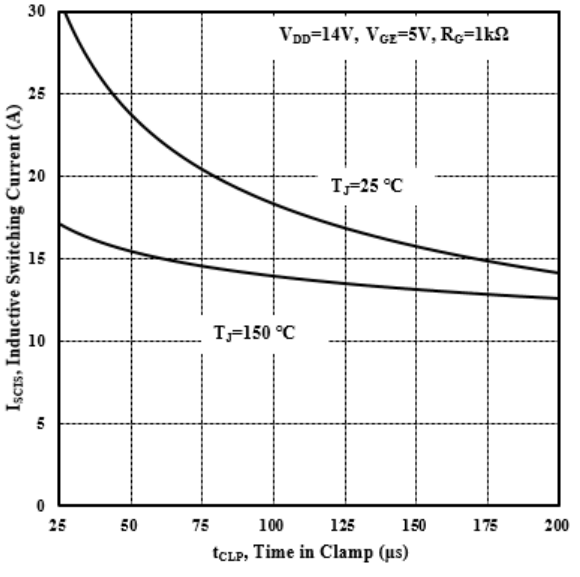
Figure 3 Self Clamped Inductive Switching Current vs Inductance	Figure 4 Self Clamped Inductive Switching Current vs Inductance
	

Figure 5 Power Dissipation vs Case Temperature

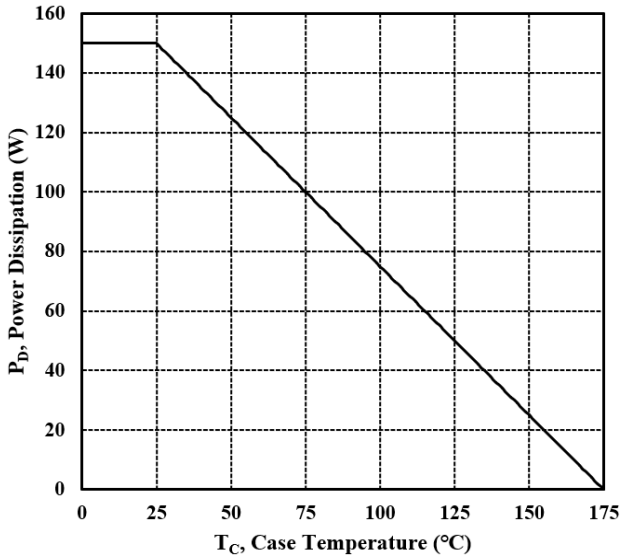


Figure 6. DC Collector Current vs Case Temperature

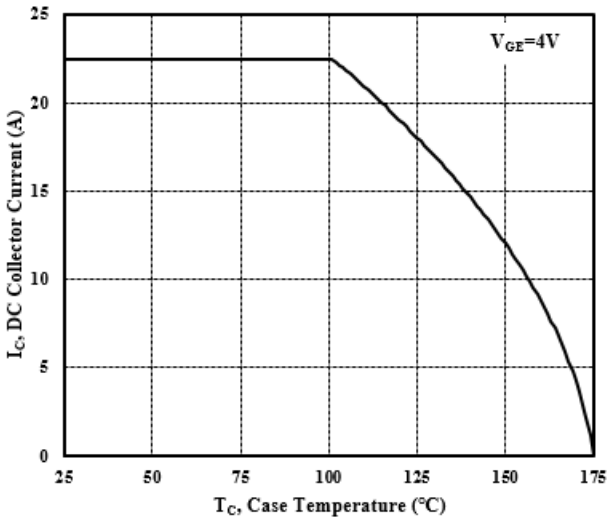


Figure 7 Threshold Voltage vs Junction Temperature

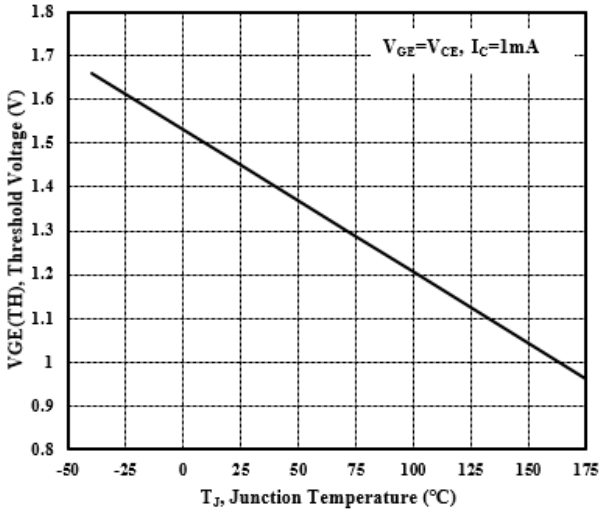


Figure 8 Breakdown Voltage vs Series Gate Resistance

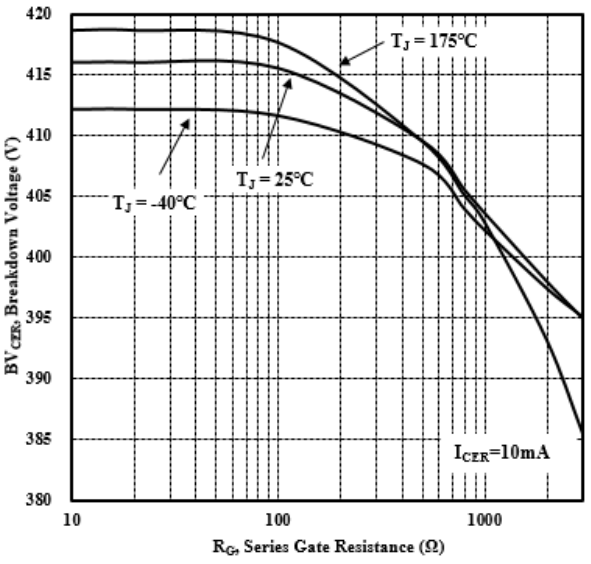


Figure 9 Leakage Current vs Junction Temperature

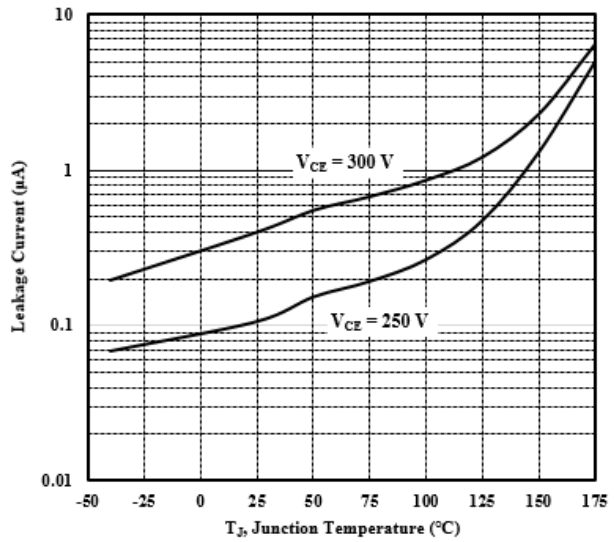


Figure 10 Collector-Emitter Voltage vs Collector Current

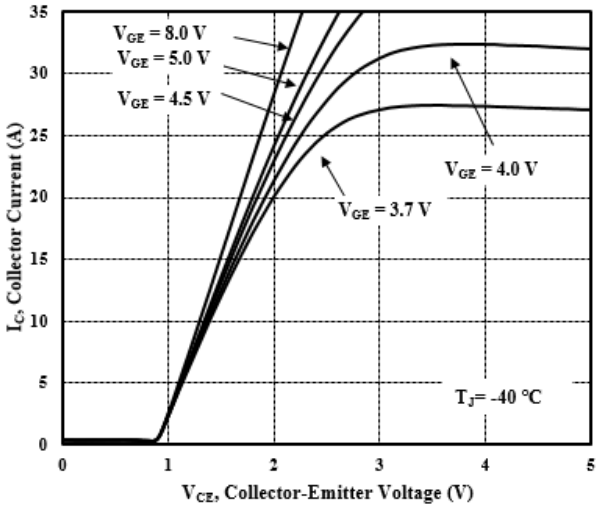


Figure 11 Collector-Emitter Voltage vs Collector Current

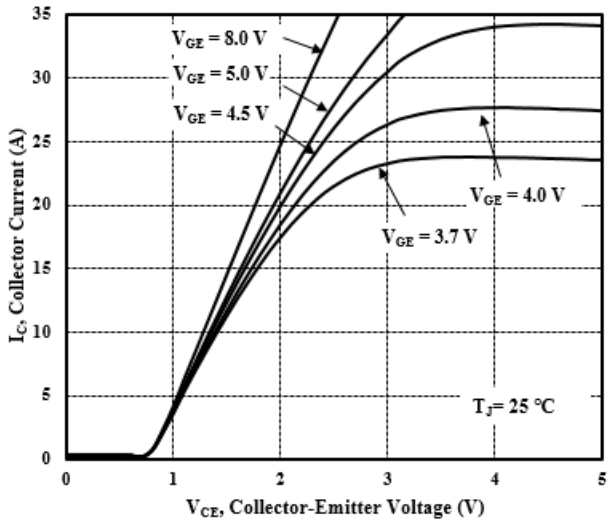


Figure 12 Collector-Emitter Voltage vs Collector Current

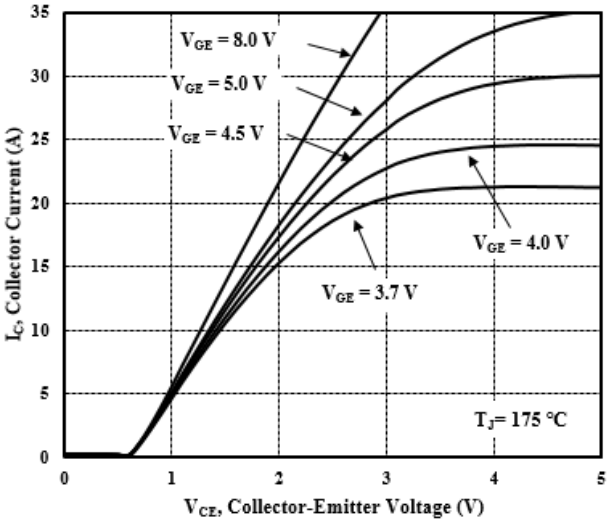


Figure 13 Transfer Characteristics

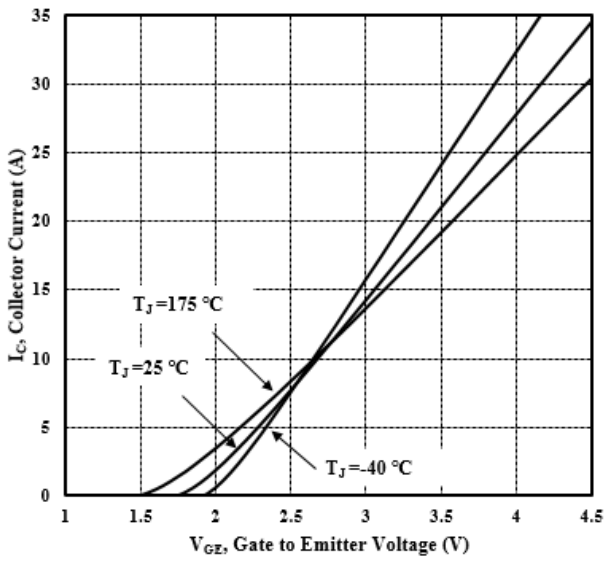


Figure 14 Capacitance vs Collector to Emitter Voltage

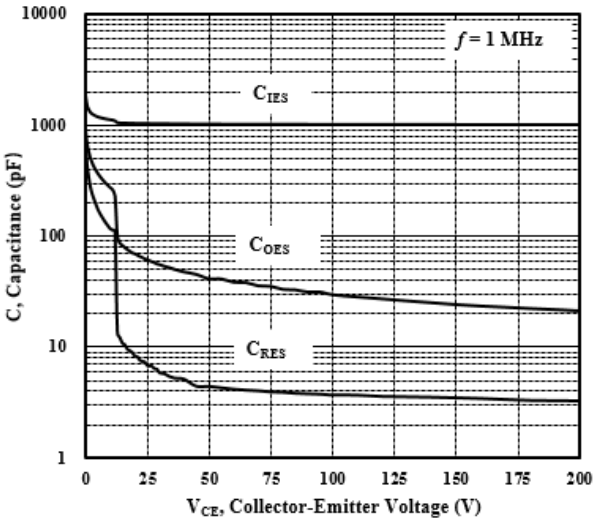


Figure 15 Gate Charge vs Gate to Emitter Voltage

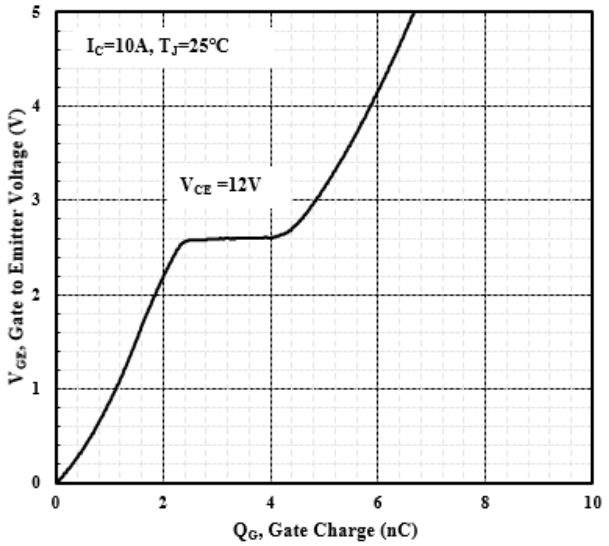


Figure 16 Switching Time vs Junction Temperature

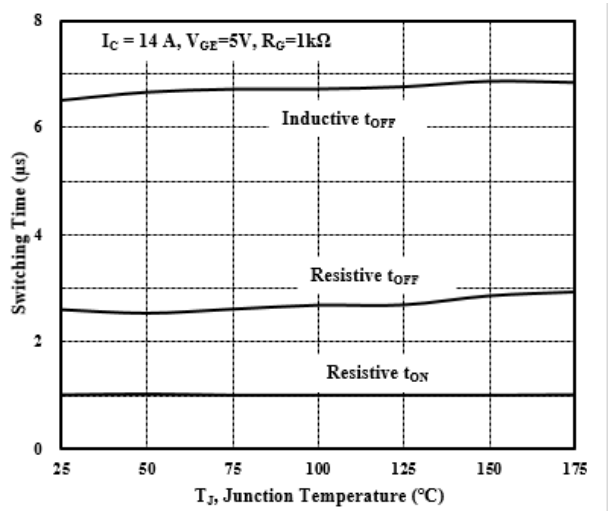
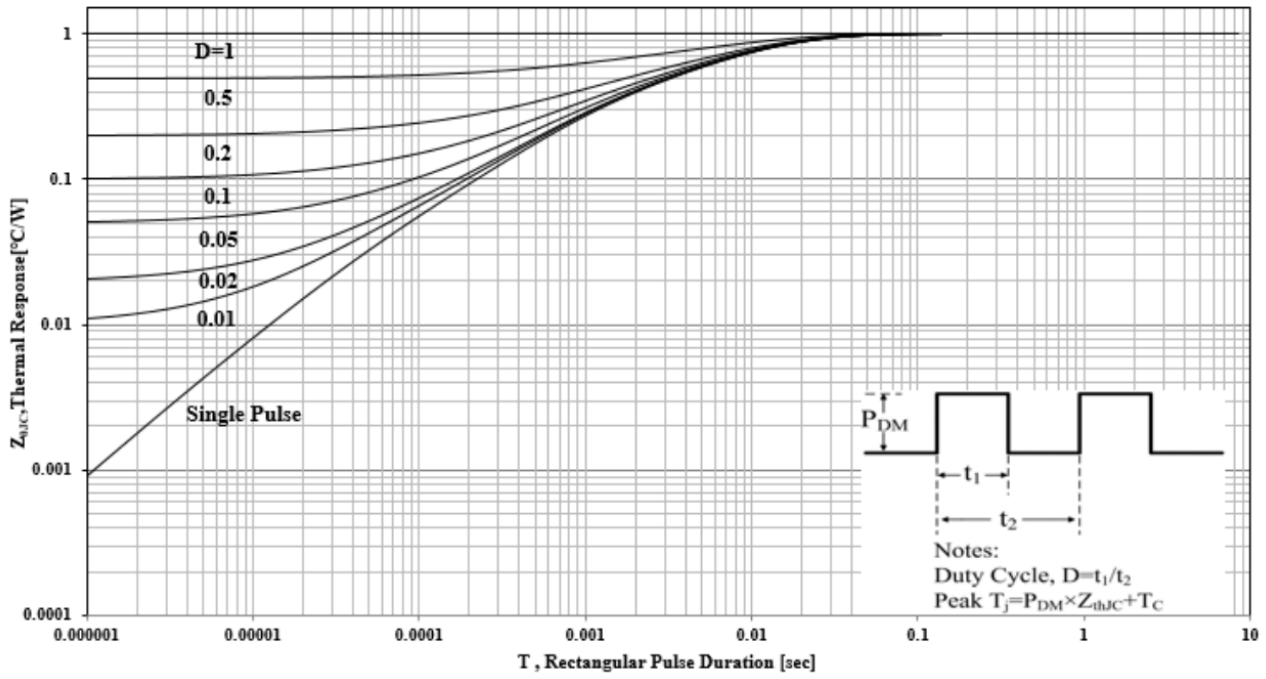


Figure 17 Transient Thermal Impedance, Junction to Case



BLQG3040A

Figure 1 Collector-Emitter Saturation Voltage vs Junction Temperature

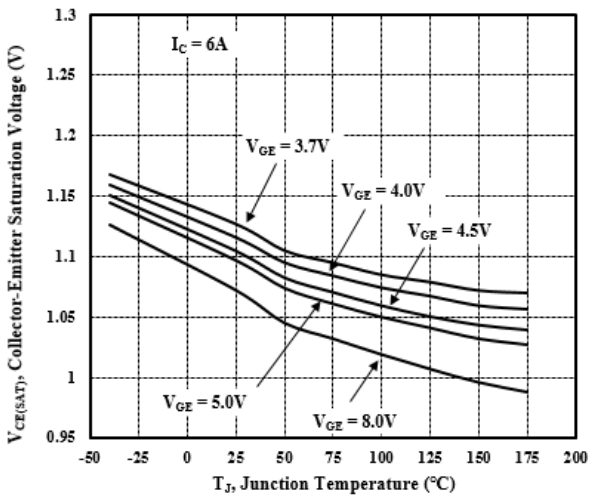


Figure 2 Collector-Emitter Saturation Voltage vs Junction Temperature

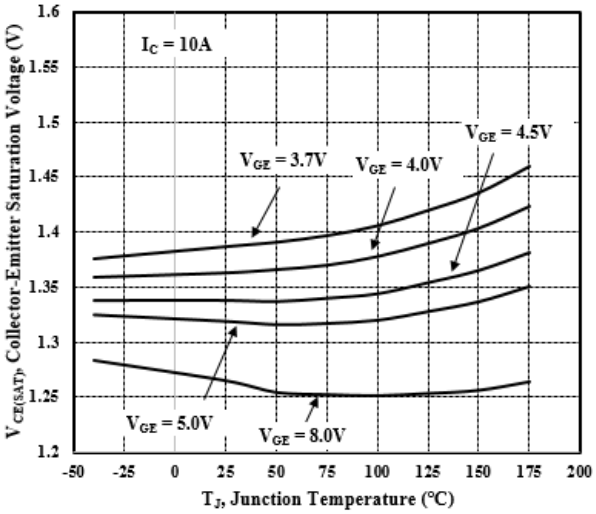


Figure 3 Self Clamped Inductive Switching Current vs Inductance

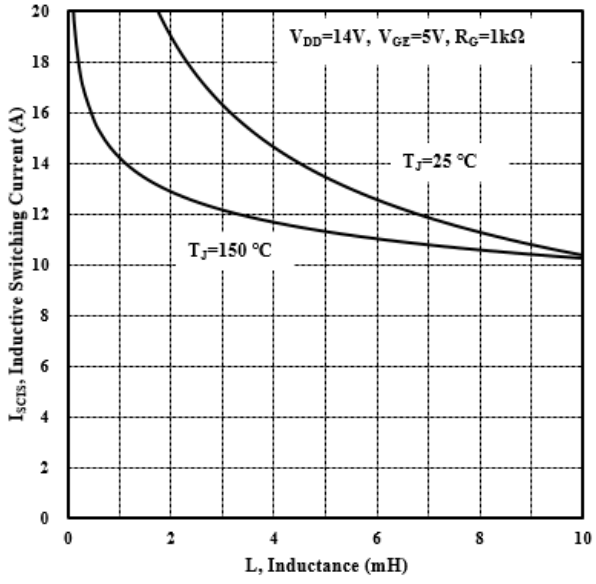


Figure 4 Self Clamped Inductive Switching Current vs Inductance

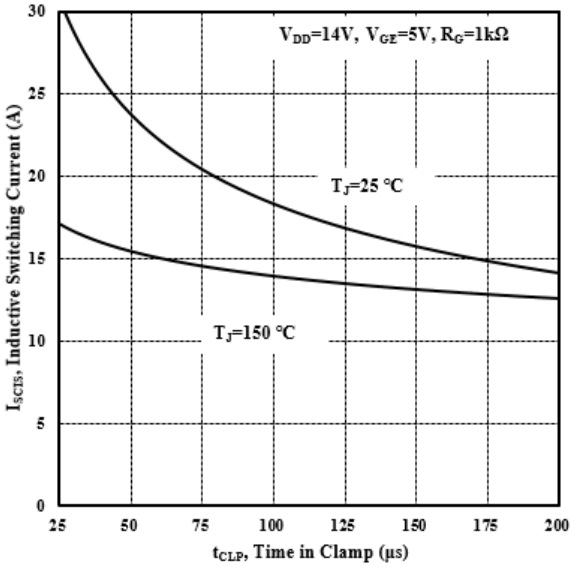


Figure 5 Power Dissipation vs Case Temperature

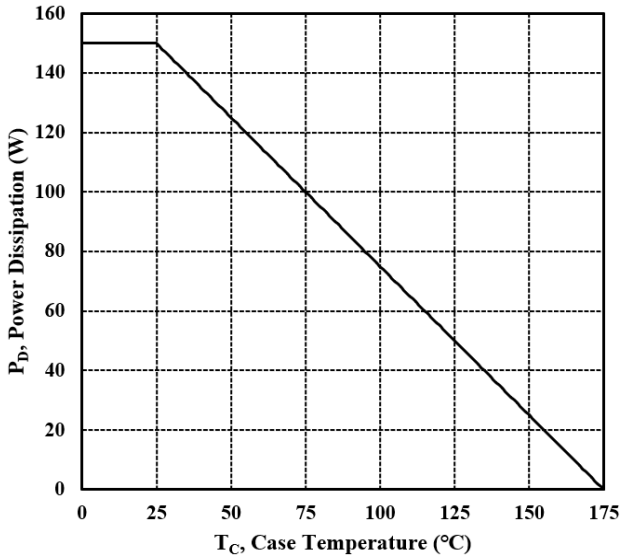


Figure 6. DC Collector Current vs Case Temperature

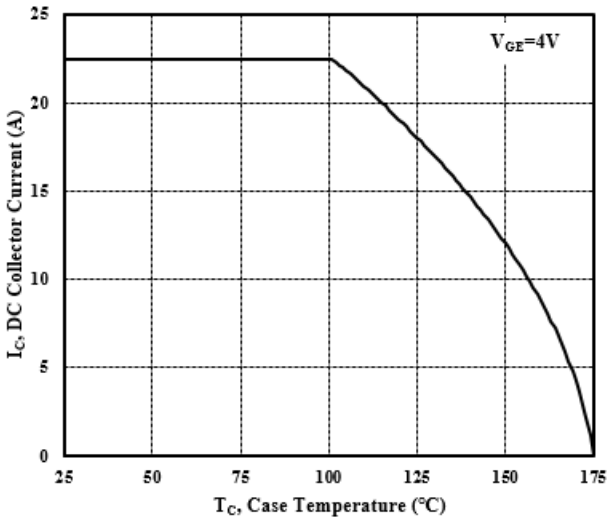


Figure 7 Threshold Voltage vs Junction Temperature

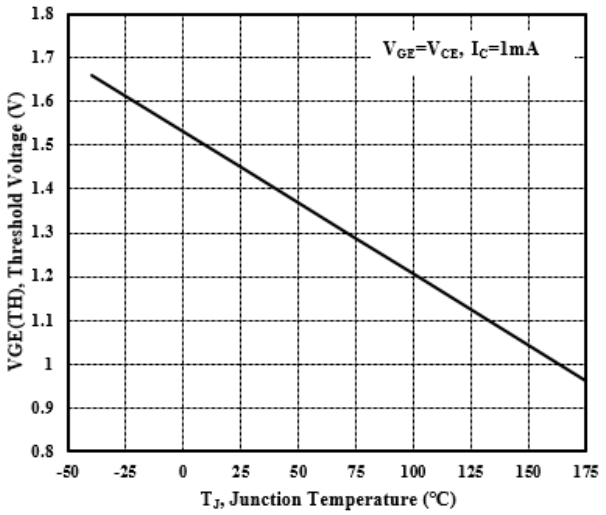


Figure 8 Breakdown Voltage vs Series Gate Resistance

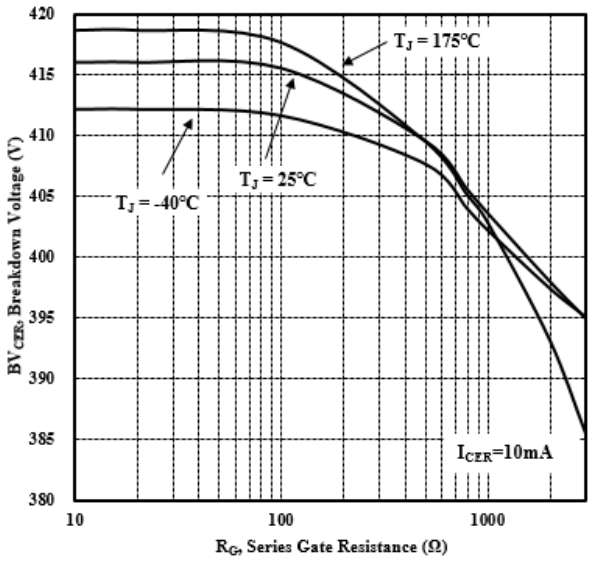


Figure 9 Leakage Current vs Junction Temperature

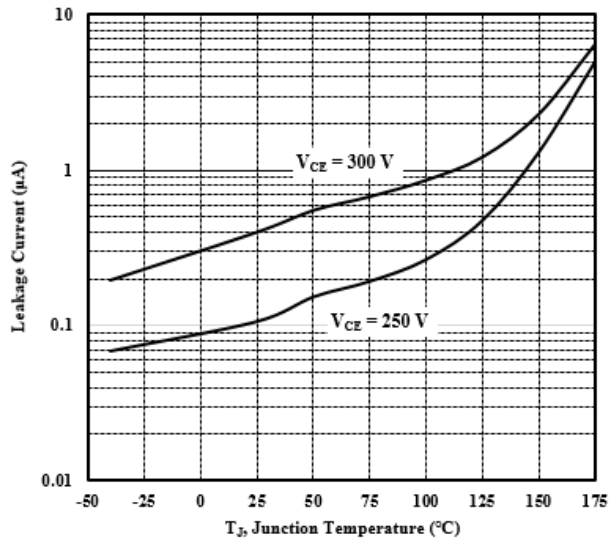


Figure 10 Collector-Emitter Voltage vs Collector Current

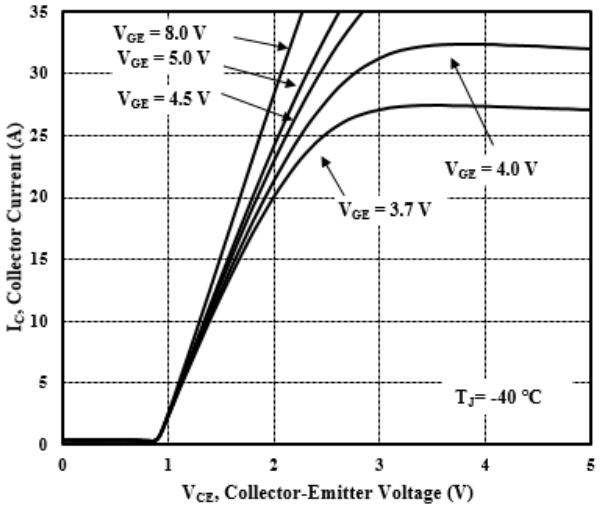


Figure 11 Collector-Emitter Voltage vs Collector Current

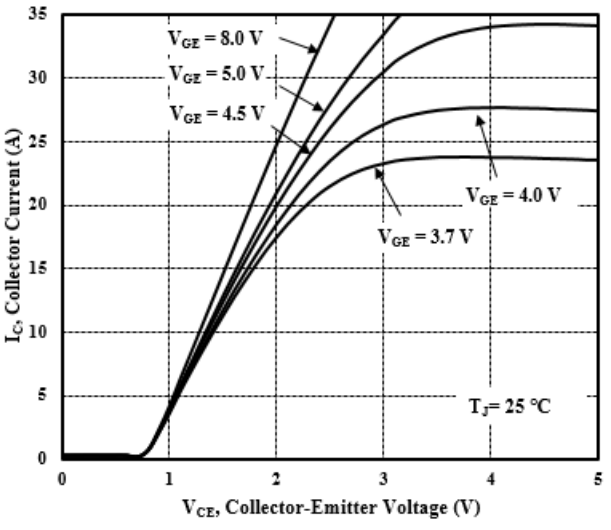


Figure 12 Collector-Emitter Voltage vs Collector Current

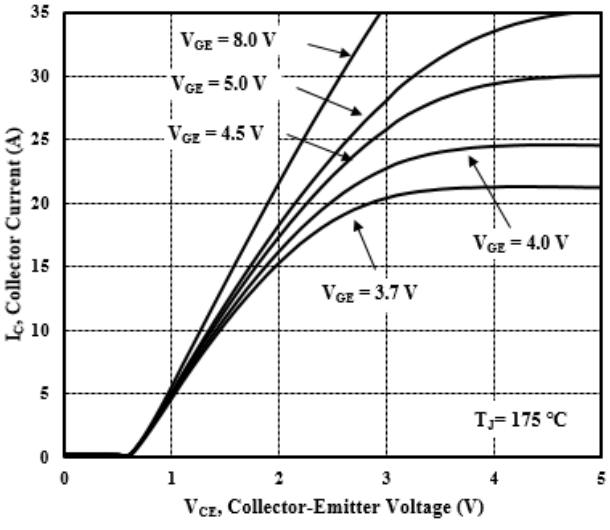


Figure 13 Transfer Characteristics

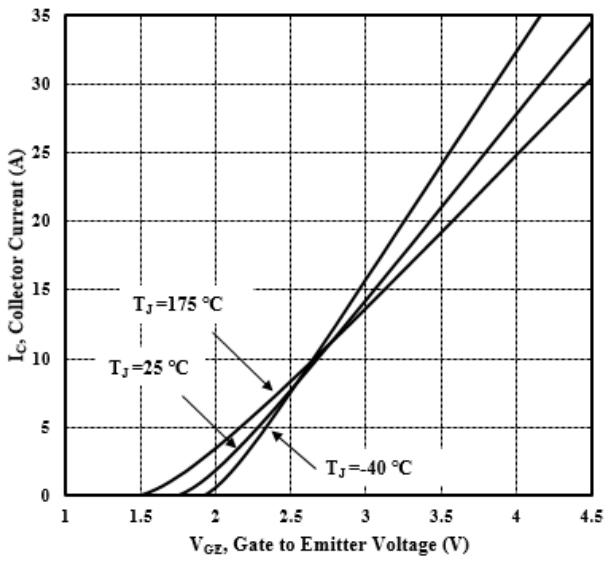


Figure 14 Capacitance vs Collector to Emitter Voltage

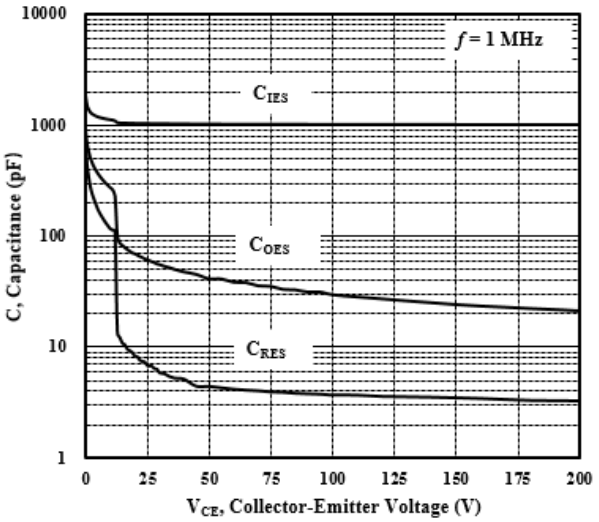


Figure 15 Gate Charge vs Gate to Emitter Voltage

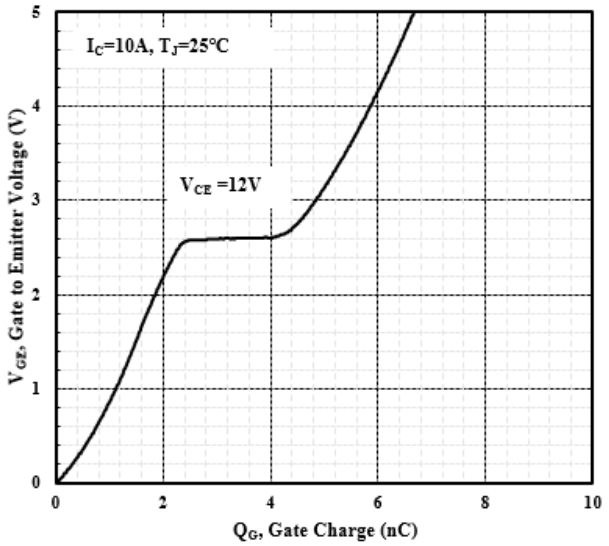


Figure 16 Switching Time vs Junction Temperature

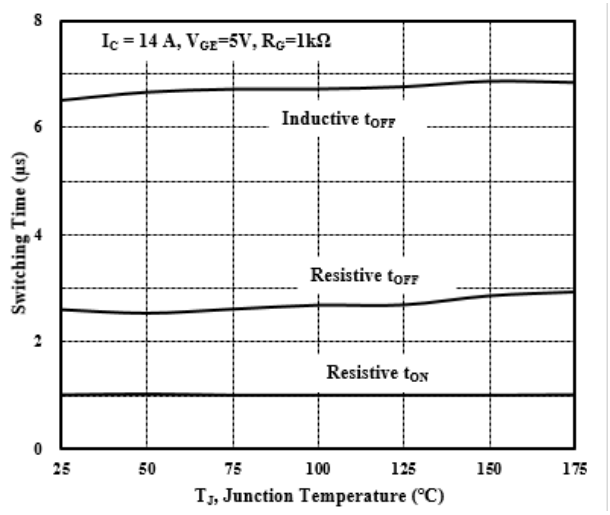
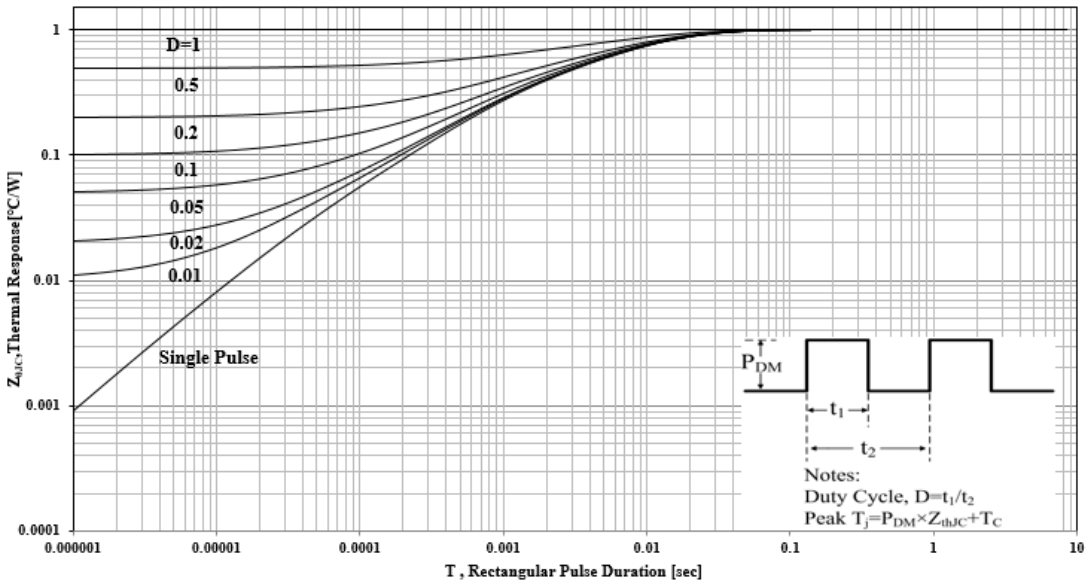


Figure 17 Transient Thermal Impedance, Junction to Case



6. Test Circuit and Waveform

Figure 18 Inductive Switching Test Circuit

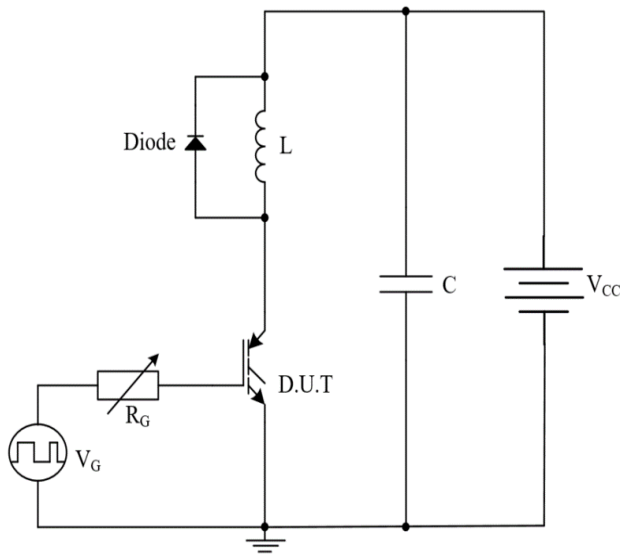


Figure 19 Resistive Switching Test Circuit

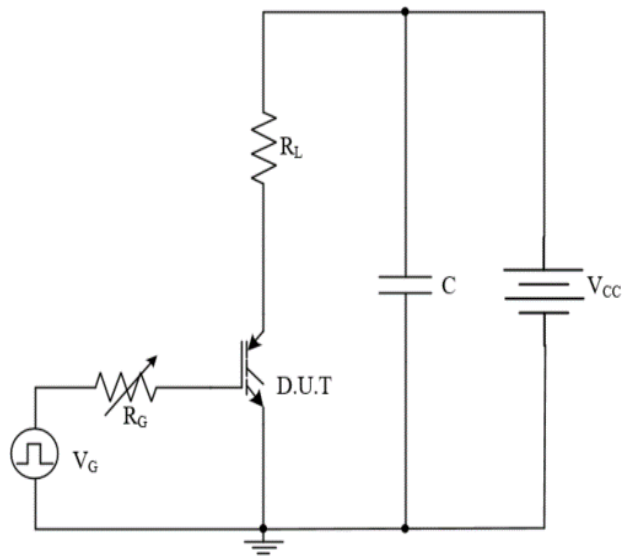


Figure 20 Switching Waveforms

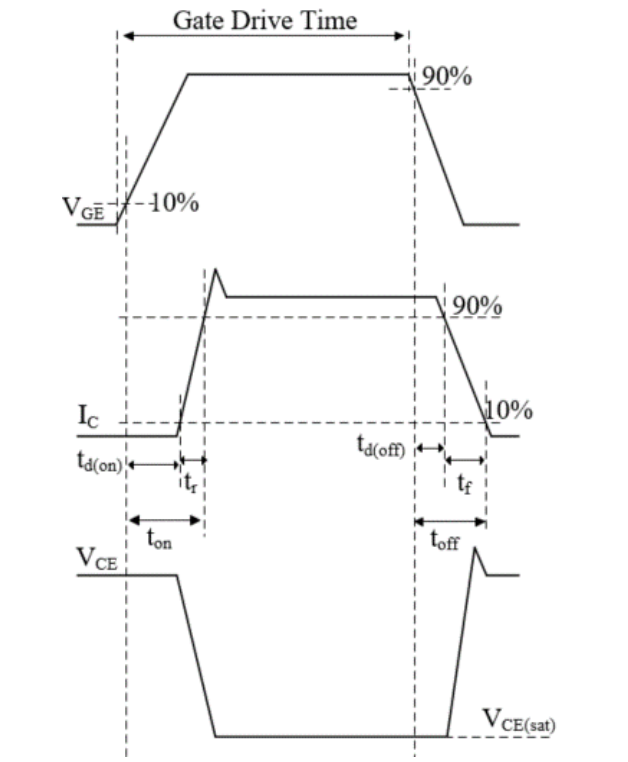


Figure 21 Self Clamped Inductive Switching Circuit

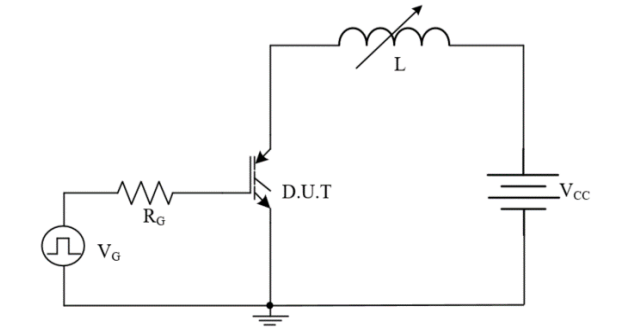
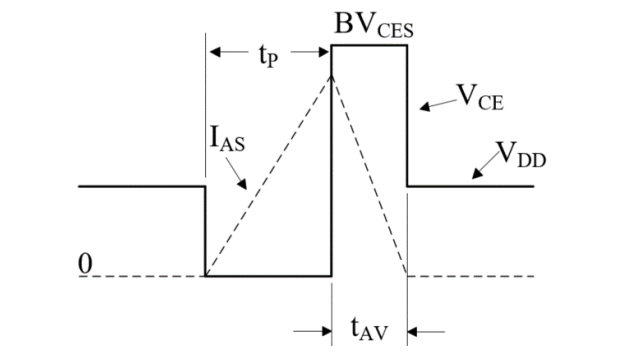
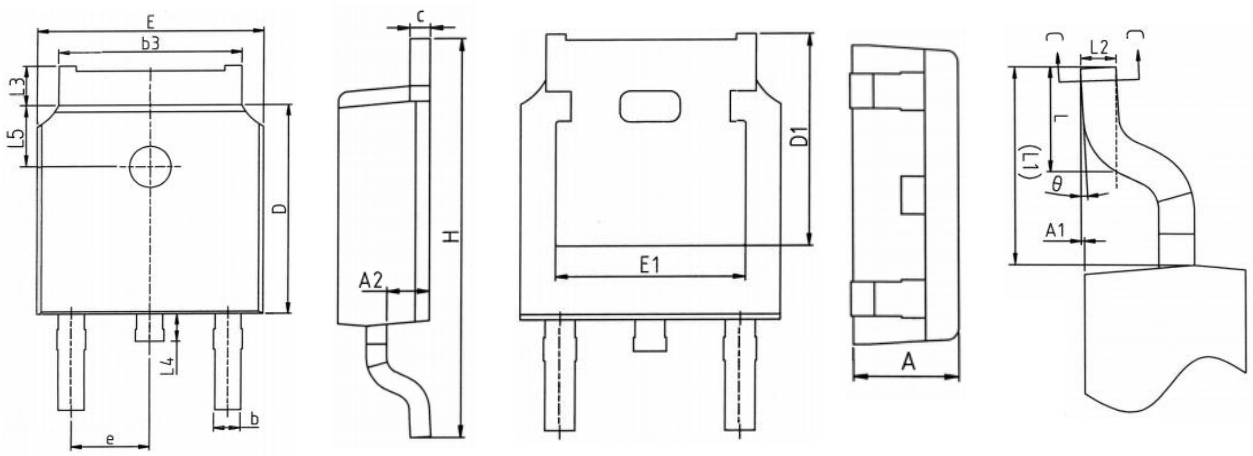


Figure 22 Self Clamped Inductive Switching Waveform

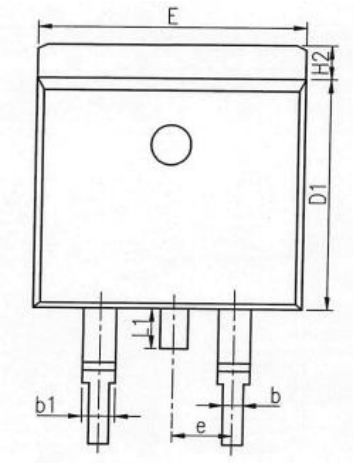


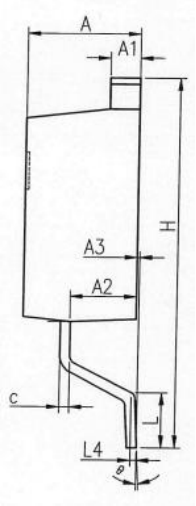
7. Package Description

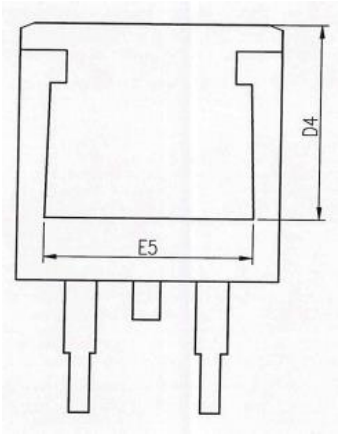


TO-252 Package

SYMBOL	Values(mm)		
	MIN	NOM	MAX
A	2.20	2.30	2.38
A1	0.00	-	0.12
A2	0.97	1.07	1.17
b	0.68	0.78	0.90
b3	5.20	5.33	5.46
c	0.43	0.53	0.61
D	5.98	6.10	6.22
D1	5.30REF		
E	6.40	6.60	6.73
E1	4.63	-	-
e	2.286BSC		
H	9.40	10.10	10.50
L	1.38	1.50	1.75
L1	2.90REF		
L2	0.51BSC		
L3	0.88	-	1.28
L4	0.50	-	1.00
L5	1.65	1.80	1.95
θ	0°	-	8°







TO-263 Package

Items	Values (mm)		
	MIN	NOM	MAX
A	4.37	4.57	4.77
A1	1.22	1.27	1.42
A2	2.49	2.69	2.89
A3	0.00	0.13	0.25
b	0.70	0.81	0.96
b1	1.17	1.27	1.47
c	0.30	0.38	0.53
D1	8.50	8.70	8.90
D4	6.60	-	-
E	9.86	10.16	10.36
E5	7.06	-	-
e	2.54 BSC		
H	14.70	15.10	15.50
H2	1.07	1.27	1.47
L	2.00	2.30	2.60
L1	1.40	1.55	1.70
L4	0.25 BSC		
θ	0°	5°	9°

Revision History:

BLG3040 production platform Revision: 2025-09-08, Rev. 1.0
Previous Revision

Revision	Date	Revision Date Subjects (major changes since last revision)
1.0	2025-09-08	

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NOTE:

1. Any use beyond the maximum ratings of the device in performance may cause damage to the device or even the permanent failure, which may affect the dependability of the machine. Please do not exceed the absolute maximum ratings of the device when designing circuit.
2. When installing the heat sink, please pay attention to the torsional moment and the smoothness of the heat sink.
3. Semiconductor device is sensitive to the ESD, it is necessary to protect the device from being damaged by the ESD when using it.
4. Shanghai Belling reserves the right to make changes in this specification sheet and is subject to change without prior notice.

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