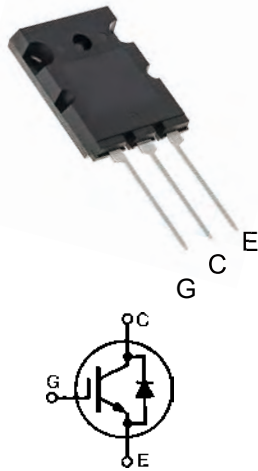


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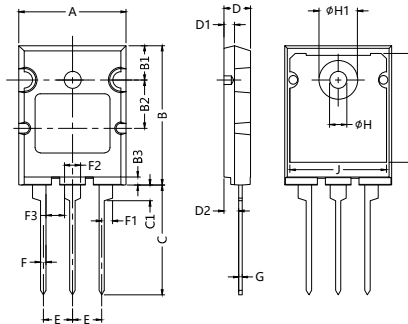
Discrete IGBTs



SG160T60DB3

G=Gate
C=Collector
E=Emitter

Dimensions in mm



Dim.	Millimeter		Dim.	Millimeter	
	Min.	Max.		Min.	Max.
A	19.50	20.50	E	5.45TYP	
B	25.70	26.30	F	0.90	1.25
B1	5.80	6.20	F1	2.30	2.75
B2	8.80	9.20	F2	2.80	3.20
B3	1.35REF		F3	2.40	/
C	19.50	20.50	G	0.50	0.85
C1	2.20	2.70	H	3.20	3.60
D	4.80	5.20	H1	6.50	7.50
D1	2.00REF		J	16.00	/
D2	2.50	3.10	K	19.00	/



MAXIMUM RATING (Ta=25°C)

SYMBOL	CHARACTERISTIC		RATING	UNIT
V _{CES}	Collector-Emitter Voltage		600	V
V _{GES}	Gate-Emitter Voltage		±20	V
I _C	Collector Current	@T _c =25°C	160	A
		@T _c =100°C	80	A
I _{CM} *	Pulsed Collector Current		300	A
I _F	Diode Continuous Forward	@T _c =100°C	80	A
I _{FM}	Current Diode Maximum		300	A
P _D	Maximum Power Dissipation	@T _c =25°C	260	W
		@T _c =100°C	105	W
T _j	Maximum Junction Temperature		150	°C
T _{stg}	Storage Temperature Range		-55 to +150	°C

*Repetitive rating : Pulse width limited by max. junction temperature

THERMAL CHARACTERISTIC

SYMBOL	CHARACTERISTIC	MAX.	UNIT
R _{thJC}	Thermal Resistance, Junction to Case	0.48	°C/W
R _{thJC}	(IGBT) Thermal Resistance, Junction to Case	0.82	°C/W
R _{thJA}	(DIODE) Thermal Resistance, Junction to Ambient	24	°C/W

General Description

SIRECTIFIER Trench Field Stop IGBTs offer low switching losses, high energy efficiency and short circuit ruggedness.

It is designed for applications such as motor control, uninterrupted power supplies(UPS), general inverters.

FEATURES

- High speed switching
- High ruggedness, temperature stable behavior
- Short Circuit Withstand Times > 10us
- Extremely enhanced avalanche capability

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Discrete IGBTs

ELECTRICAL CHARACTERISTICS (Ta=25°C)

SYMBOL	TEST CONDITION	CHARACTERISTIC	MIN.	TYP.	MAX.	UNIT	
Static							
B _V CES	V _{GE} =0V , I _C =250μA	Collector-Emitter Breakdown Voltage	600	-	-	V	
I _C ES	V _{GE} =0V, V _{CE} =600V	Collector Cut-off Current	-	-	250	μA	
I _G ES	V _{CE} =0V, V _{GE} =±20V	Gate Leakage Current	-	-	±100	nA	
V _{GE} (th)	V _{GE} =V _{CE} , I _C =7.5mA	Gate Threshold Voltage	4.0	5.0	6.5	V	
V _{CE} (sat)	V _{GE} =15V, I _C =80A	Collector-Emitter Saturation Voltage	-	1.95	2.50	V	
	V _{GE} =15V, I _C =160A		-	2.10	-	V	
	V _{GE} =15V, I _C =80A, T _C = 125°C		-	1.70	-	V	
Dynamic							
Q _g	V _{CC} =300V, V _{GE} =15V, I _C = 80A	Total Gate Charge	-	350	-	nC	
Q _{ge}		Gate-Emitter Charge	-	60	-	nC	
Q _{gc}		Gate-Collector Charge	-	100	-	nC	
t _d (on)	V _{CC} =300V, I _C =80A, V _{GE} =15V, R _G =10Ω Inductive Load, T _C = 25°C (Note 1)	Turn-On Delay Time	-	40	-	ns	
t _r		Rise Time	-	100	-	ns	
t _d (off)		Turn-Off Delay Time	-	100	-	ns	
t _f		Fall Time	-	80	-	ns	
E _{on}		Turn-On Switching Loss	-	2.5	3.75	mJ	
E _{off}		Turn-Off Switching Loss	-	1.75	3.25	mJ	
E _{ts}		Total Switching Loss	-	4.3	6.9	mJ	
t _d (on)		V _{CC} =300V, I _C =75A, V _{GE} =15V, R _G =10Ω Inductive Load, T _C = 125°C(Note 1)	Turn-On Delay Time	-	100	-	ns
t _r			Rise Time	-	60	-	ns
t _d (off)	Turn-Off Delay Time		-	240	-	ns	
t _f	Fall Time		-	50	-	ns	
E _{on}	Turn-On Switching Loss		-	3.0	-	mJ	
E _{off}	Turn-Off Switching Loss		-	2.65	-	mJ	
E _{ts}	Total Switching Loss		-	5.6	-	mJ	
C _{ies}	V _{CE} =30V, V _{GE} =0V, f=1MHz	Input Capacitance	-	5050	-	pF	
C _{oes}		Ouput Capacitance	-	550	-	pF	
C _{res}		Reverse Transfer Capacitance	-	180	-	pF	
t _{sc}	V _{CC} =300V, V _{GE} =15V, T _C =100°C	Short Circuit Withstand Time	10	-	-	μs	

Note 1 : Energy loss include tail current and diode reverse recovery.

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ELECTRICAL CHARACTERISTIC OF DIODE

SYMBOL	TEST CONDITION		CHARACTERISTIC	MIN.	TYP.	MAX.	UNIT
V _F	I _F = 25A	T _C =25°C	Diode Forward Voltage	-	1.4	1.6	V
		T _C =125°C		-	1.3	-	
t _{rr}	V _{CC} =300V, I _F =80A di/dt = 600A/μs	T _C =25°C	Diode Reverse Recovery Time	-	50	-	ns
		T _C =125°C		-	100	-	
I _{rr}		T _C =25°C	Diode Peak Reverse Recovery Current	-	5	-	A
		T _C =125°C		-	8.5	-	
Q _{rr}		T _C =25°C	Diode Reverse Recovery Charge	-	110	-	μC
		T _C =125°C		-	400	-	

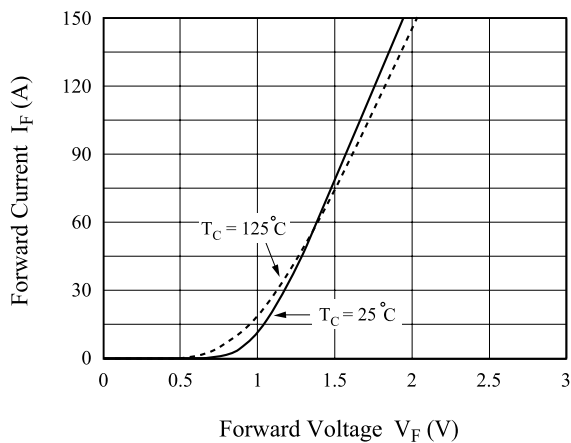


Fig 1. Forward Characteristics

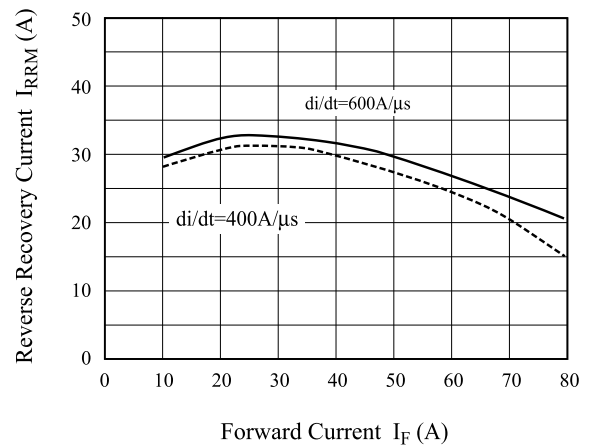


Fig 2. Reverse Recovery Current

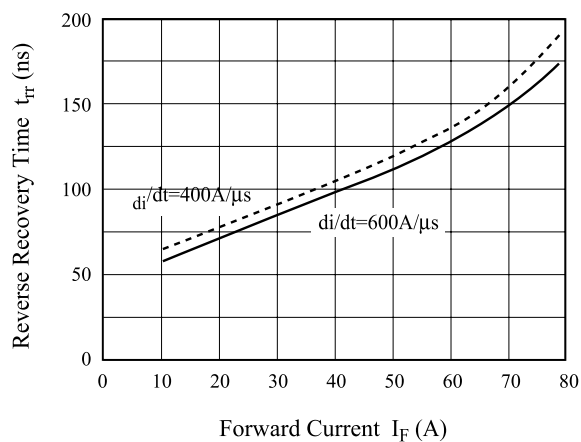


Fig 3. Reverse Recovery Time

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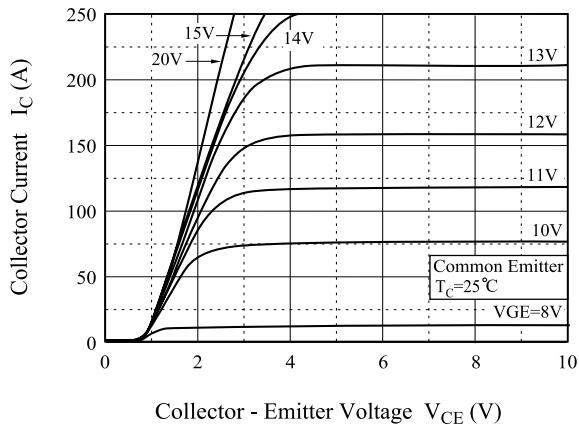


Fig 4. Saturation Voltage Characteristics

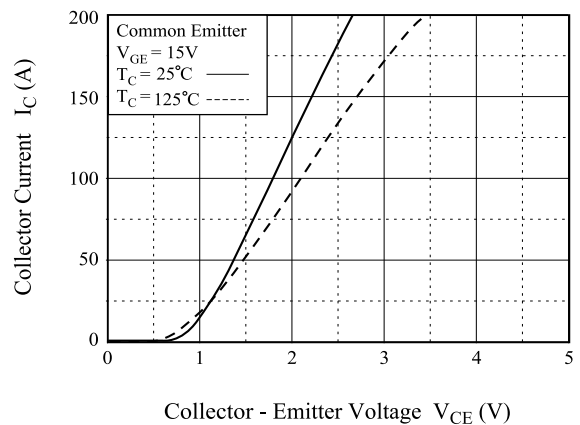


Fig 5. Saturation Voltage Characteristics

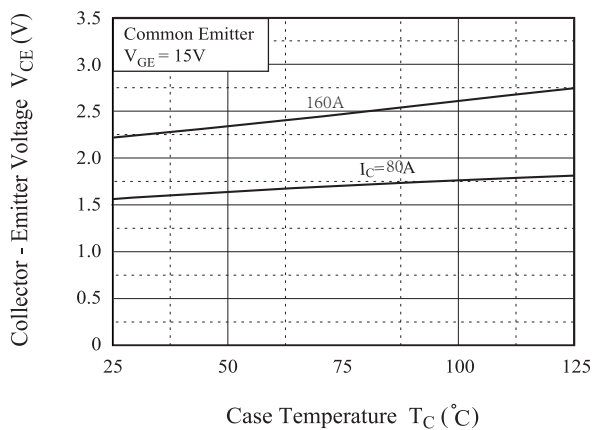


Fig 6. Saturation Voltage vs. Case Temperature

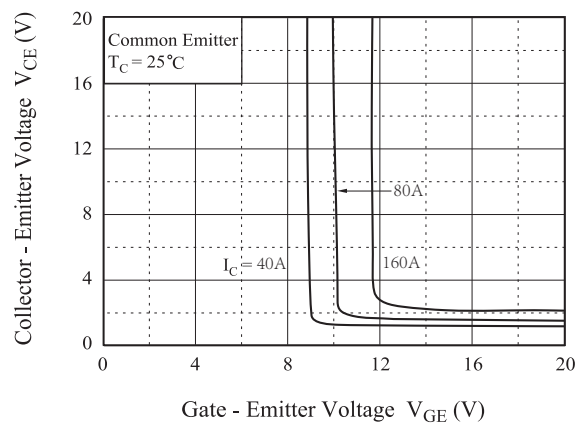


Fig 7. Saturation Voltage vs. V_{GE}

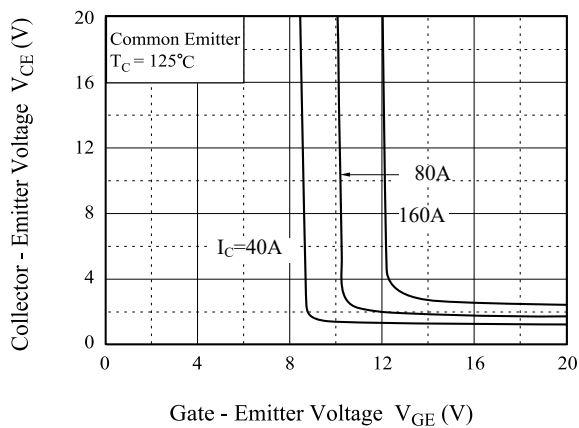


Fig 8. Saturation Voltage vs. V_{GE}

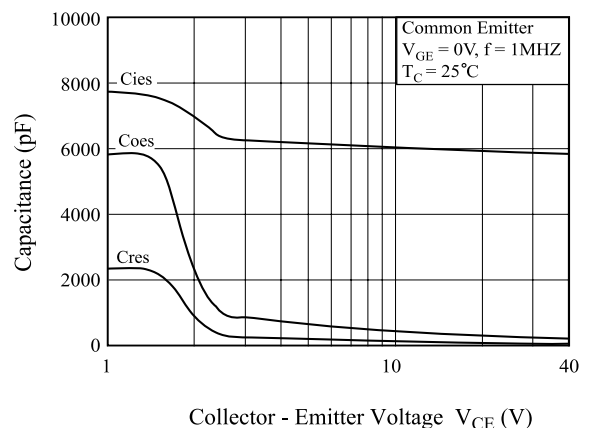


Fig 9. Capacitance Characteristics

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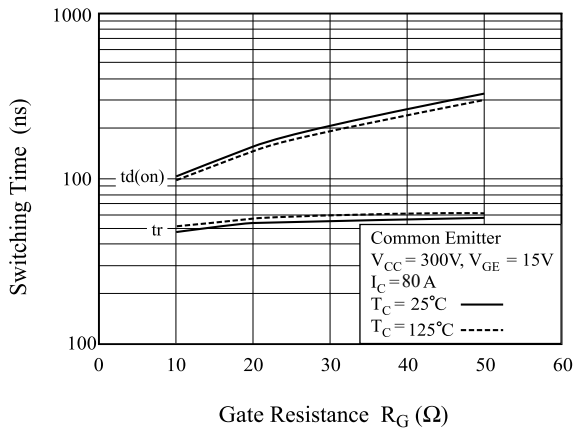


Fig 10. Turn-On Characteristics vs. Gate Resistance

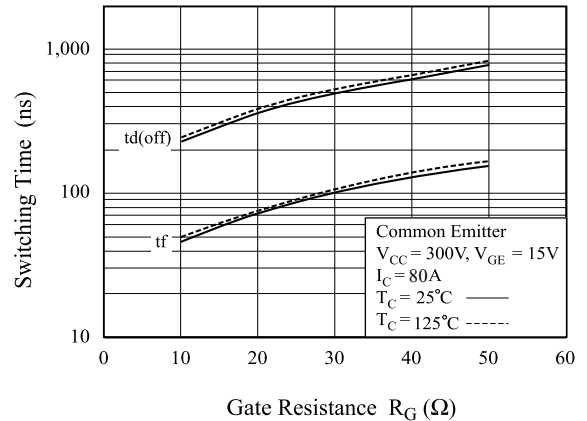


Fig 11. Turn-Off Characteristics vs. Gate Resistance

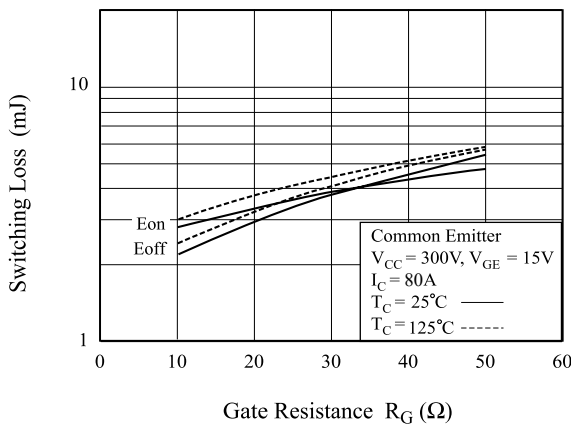


Fig 12. Switching Loss vs. Gate Resistance

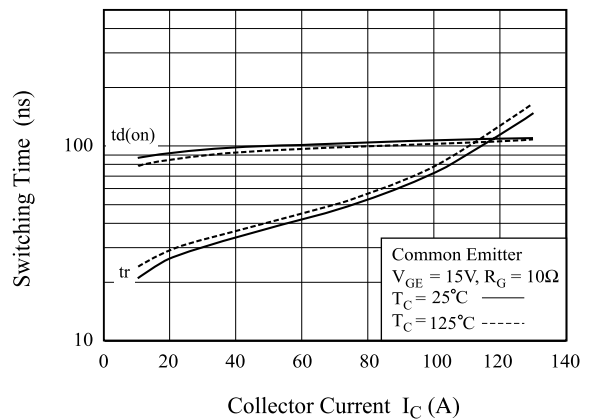


Fig 13. Turn-On Characteristics vs. Collector Current

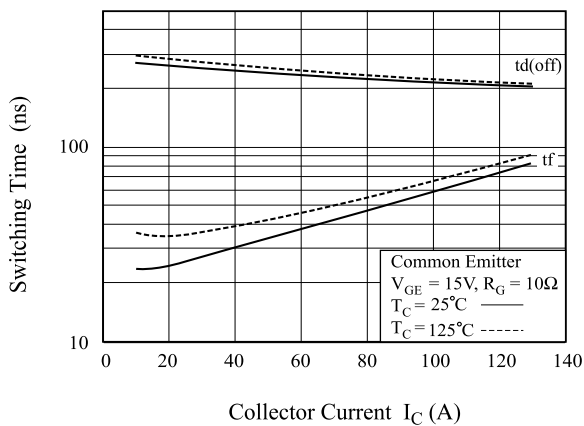


Fig 14. Turn-Off Characteristics vs. Collector Current

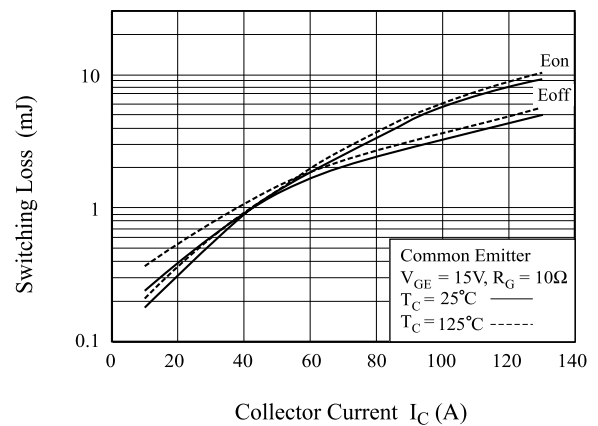


Fig 15. Switching Loss vs. Collector Current

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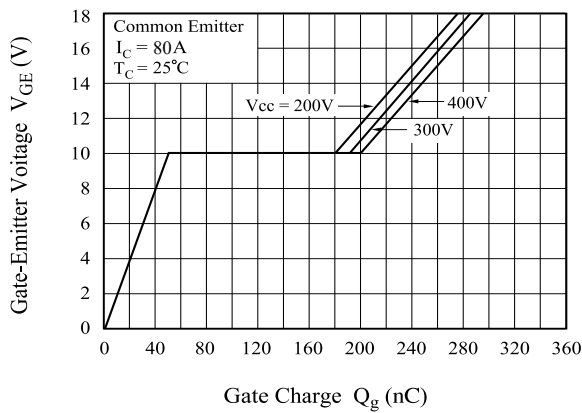


Fig 16. Gate Charge Characteristics

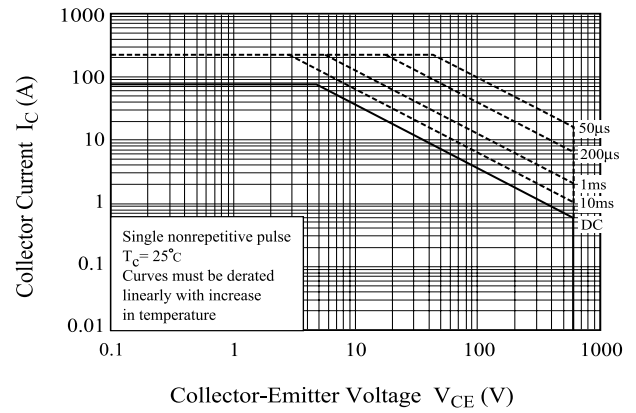


Fig 17. SOA Characteristics

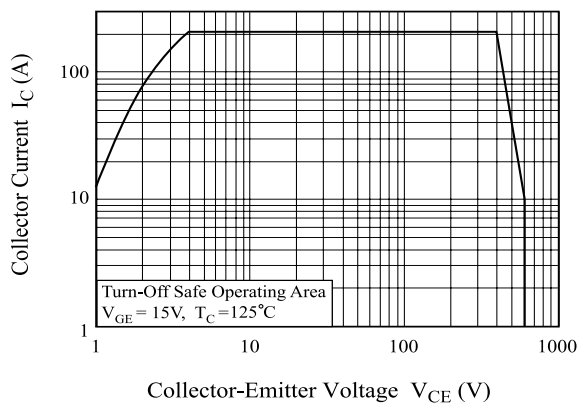


Fig 18. Turn-Off SOA

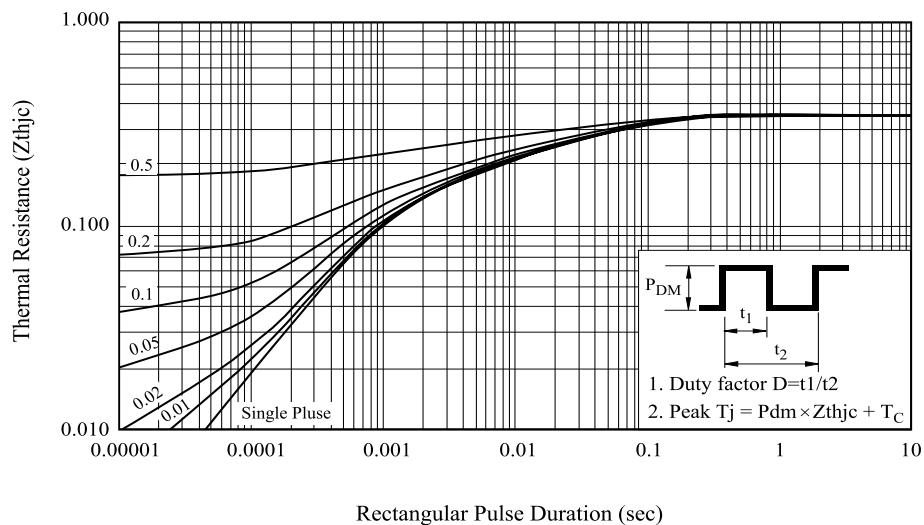


Fig 19. Transient Thermal Impedance of IGBT

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Fig.20 Switching Test Circuit

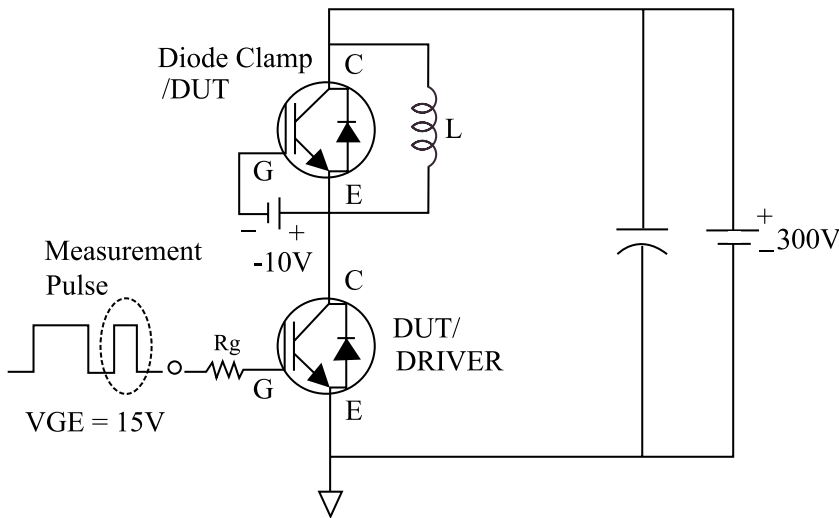


Fig.21 Definition Switching Time & Loss

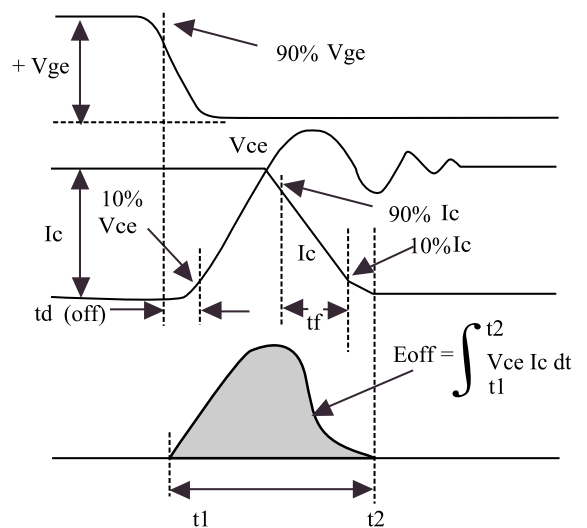
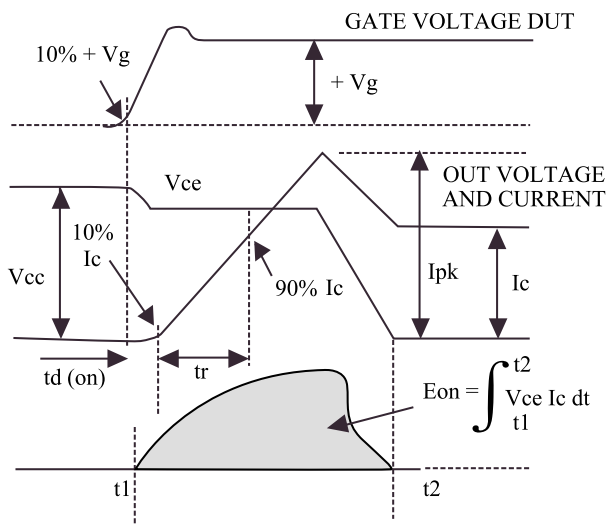
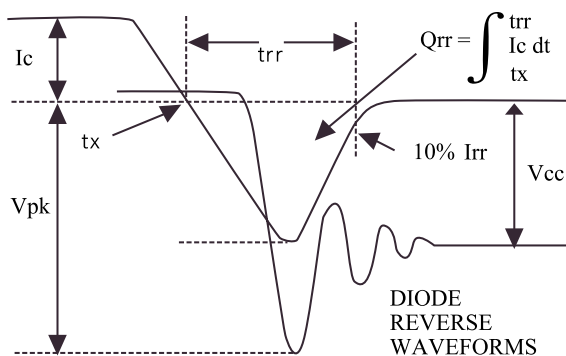


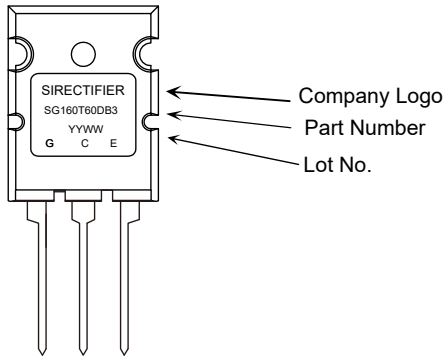
Fig.22 Definition Diode Switching Time



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Discrete IGBTs

MARKING



ORDERING INFORMATION

Part Number	Package	Shipping	Marking Code
SG160T60DB3	TO-264	20pcs / Tube	SG160T60DB3