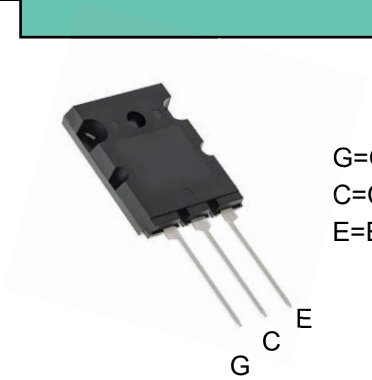
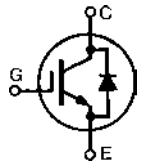
SG160T60DB3

Discrete IGBTs



G=Gate
C=Collector
E=Emitter



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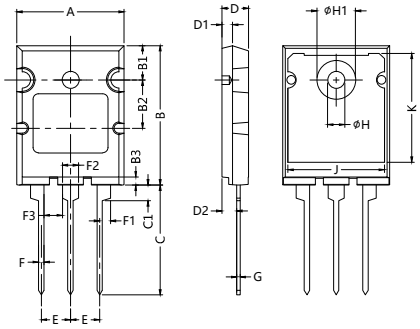
Dimensions in mm



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℃)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Collector-Emitter Voltage		V_{CES}	600	V
Gate-Emitter Voltage		V_{GES}	±20	V
Collector Current	@Tc=25°C	I_C	160	A
	@Tc=100°C		80	A
Pulsed Collector Current		I_{CM}*	300	A
Diode Continuous Forward	@Tc=100°C	I_F	80	A
Current Diode Maximum		I_{FM}	300	A
Maximum Power Dissipation	@Tc=25°C	P_D	260	W
	@Tc=100°C		105	W
Maximum Junction Temperature		T_j	150	°C
Storage Temperature Range		T_{stg}	-55 to +150	°C

*

Repetitive rating : Pulse width limited by max. junction temperature

THERMAL CHARACTERISTIC

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Junction to Case	R_{thJC}	0.48	°C/W
(IGBT) Thermal Resistance, Junction to Case	R_{thJC}	0.82	°C/W
(DIODE) Thermal Resistance, Junction to Ambient	R_{thJA}	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_{VCES}	V_{GE}=0V , I_C=250μA	Collector-Emitter Breakdown Voltage	600	-	-	V
I_{CES}	V_{GE}=0V, V_{CE}=600V	Collector Cut-off Current	-	-	250	μA
I_{GES}	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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Discrete IGBTs

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

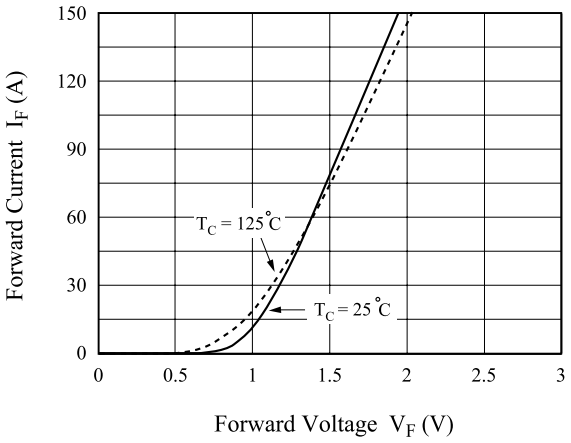

Fig 2. Reverse Recovery Current

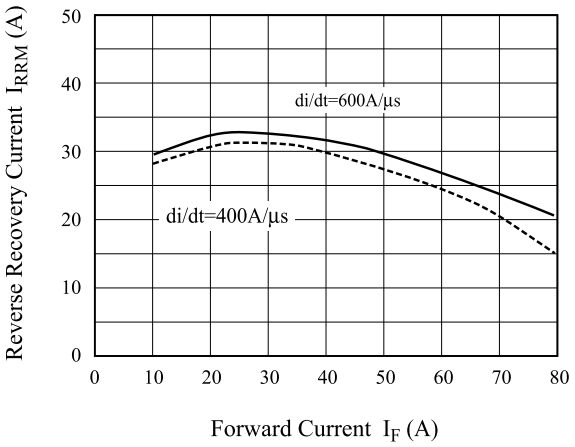

Fig 3. Reverse Recovery Time

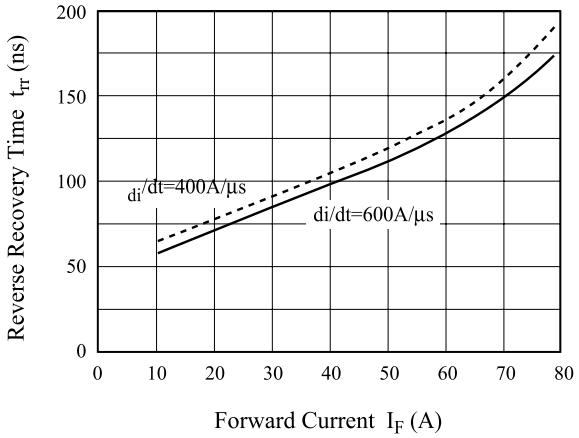

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Fig 4. Saturation Voltage Characteristics

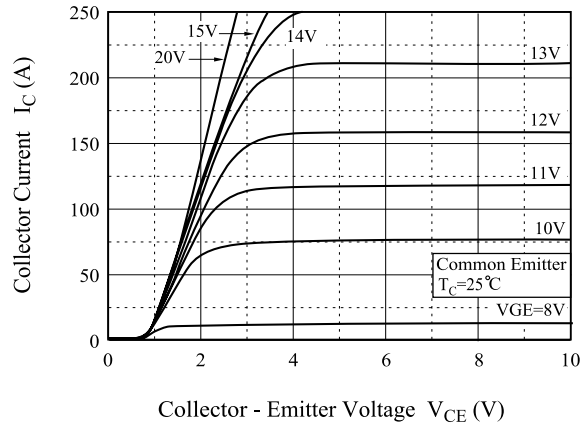

Fig 5. Saturation Voltage Characteristics

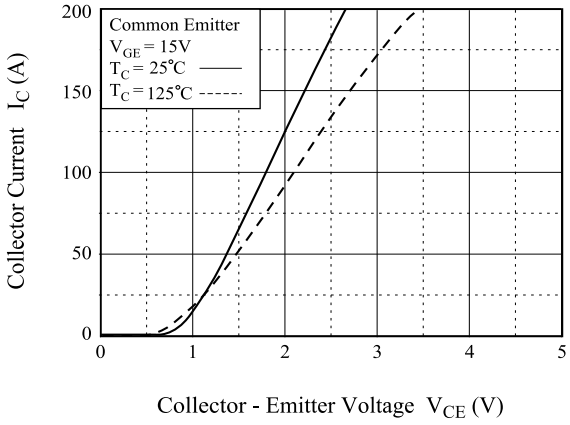

Fig 6. Saturation Voltage vs. Case Temperature

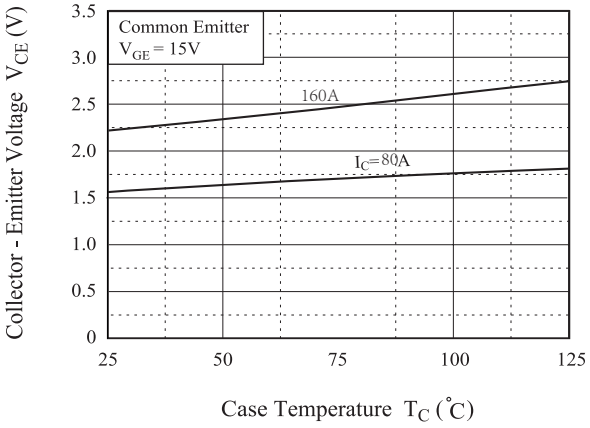

Fig 7. Saturation Voltage vs. V_{GE}

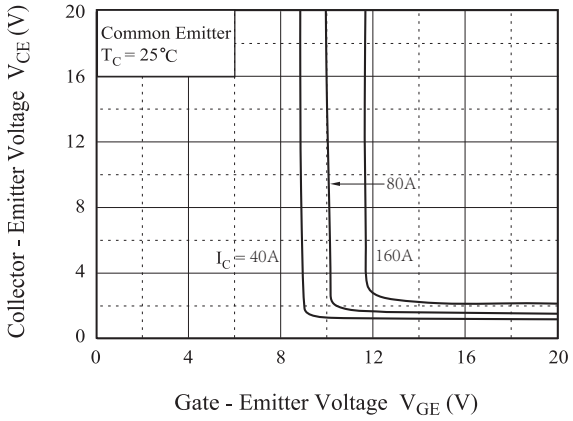

Fig 8. Saturation Voltage vs. V_{GE}

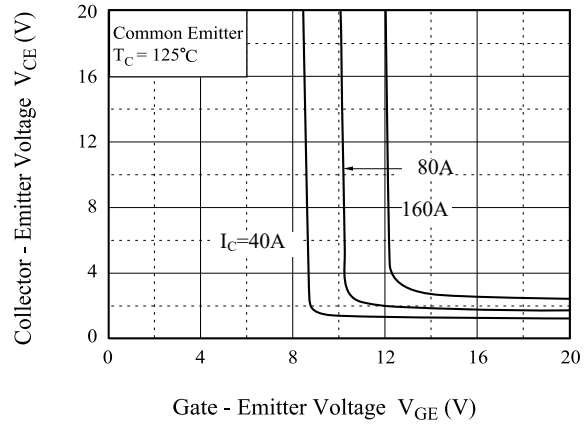

Fig 9. Capacitance Characteristics

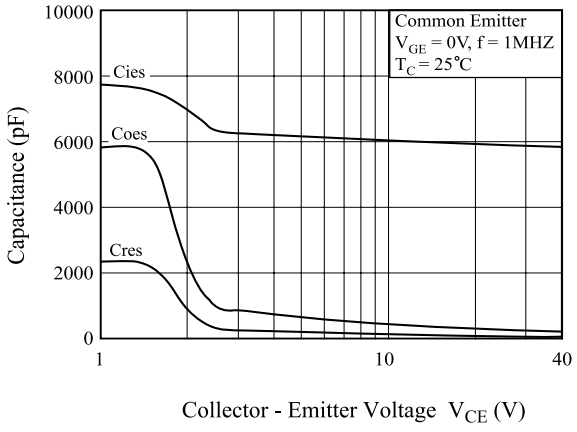

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Fig 10. Turn-On Characteristics vs. Gate Resistance

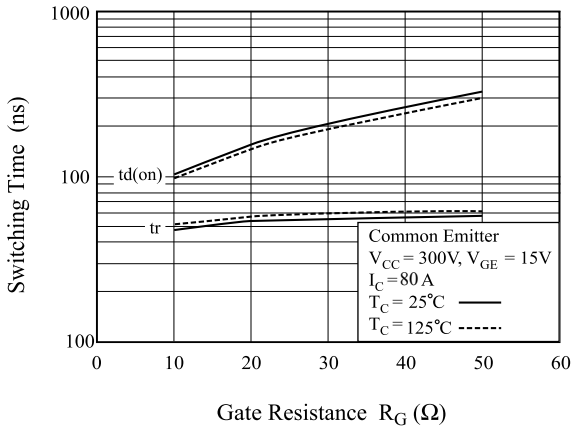

Fig 11. Turn-Off Characteristics vs. Gate Resistance

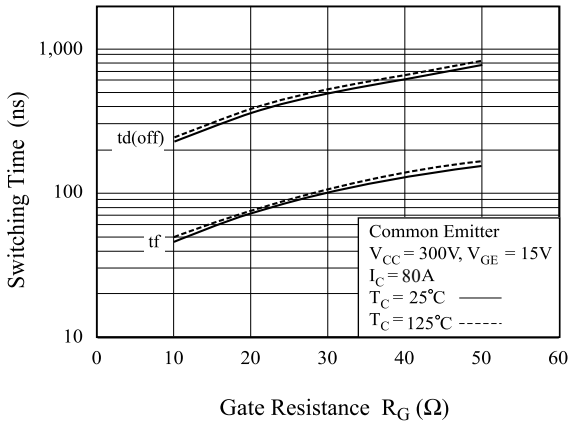

Fig 12. Switching Loss vs. Gate Resistance

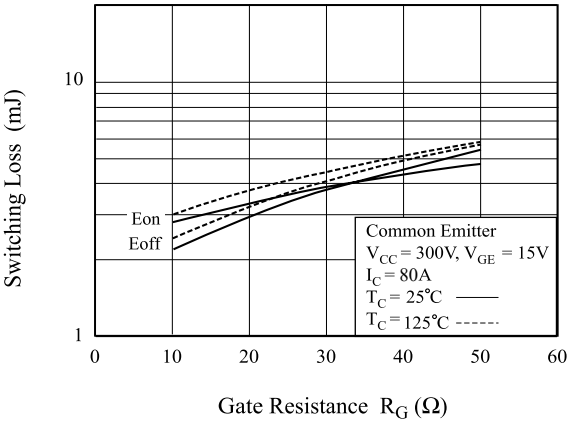

Fig 13. Turn-On Characteristics vs. Collector Current

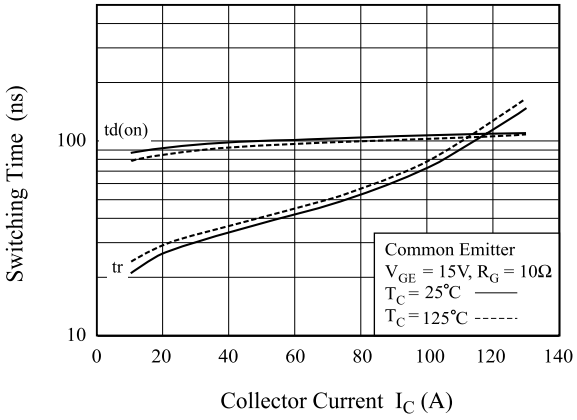

Fig 14. Turn-Off Characteristics vs. Collector Current

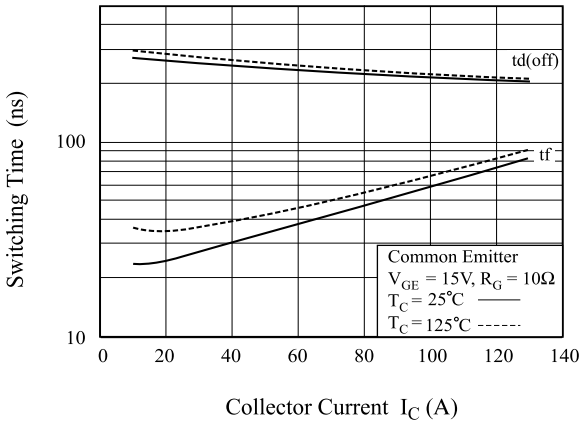

Fig 15. Switching Loss vs. Collector Current

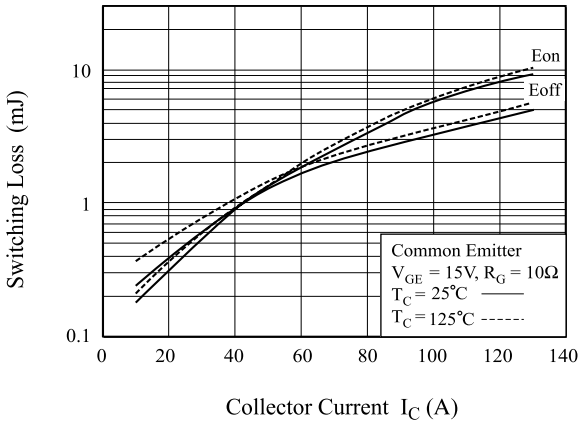

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Fig 16.Gate Charge Characteristics

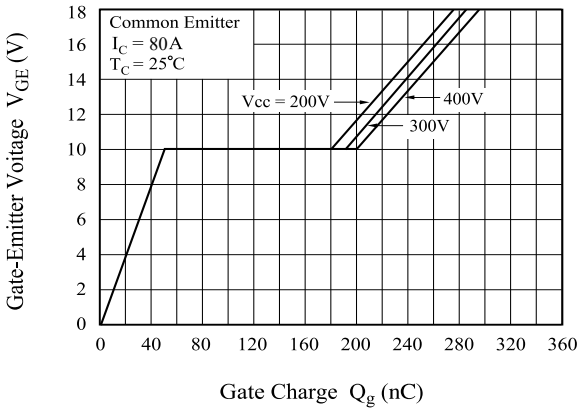

Fig 17. SOA Characteristics

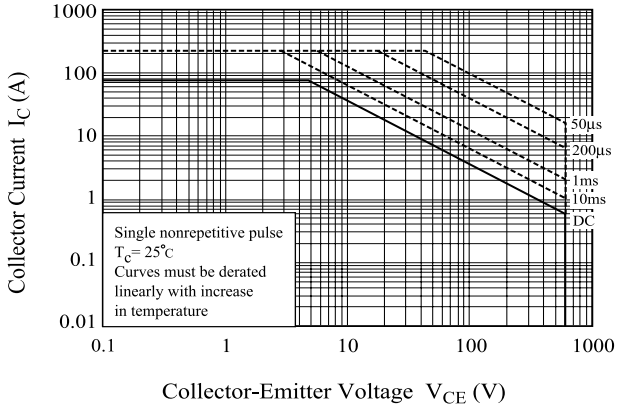

Fig 18. Turn-Off SOA

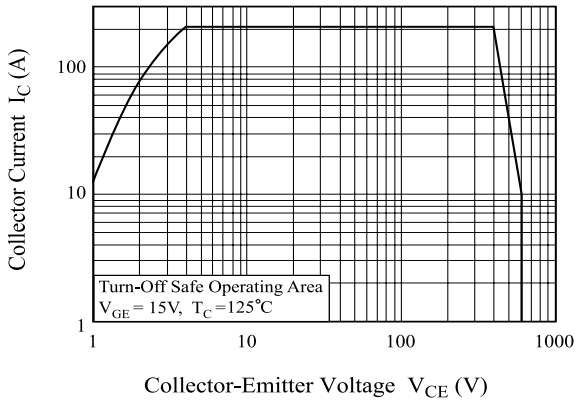

Fig 19. Transient Thermal Impedance of IGBT

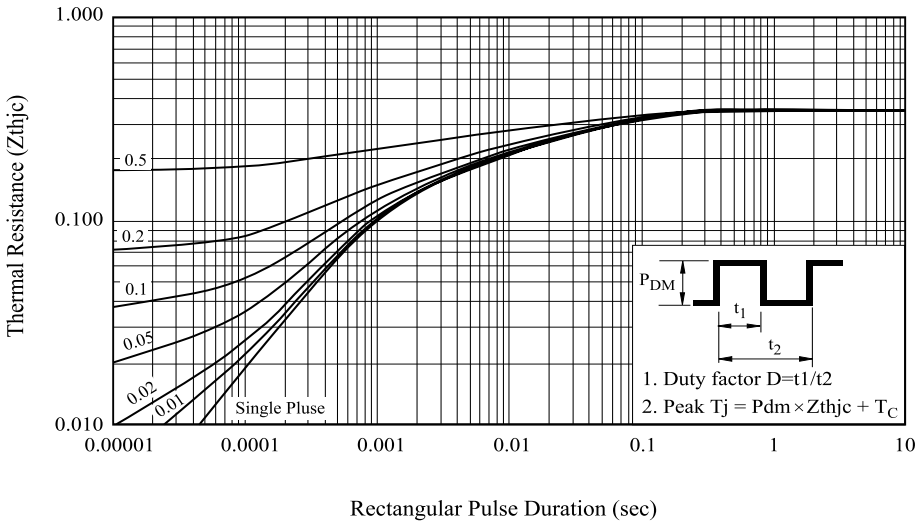

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Fig.20 Switching Test Circuit

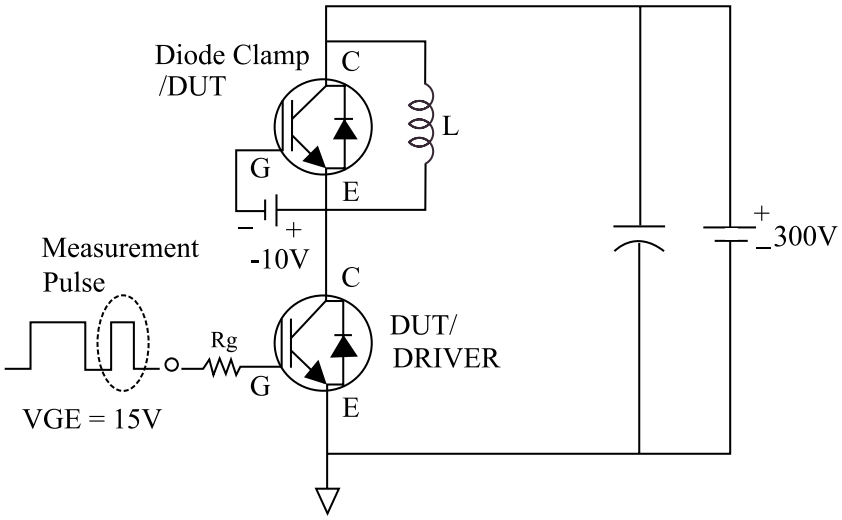
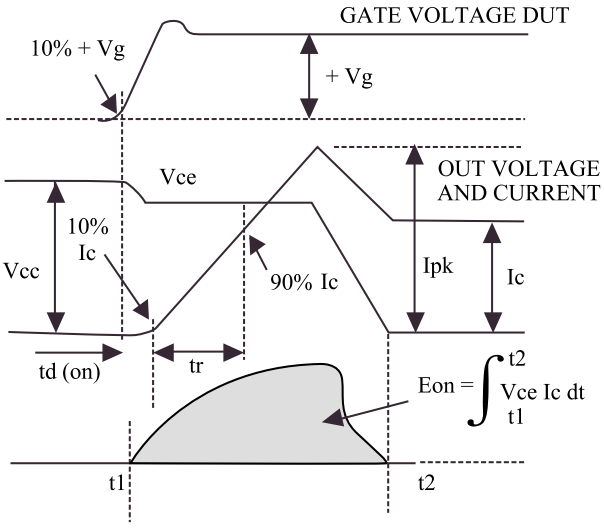


Fig.21 Definition Switching Time & Loss



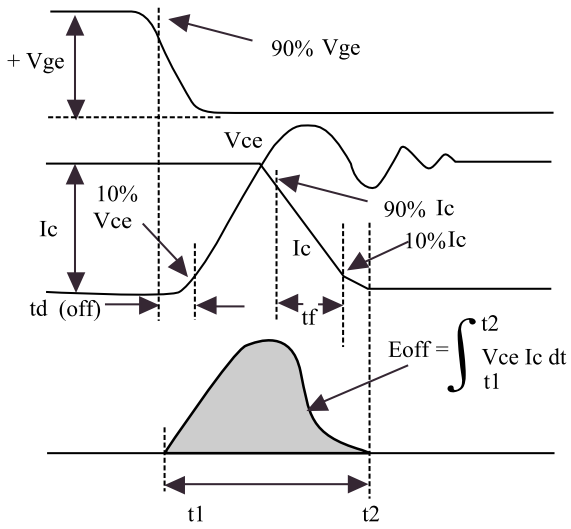
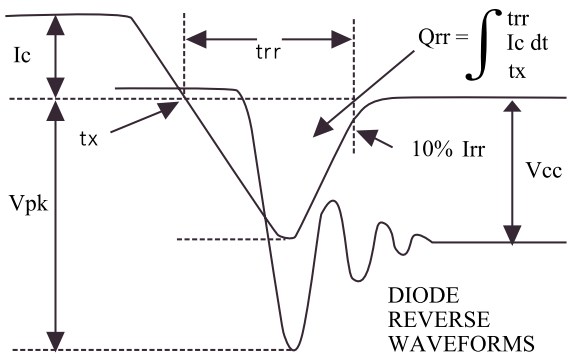


Fig.22 Definition Diode Switching Time



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