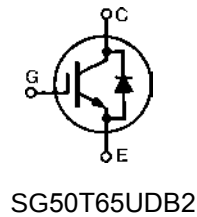
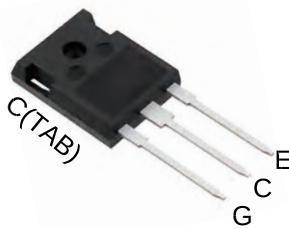


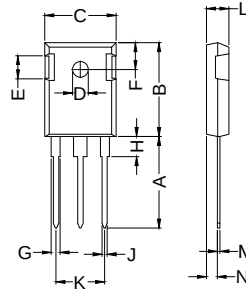
SG50T65UDB2

Discrete IGBTs



SG50T65UDB2

Dimensions TO-247AD



Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	19.81	20.32	0.780	0.800
B	20.80	21.46	0.819	0.845
C	15.75	16.26	0.620	0.640
ØD	3.15	3.65	0.124	0.144
E	4.32	5.49	0.170	0.216
F	5.40	6.30	0.213	0.248
G	1.65	2.18	0.065	0.086
H	3.80	4.50	0.150	0.177
J	1.00	1.40	0.039	0.055
K	10.80	11.10	0.425	0.437
L	4.70	5.30	0.185	0.209
M	0.40	0.80	0.016	0.031
N	1.50	2.49	0.059	0.098

G=Gate, C=Collector,
E=Emitter, TAB=Collector



MAXIMUM RATING (Ta=25°C)

SYMBOL	CHARACTERISTIC		RATING	UNIT
V _{CES}	Collector-Emitter Voltage		650	V
V _{GES}	Gate-Emitter Voltage		±20	V
I _C	Collector Current	@T _c =25°C	100	A
		@T _c =100°C	50	A
I _{CM} *	Pulsed Collector Current		150	A
I _F	Diode Continuous Forward	@T _c =100°C	50	A
I _{FM}	Current Diode Maximum		100	A
P _D	Forward Current Ma: Power Dissipation	@T _c =25°C	277	W
		@T _c =100°C	111	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	0.45	°C/W
R _{thJC}	(IGBT) Thermal Resistance, Junction to Case	1.0	°C/W
R _{thJA}	(DIODE) Thermal Resistance, Junction to Ambient	40	°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

SG50T65UDB2

Discrete IGBTs

ELECTRICAL CHARACTERISTICS (Ta=25°C)

SYMBOL	CHARACTERISTIC	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Static							
BV _{CES}	Collector-Emitter Breakdown Voltage	V _{GE} =0V , I _C =250μA	650	-	-	V	
I _{CES}	Collector Cut-off Current	V _{GE} =0V, V _{CE} =650V	-	-	250	μA	
I _{GES}	Gate Leakage Current	V _{CE} =0V, V _{GE} =±20V	-	-	±100	nA	
V _{GE(th)}	Gate Threshold Voltage	V _{GE} =V _{CE} , I _C =5mA	4.5	5.5	7.0	V	
V _{CE(sat)}	Collector-Emitter Saturation Voltage	V _{GE} =15V, I _C =50A	-	1.65	2.10	V	
		V _{GE} =15V, I _C =100A	-	2.25	-	V	
		V _{GE} =15V, I _C =50A, T _C = 125°C	-	1.90	-	V	
Dynamic							
Q _g	Total Gate Charge	V _{CC} =300V, V _{GE} =15V, I _C = 50A	-	200	-	nC	
Q _{ge}	ChargeGate-Emitter Charge		-	30	-	nC	
Q _{gc}	Gate-Collector Charge		-	100	-	nC	
t _{d(on)}	Turn-On Delay Time	V _{CC} =300V, I _C =50A, V _{GE} =15V, R _G =10Ω Inductive Load, T _C = 25°C (Note 1)	-	60	-	ns	
t _r	Rise Time		-	45	-	ns	
t _{d(off)}	Turn-Off Delay Time		-	250	-	ns	
t _f	Fall Time		-	40	-	ns	
E _{on}	Turn-On Switching Loss		-	1.25	1.65	mJ	
E _{off}	Turn-Off Switching Loss		-	0.95	1.25	mJ	
E _{ts}	Total Switching Loss		-	2.2	2.9	mJ	
t _{d(on)}	Turn-On Delay Time		V _{CC} =300V, I _C =50A, V _{GE} =15V, R _G =10Ω Inductive Load, T _C = 125°C (Note 1)	-	60	-	ns
t _r	Rise Time			-	50	-	ns
t _{d(off)}	Turn-Off Delay Time	-		260	-	ns	
t _f	Fall Time	-		50	-	ns	
E _{on}	Turn-On Switching Loss	-		1.25	-	mJ	
E _{off}	Turn-Off Switching Loss	-		1.15	-	mJ	
E _{ts}	Total Switching Loss	-		2.4	-	mJ	
C _{ies}	Input Capacitance	V _{CE} =30V, V _{GE} =0V, f=1MHz		-	4000	5200	pF
C _{oes}	CapacitanceOuput Capacitance		-	250	-	pF	
C _{res}	Reverse Transfer Capacitance		-	150	-	pF	
t _{sc}	Short Circuit Withstand Time	V _{CC} =300V, V _{GE} =15V, T _C =100°C	10	-	-	μs	

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

SG50T65UDB2

Discrete IGBTs

ELECTRICAL CHARACTERISTIC OF DIODE

SYMBOL	CHARACTERISTIC	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
V _F	Diode Forward Voltage	I _F = 50A	T _C =25°C	-	1.8	2.5	V
			T _C =125°C	-	1.9	-	
t _{rr}	Diode Reverse Recovery Time	V _{CC} =300V, I _F =50A di/dt = 600A/μs	T _C =25°C	-	100	-	ns
			T _C =125°C	-	175	-	
I _{rr}	Diode Peak Reverse Recovery Current		T _C =25°C	-	19	-	A
			T _C =125°C	-	22	-	
Q _{rr}	Diode Reverse Recovery Charge		T _C =25°C	-	1.1	-	μC
			T _C =125°C	-	2.3	-	

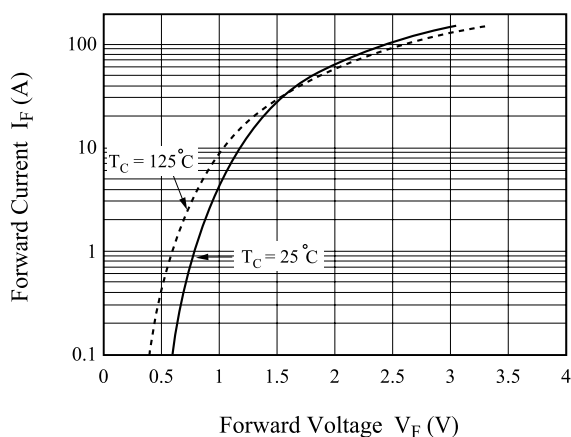


Fig.1 Forward Characteristics

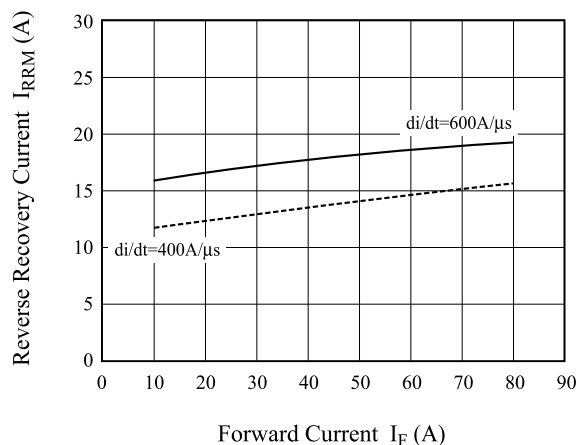


Fig.2 Reverse Recovery Current

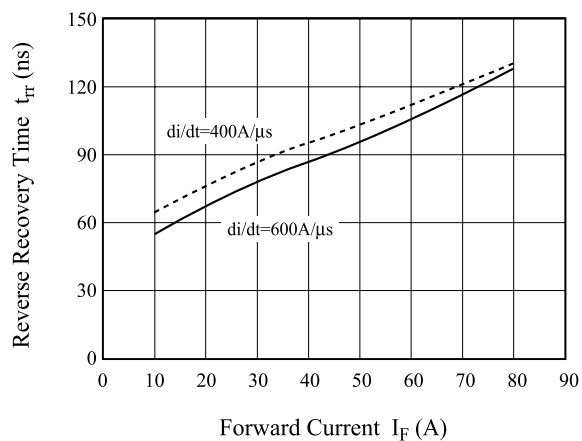


Fig.3 Reverse Recovery Time

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SG50T65UDB2

Discrete IGBTs

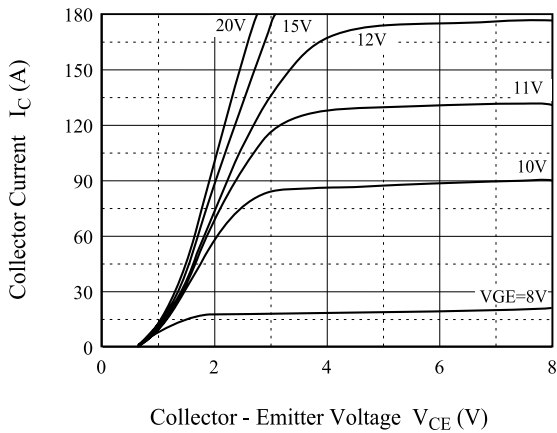


Fig.4 Saturation Voltage Characteristics

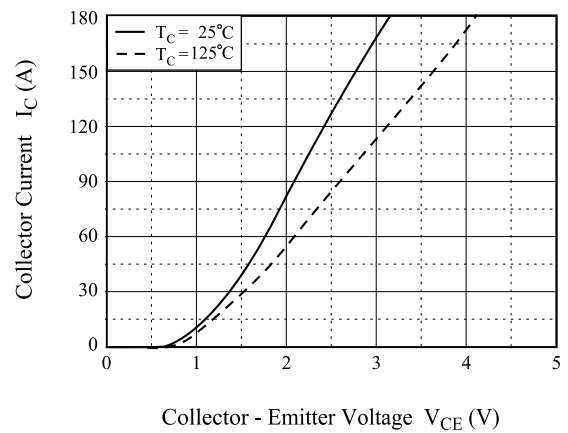


Fig.5 Saturation Voltage Characteristics

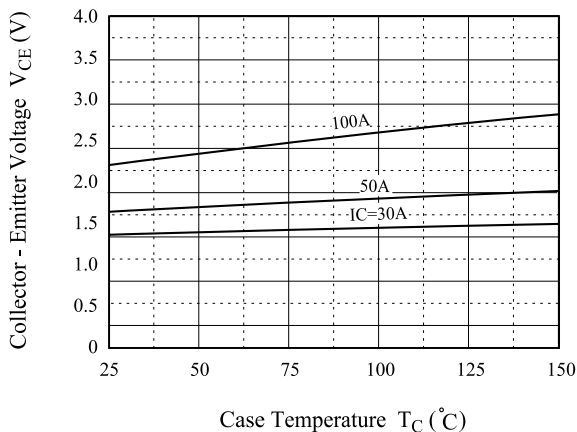


Fig.6 Saturation Voltage vs. Case Temperature

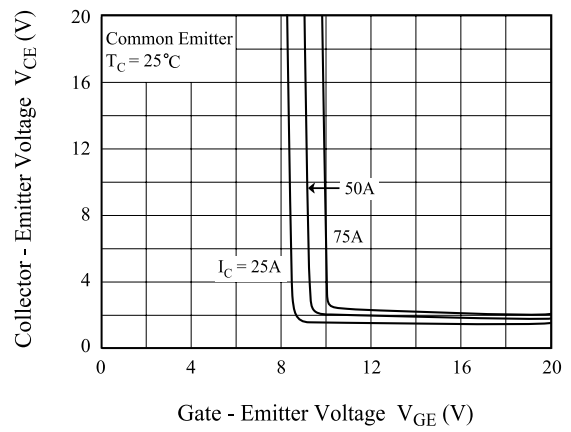


Fig.7 Saturation Voltage vs. V_{GE}

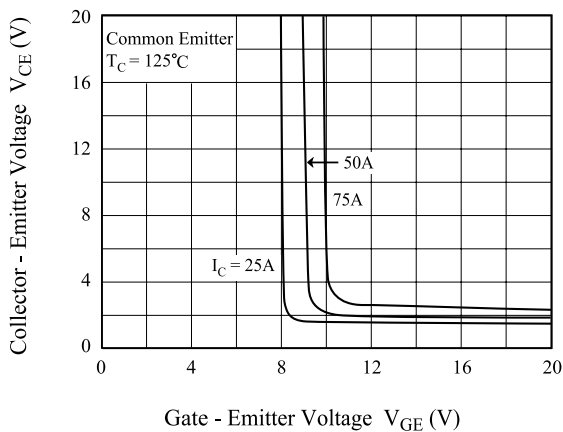


Fig.8 Saturation Voltage vs. V_{GE}

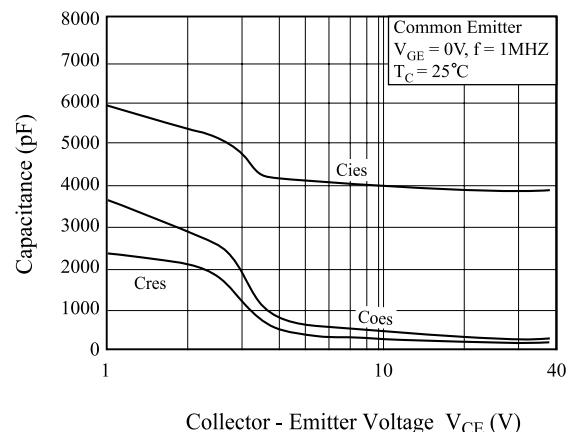


Fig.9 Capacitance Characteristics

SG50T65UDB2

Discrete IGBTs

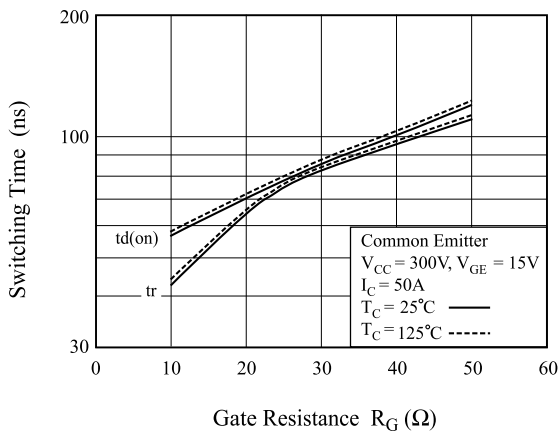


Fig.10 Turn-On Characteristics vs. Gate Resistance

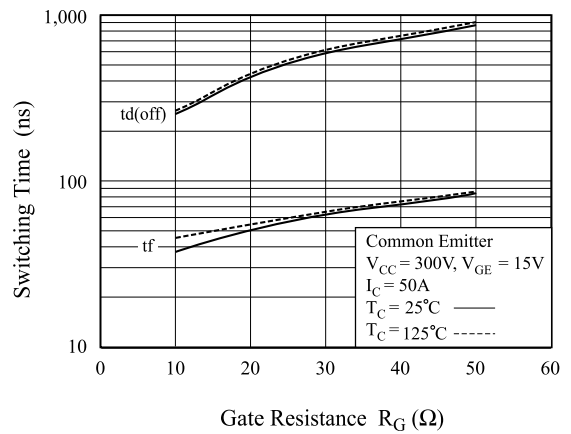


Fig.11 Turn-Off Characteristics vs. Gate Resistance

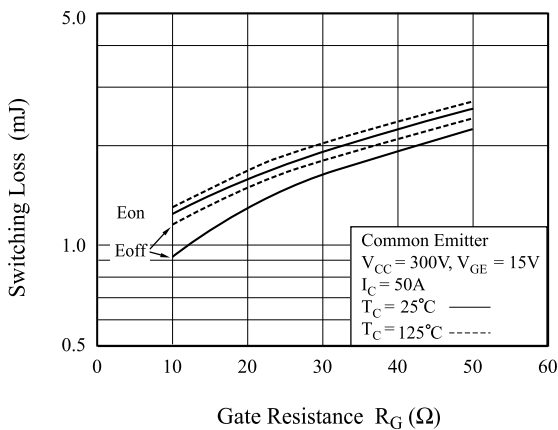


Fig.12 Switching Loss vs. Gate Resistance

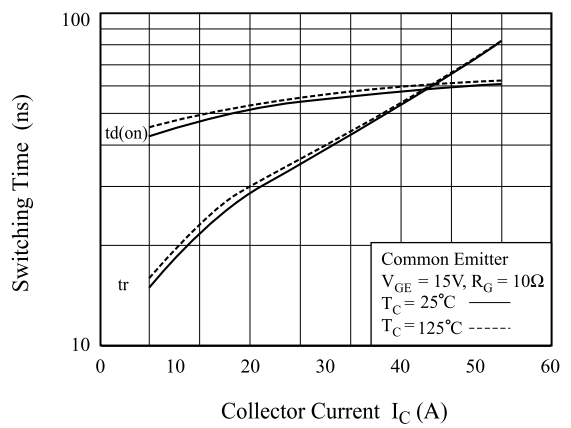


Fig.13 Turn-On Characteristics vs. Collector Current

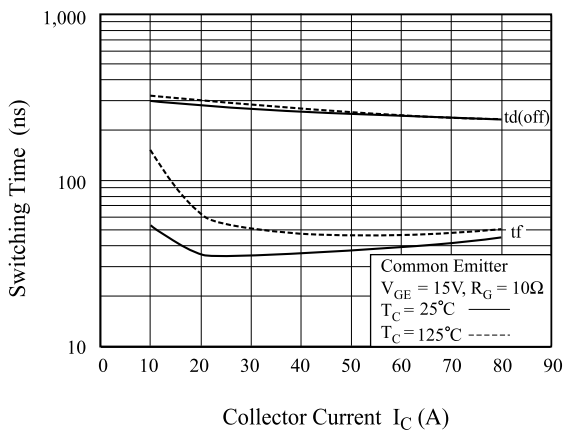


Fig.14 Turn-Off Characteristics vs. Collector Current

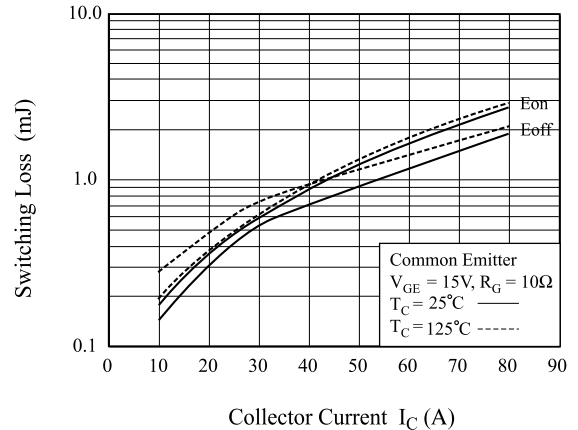


Fig.15 Switching Loss vs. Collector Current

SG50T65UDB2

Discrete IGBTs

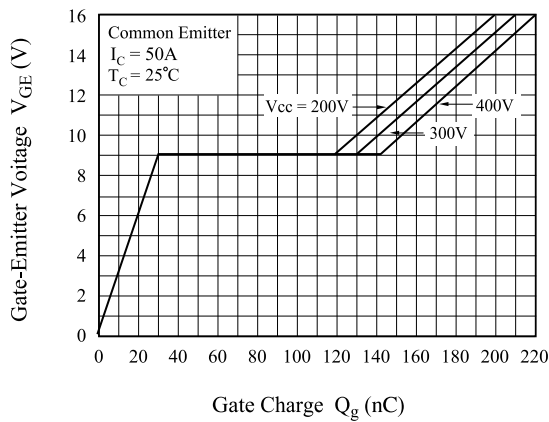


Fig.16 Gate Charge Characteristics

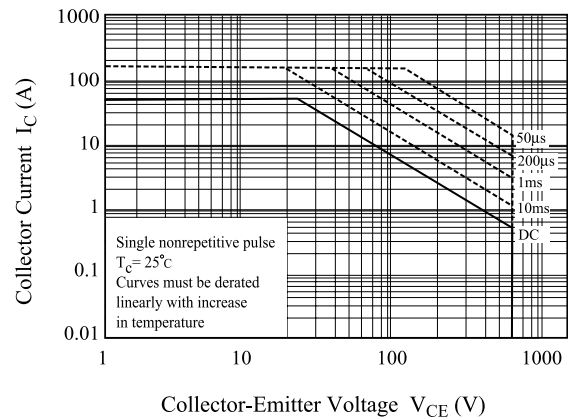


Fig.17 SOA Characteristics

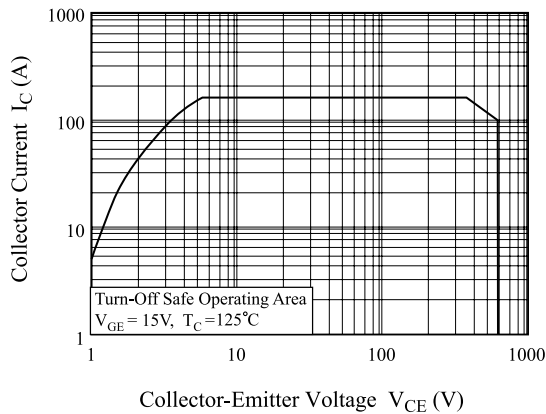


Fig.18 Turn-Off SOA

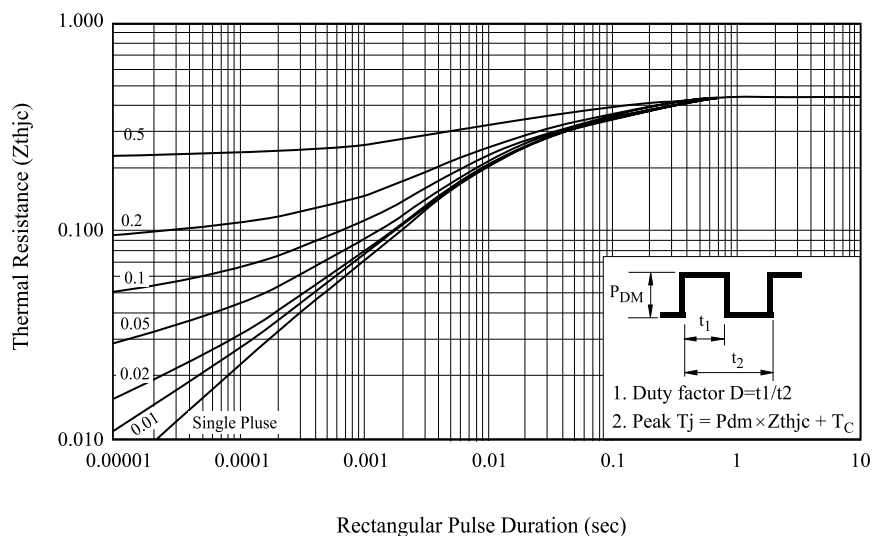


Fig.19 Transient Thermal Impedance of IGBT

SG50T65UDB2

Discrete IGBTs

Fig.20 Switching Test Circuit

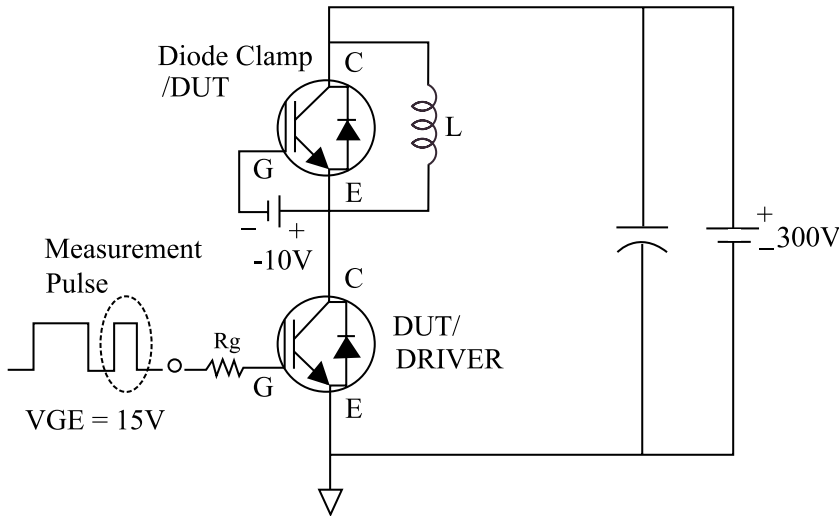


Fig.21 Definition Switching Time & Loss

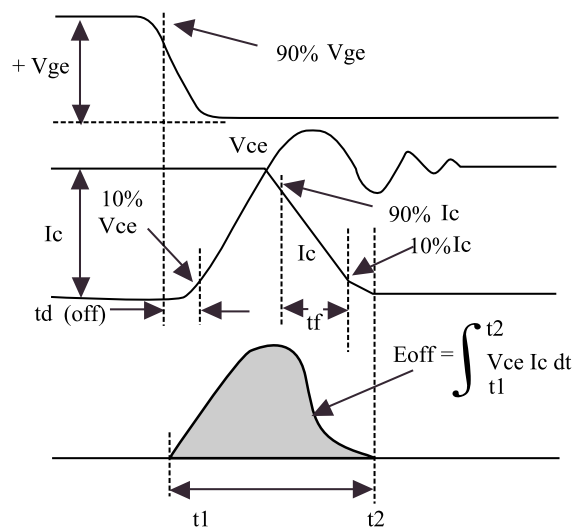
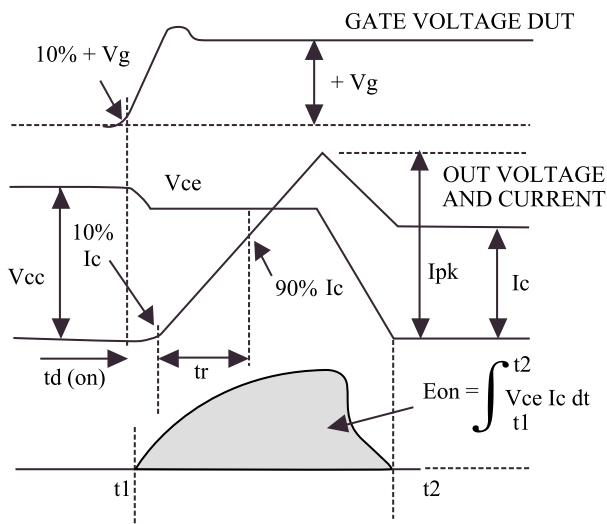
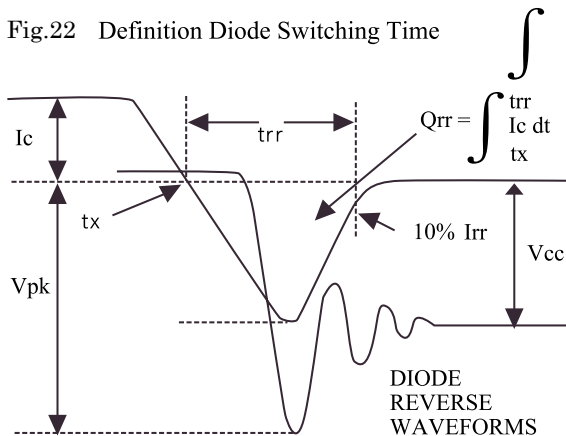


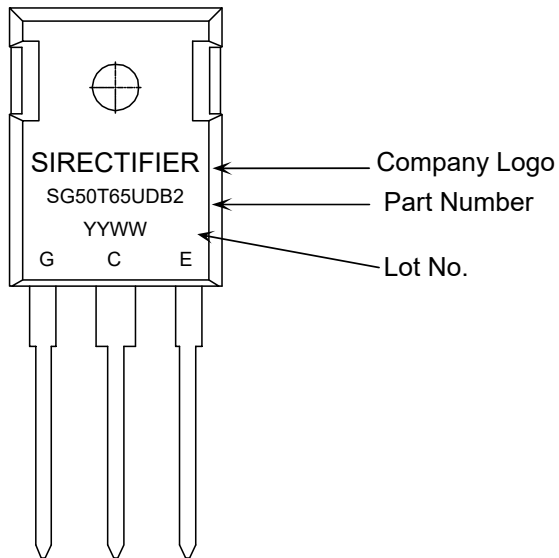
Fig.22 Definition Diode Switching Time



SG50T65UDB2

Discrete IGBTs

MARKING



ORDERING INFORMATION

Part Number	Package	Shipping	Marking Code
SG50T65UDB2	TO-247AD	30pcs / Tube	SG50T65UDB2