

General Description

KEC Field Stop Trench 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

ORDERING INFORMATION

FULL NAME	PACKAGE	SUFFIX
KGF75N60KDB-U/P	TO-247	-
KGF75N60KDB-U/PE	TO-247(E)	Added code "E" to TO-247(E)

MAXIMUM RATING (Ta=25)

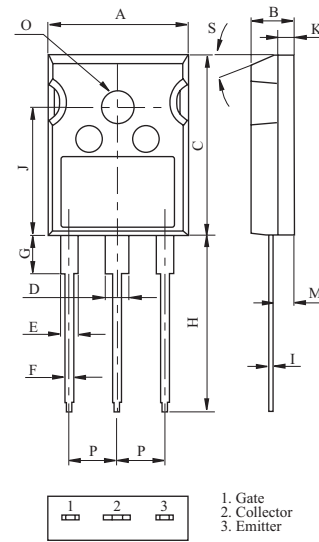
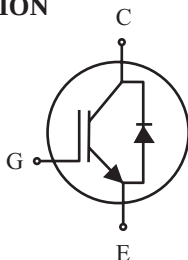
CHARACTERISTIC		SYMBOL	RATING	UNIT
Collector-Emitter Voltage		V_{CES}	600	V
Gate-Emitter Voltage		V_{GES}	± 20	V
Collector Current	@Tc=25	I_C	100	A
	@Tc=100		75	A
Pulsed Collector Current		I_{CM}^*	225	A
Diode Continuous Forward Current		@Tc=100 I_F	75	A
Diode Maximum Forward Current		I_{FM}	150	A
Maximum Power Dissipation	@Tc=25	P_D	357	W
	@Tc=100		143	W
Maximum Junction Temperature		T_j	150	
Storage Temperature Range		T_{stg}	-55 to + 150	

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

THERMAL CHARACTERISTIC

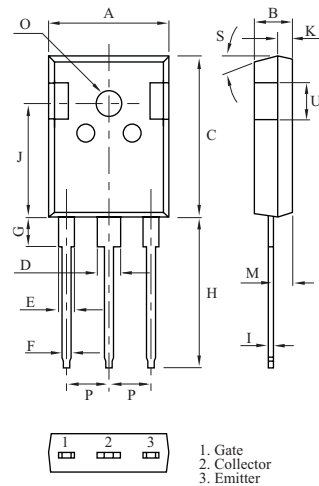
CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Junction to Case (IGBT)	R_{thJC}	0.35	/W
Thermal Resistance, Junction to Case (DIODE)	R_{thJC}	0.8	/W
Thermal Resistance, Junction to Ambient	R_{thJA}	40	/W

PIN CONNECTION



DIM	MILLIMETERS
A	15.90 ± 0.30
B	5.00 ± 0.20
C	20.85 ± 0.30
D	3.00 ± 0.20
E	2.00 ± 0.20
F	1.20 ± 0.20
G	Max. 4.50
H	20.10 ± 0.70
I	0.60 ± 0.02
J	14.70 ± 0.20
K	2.00 ± 0.10
M	2.40 ± 0.20
O	φ3.60 ± 0.30
P	5.45 ± 0.30
S	20°

TO-247



DIM	MILLIMETERS
A	15.80 ± 0.05
B	5.00 ± 0.08
C	21.00 ± 0.05
D	3.00 ± 0.10
E	2.00 ± 0.10
F	1.20
G	Max. 4.50
H	19.92 ± 0.10
I	0.60 ± 0.01
J	14.70 ± 0.20
K	2.00 ± 0.03
M	2.41 ± 0.05
O	φ3.60 ± 0.15
P	5.44
S	15°
U	5.00

TO-247(E)

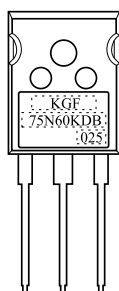
KGF75N60KDB

ELECTRICAL CHARACTERISTICS (Ta=25)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Static						
Collector-Emitter Breakdown Voltage	BV _{CES}	V _{GE} =0V , I _C =250 μA	600	-	-	V
Collector Cut-off Current	I _{CES}	V _{GE} =0V, V _{CE} =600V	-	-	250	μA
Gate Leakage Current	I _{GES}	V _{CE} =0V, V _{GE} = ± 20V	-	-	± 100	nA
Gate Threshold Voltage	V _{GE(th)}	V _{GE} =V _{CE} , I _C =7.5mA	5.0	6.0	7.5	V
Collector-Emitter Saturation Voltage	V _{CE(sat)}	V _{GE} =15V, I _C =75A	-	1.55	1.8	V
		V _{GE} =15V, I _C =150A	-	2.2	-	V
		V _{GE} =15V, I _C =75A, T _C = 125	-	1.7	-	V
Dynamic						
Total Gate Charge	Q _g	V _{CC} =300V, V _{GE} =15V, I _C = 75A	-	250	-	nC
Gate-Emitter Charge	Q _{ge}		-	50	-	nC
Gate-Collector Charge	Q _{gc}		-	140	-	nC
Turn-On Delay Time	t _{d(on)}	V _{CC} =300V, I _C =75A, V _{GE} =15V,R _G =10 Ω Inductive Load, T _C = 25 (Note 1)	-	100	-	ns
Rise Time	t _r		-	50	-	ns
Turn-Off Delay Time	t _{d(off)}		-	230	-	ns
Fall Time	t _f		-	45	-	ns
Turn-On Switching Loss	E _{on}		-	2.9	3.7	mJ
Turn-Off Switching Loss	E _{off}		-	2.4	3.2	mJ
Total Switching Loss	E _{ts}		-	5.3	6.9	mJ
Turn-On Delay Time	t _{d(on)}	V _{CC} =300V, I _C =75A, V _{GE} =15V, R _G =10 Ω Inductive Load, T _C = 125 (Note 1)	-	100	-	ns
Rise Time	t _r		-	60	-	ns
Turn-Off Delay Time	t _{d(off)}		-	240	-	ns
Fall Time	t _f		-	50	-	ns
Turn-On Switching Loss	E _{on}		-	3.0	-	mJ
Turn-Off Switching Loss	E _{off}		-	2.6	-	mJ
Total Switching Loss	E _{ts}		-	5.6	-	mJ
Input Capacitance	C _{ies}	V _{CE} =30V, V _{GE} =0V, f=1MHz	-	5850	7600	pF
Ouput Capacitance	C _{oes}		-	250	-	pF
Reverse Transfer Capacitance	C _{res}		-	80	-	pF
Short Circuit Withstand Time	t _{sc}	V _{CC} =300V, V _{GE} =15V, T _C =100	10	-	-	μs

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

Marking



- ① Device Mark 1
- ② Device Mark 2
- ③ Lot No

KGF75N60KDB

ELECTRICAL CHARACTERISTIC OF DIODE

CHARACTERISTIC	SYMBOL	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Diode Forward Voltage	V _F	I _F = 75A	T _C =25	-	1.5	2.1	V
			T _C =125	-	1.6	-	
Diode Reverse Recovery Time	t _{rr}	V _{CC} =300V, I _F = 75A di/dt = 600A/ μs	T _C =25	-	170	-	ns
			T _C =125	-	230	-	
Diode Peak Reverse Recovery Current	I _{rr}		T _C =25	-	20	-	A
			T _C =125	-	21	-	
Diode Reverse Recovery Charge	Q _{rr}		T _C =25	-	2.0	-	μC
			T _C =125	-	3.0	-	

Fig 1. Saturation Voltage Characteristics

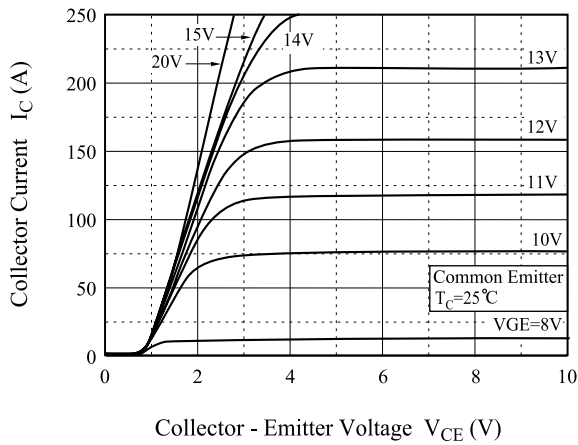


Fig 2. Saturation Voltage Characteristics

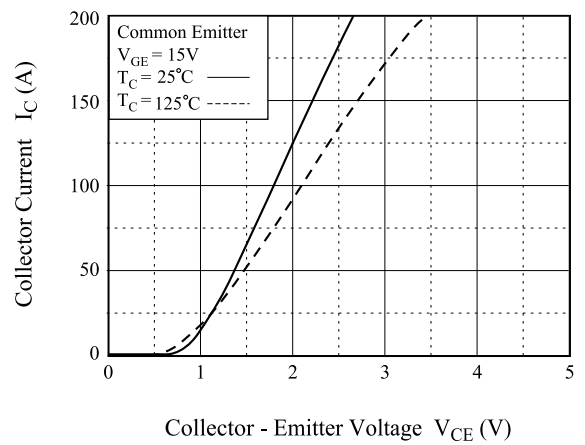


Fig 3. Saturation Voltage vs. Case Temperature

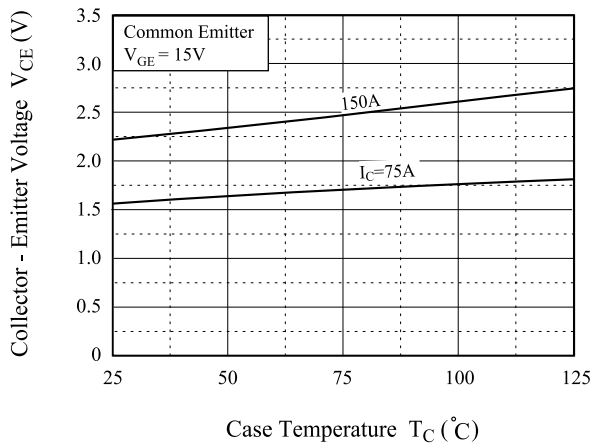


Fig 4. Saturation Voltage vs. V_{GE}

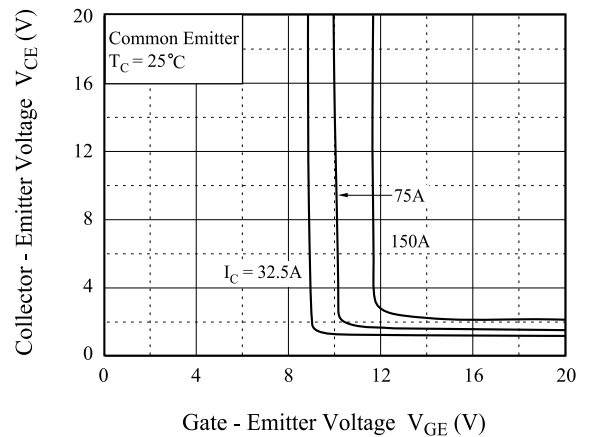


Fig 5. Saturation Voltage vs. V_{GE}

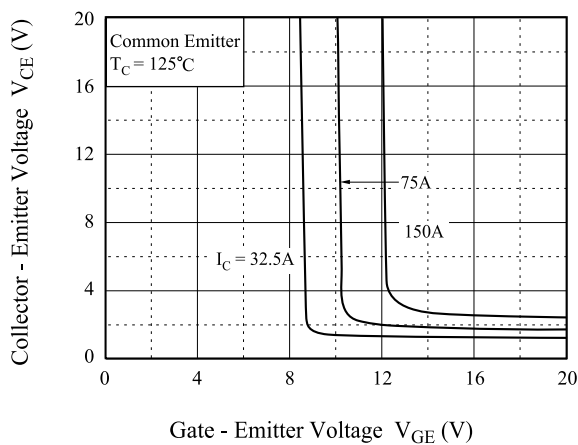


Fig 6. Capacitance Characteristics

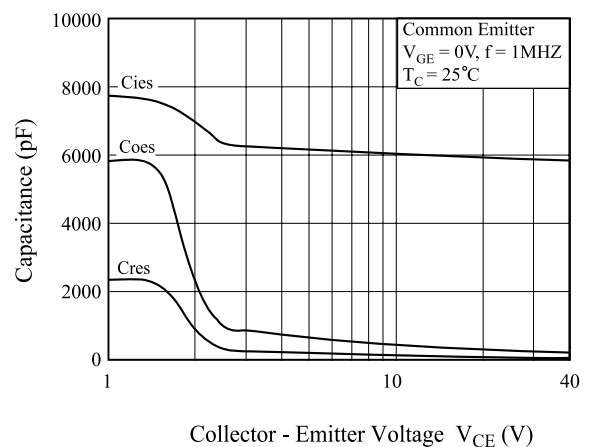


Fig 7. Turn-On Characteristics vs. Gate Resistance

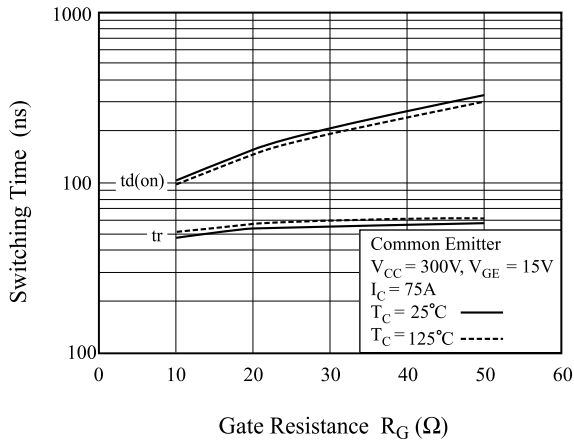


Fig 8. Turn-Off Characteristics vs. Gate Resistance

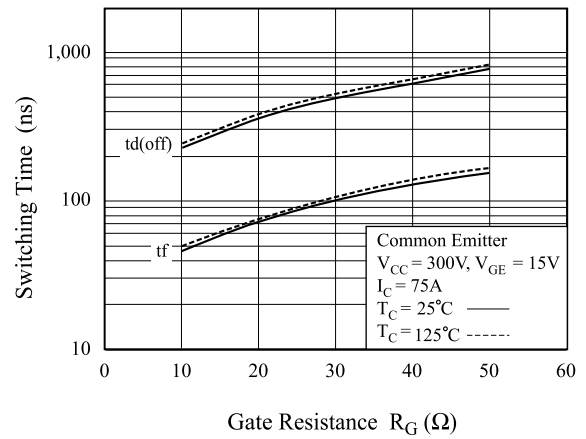


Fig 9. Switching Loss vs. Gate Resistance

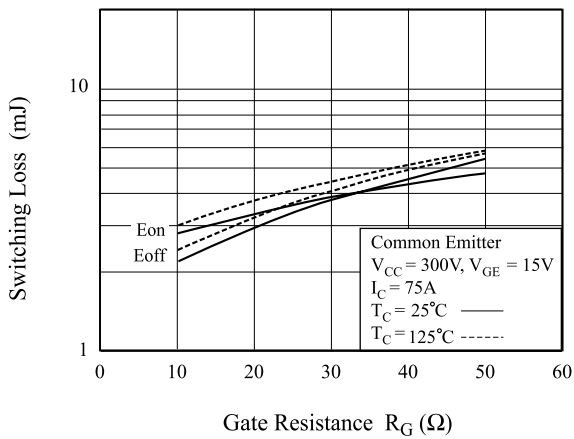


Fig 10. Turn-On Characteristics vs. Collector Current

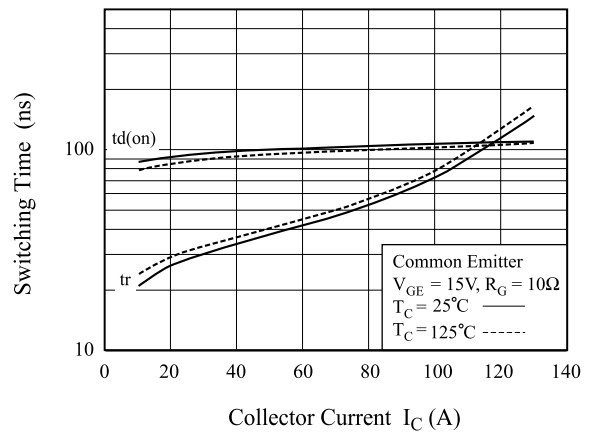


Fig 11. Turn-Off Characteristics vs. Collector Current

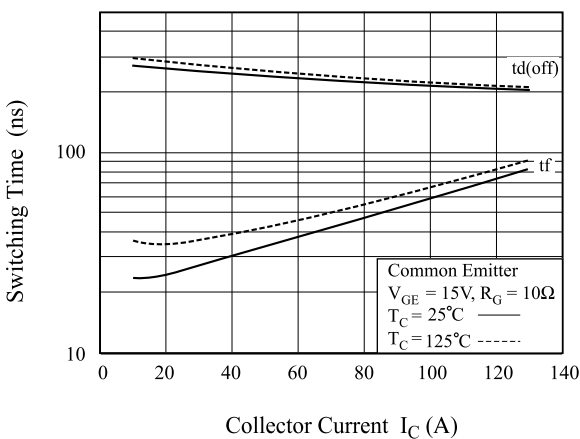


Fig 12. Switching Loss vs. Collector Current

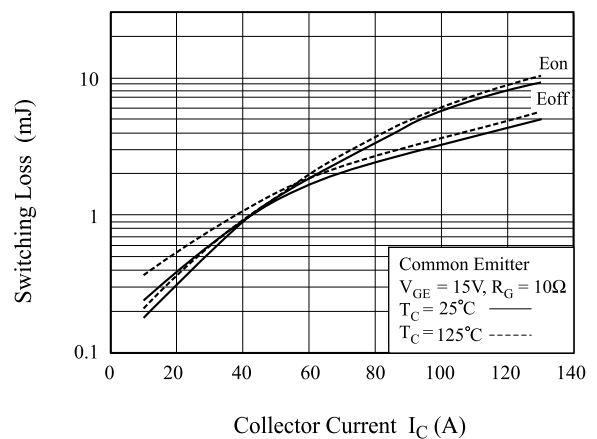


Fig 13. Gate Charge Characteristics

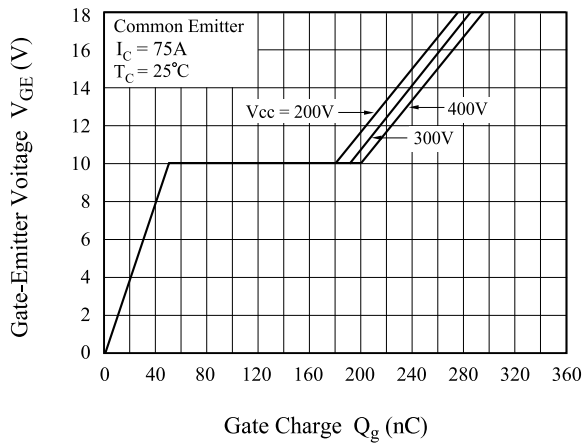


Fig 14. SOA Characteristics

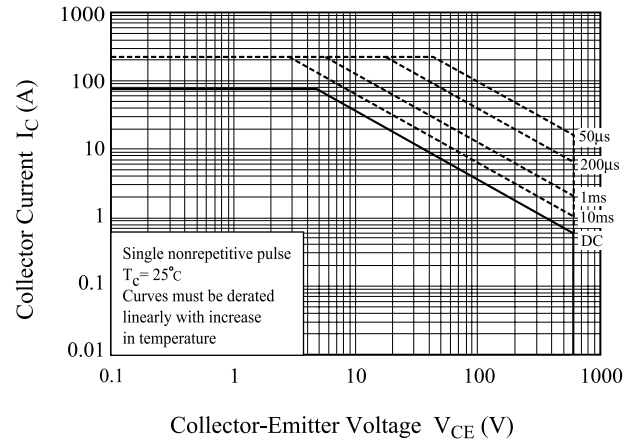


Fig 15. Turn-Off SOA

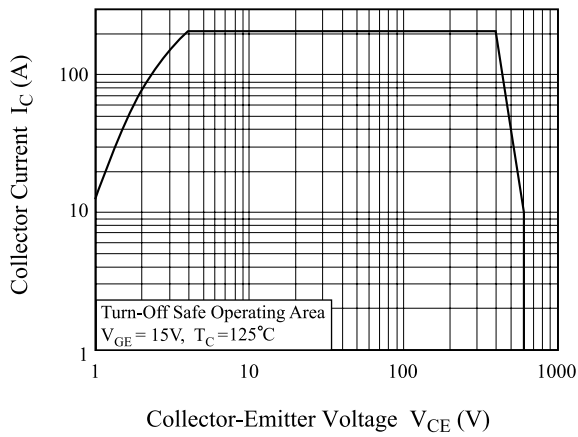


Fig 16. Transient Thermal Impedance of IGBT

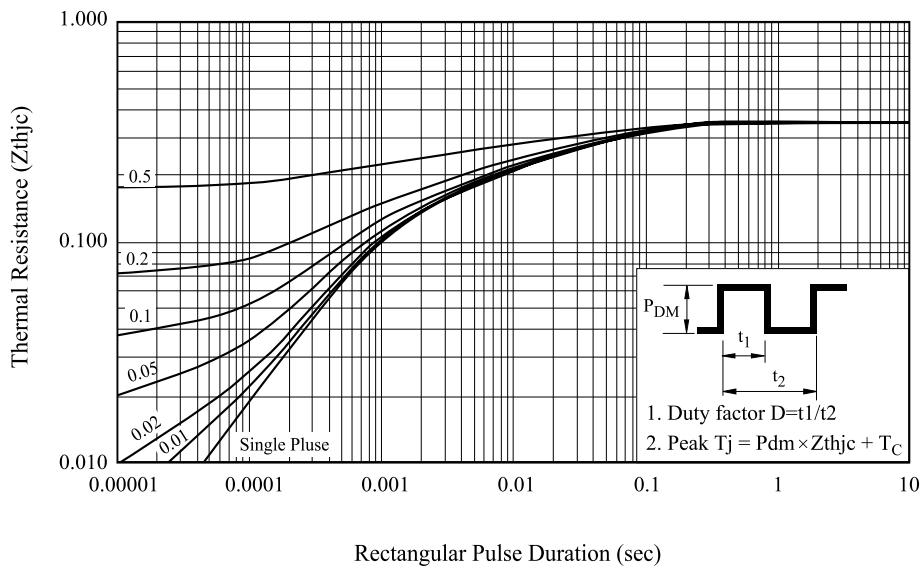


Fig 17. Forward Characteristics

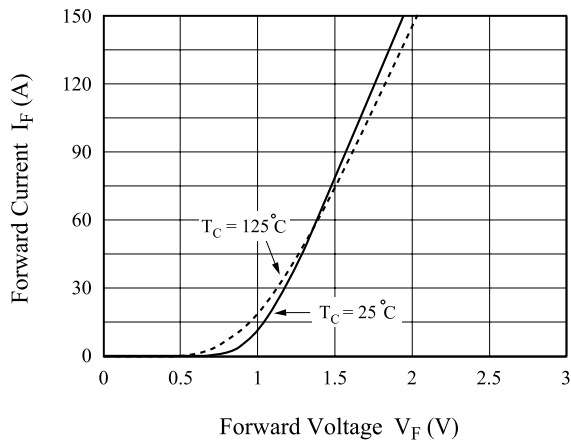


Fig 18. Reverse Recovery Current

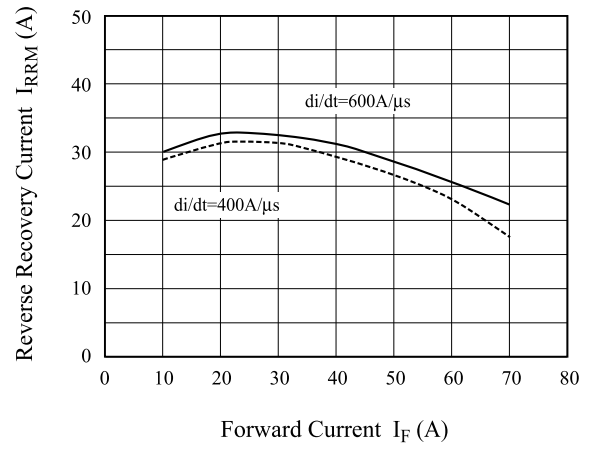


Fig 19. Reverse Recovery Time

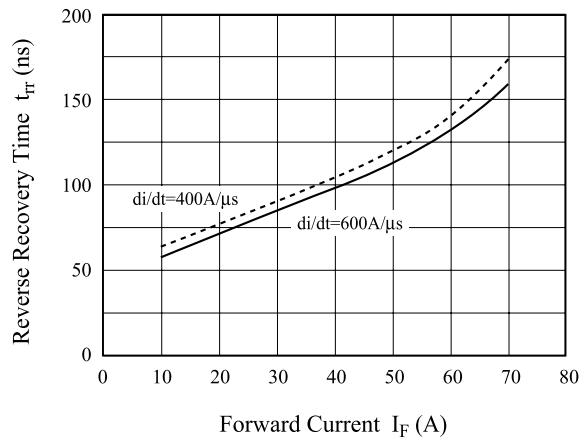


Fig 20. Switching Test Circuit

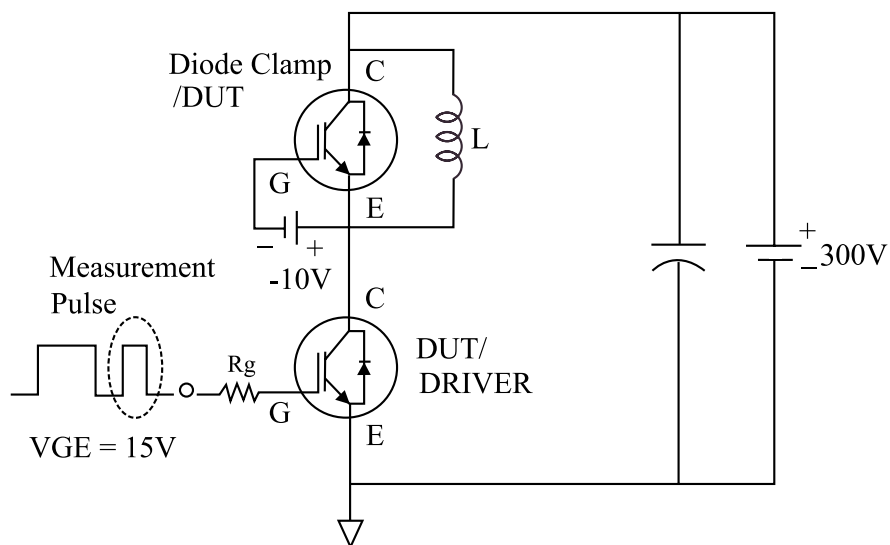


Fig 21. Definition Switching Time & Loss

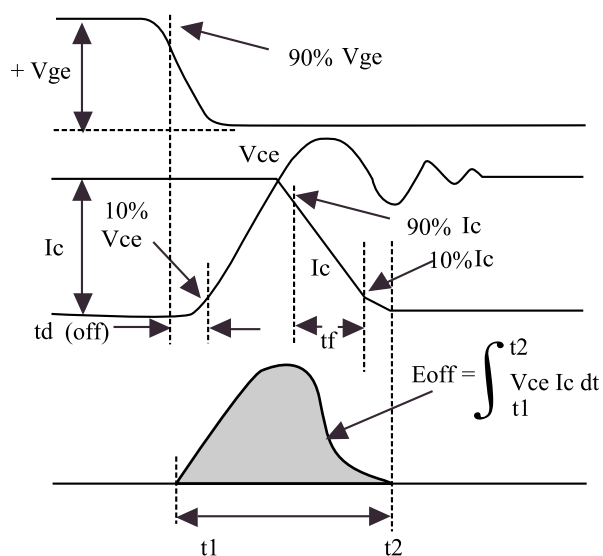
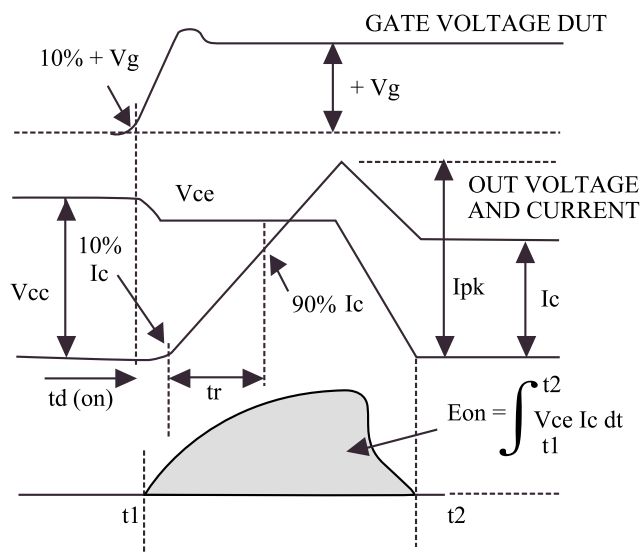


Fig 22. Definition Diode Switching Time

