

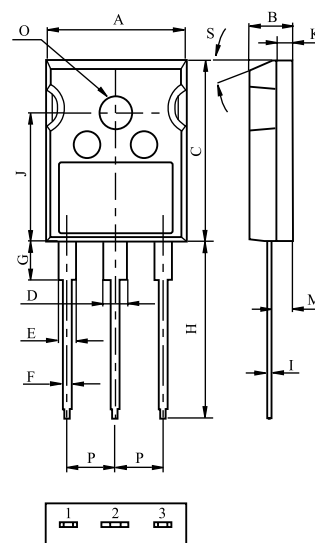
General Description

KEC NPT 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 system efficiency
- Short Circuit Withstand Times 10us
- Extremely enhanced avalanche capability



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	φ 3.60 ± 0.30
P	5.45 ± 0.30
Q	φ 3.60 ± 0.20
R	φ 7.19 ± 0.10
S	20°

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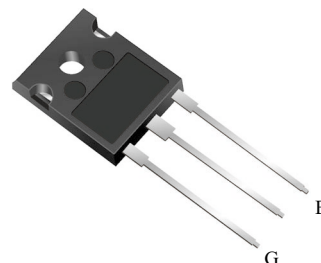
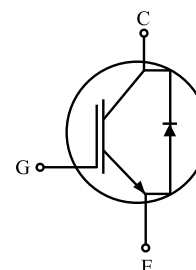
MAXIMUM RATING (Ta=25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Collector-Emitter Voltage	V_{CES}	1200	V
Gate-Emitter Voltage	V_{GES}	±20	V
Collector Current	I_C	30	A
		15	A
Pulsed Collector Current	I_{CM}^*	45	A
Diode Continuous Forward Current	I_F	15	A
Diode Maximum Forward Current	I_{FM}	45	A
Maximum Power Dissipation	P_D	200	W
		80	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 (IGBT)	R_{thJC}	0.6	°C/W
Thermal Resistance, Junction to Case (DIODE)	R_{thJC}	2.8	°C/W
Thermal Resistance, Junction to Ambient	R_{thJA}	40	°C/W

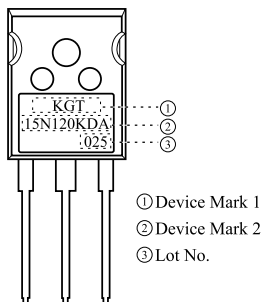


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ELECTRICAL CHARACTERISTICS (Ta=25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Static						
Collector-Emitter Breakdown Voltage	BV _{CES}	V _{GE} =0V , I _C =1.0mA	1200	-	-	V
Collector Cut-off Current	I _{CES}	V _{GE} =0V, V _{CE} =1200V	-	-	1.0	mA
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 =15mA	4.0	5.5	7.0	V
Collector-Emitter Saturation Voltage	V _{CE(sat)}	V _{GE} =15V, I _C =15A	-	1.90	2.30	V
		V _{GE} =15V, I _C =15A, T _C = 125°C	-	2.25	-	V
		V _{GE} =15V, I _C =30A	-	2.35	-	V
Dynamic						
Total Gate Charge	Q _g	V _{CC} =600V, V _{GE} =15V, I _C = 15A	-	115	170	nC
Gate-Emitter Charge	Q _{ge}		-	13	-	nC
Gate-Collector Charge	Q _{gc}		-	40	-	nC
Turn-On Delay Time	t _{d(on)}	V _{CC} =600V, I _C =15A, V _{GE} =15V,R _G =10Ω Inductive Load, T _C = 25°C	-	50	-	ns
Rise Time	t _r		-	30	-	ns
Turn-Off Delay Time	t _{d(off)}		-	260	-	ns
Fall Time	t _f		-	100	180	ns
Turn-On Switching Loss	E _{on}		-	2.7	4.0	mJ
Turn-Off Switching Loss	E _{off}		-	0.55	0.90	mJ
Total Switching Loss	E _{ts}		-	3.25	4.90	mJ
Turn-On Delay Time	t _{d(on)}	V _{CC} =600V, I _C =15A, V _{GE} =15V, R _G =10Ω Inductive Load, T _C = 125°C	-	50	-	ns
Rise Time	t _r		-	30	-	ns
Turn-Off Delay Time	t _{d(off)}		-	270	-	ns
Fall Time	t _f		-	150	-	ns
Turn-On Switching Loss	E _{on}		-	2.9	4.2	mJ
Turn-Off Switching Loss	E _{off}		-	0.8	1.2	mJ
Total Switching Loss	E _{ts}		-	3.7	5.4	mJ
Input Capacitance	C _{ies}	V _{CE} =30V, V _{GE} =0V, f=1MHz	-	1900	-	pF
Ouput Capacitance	C _{oes}		-	80	-	pF
Reverse Transfer Capacitance	C _{res}		-	55	-	pF
Short Circuit Withstand Time	t _{sc}	V _{CC} =600V, V _{GE} =15V, T _C =100°C	10	-	-	μs

Marking



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ELECTRICAL CHARACTERISTIC OF DIODE

CHARACTERISTIC	SYMBOL	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Diode Forward Voltage	V _F	I _F = 15A	T _C =25°C	-	1.8	2.5	V
			T _C =125°C	-	1.9	-	
Diode Reverse Recovery Time	t _{rr}	I _F = 15A di/dt = 200A/μs	T _C =25°C	-	230	300	ns
			T _C =125°C	-	270	-	
Diode Peak Reverse Recovery Current	I _{rr}		T _C =25°C	-	24	31	A
			T _C =125°C	-	27	-	
Diode Reverse Recovery Charge	Q _{rr}		T _C =25°C	-	2400	4000	nC
			T _C =125°C	-	3640	-	

Typical Performance Characteristics

Fig 1. Saturation Voltage Characteristics

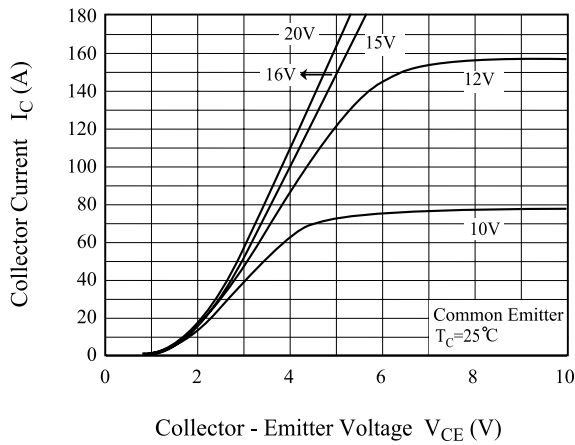


Fig 2. Saturation Voltage Characteristics

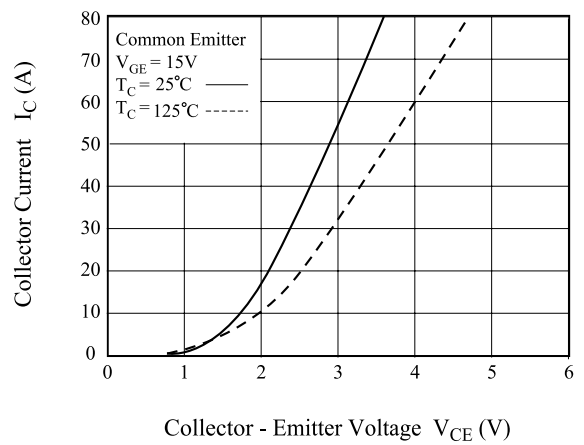


Fig 3. Saturation Voltage vs. Case Temperature

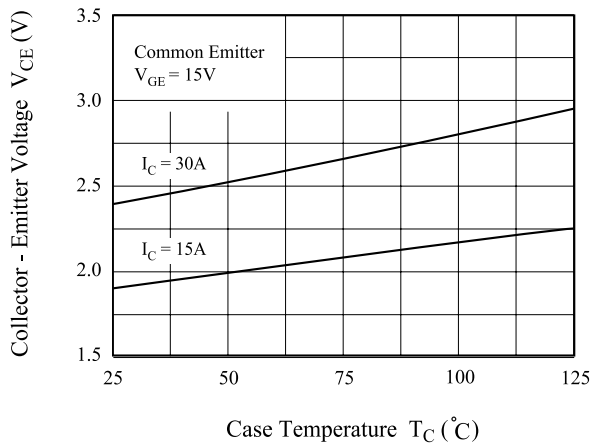


Fig 4. Saturation Voltage vs. V_{GE}

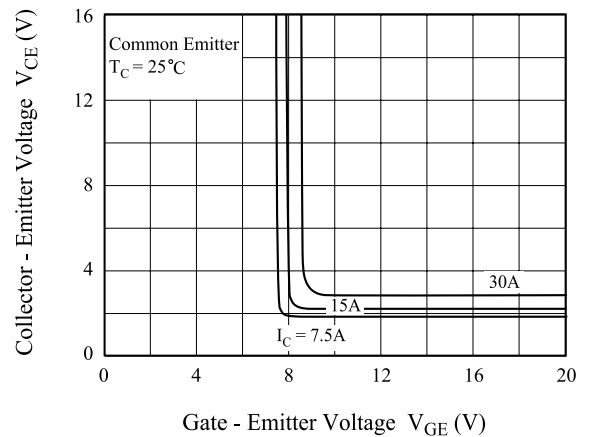


Fig 5. Saturation Voltage vs. V_{GE}

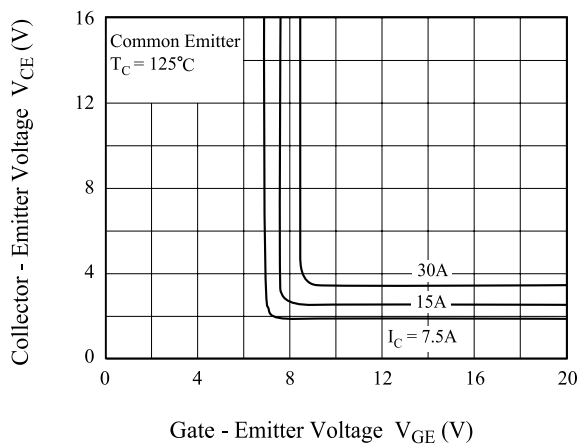
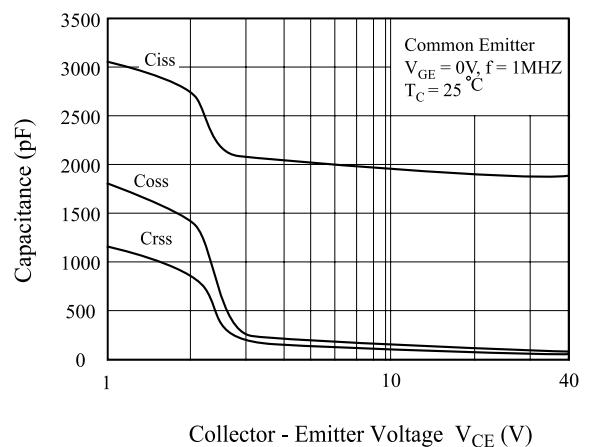


Fig 6. Capacitance Characteristics



Typical Performance Characteristics (Continued)

Fig 7. Turn-On Characteristics vs. Gate Resistance

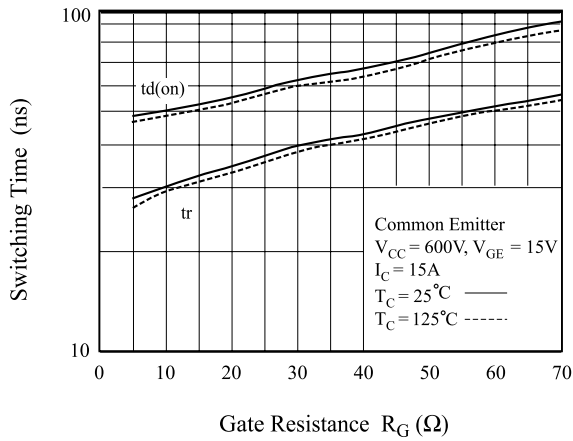


Fig 8. Turn-Off Characteristics vs. Gate Resistance

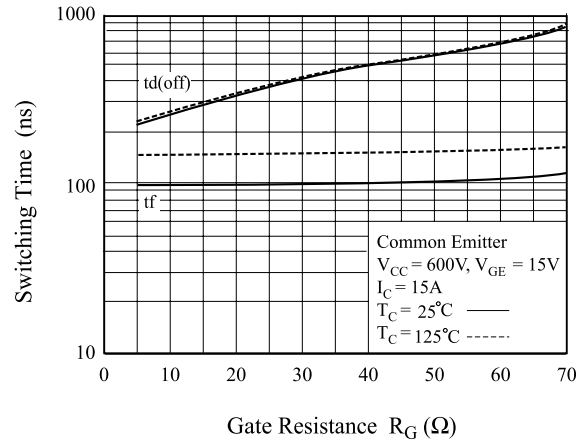


Fig 9. Switching Loss vs. Gate Resistance

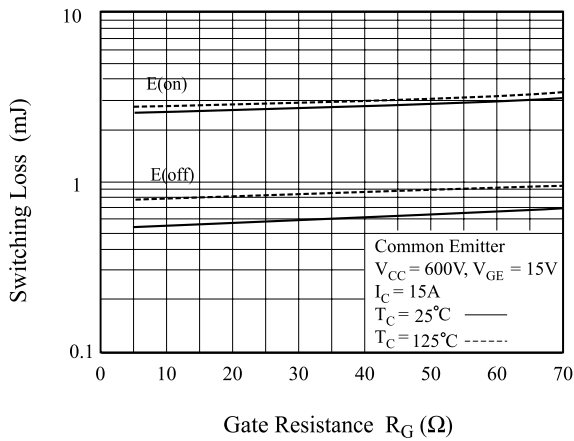


Fig 10. Turn-On Characteristics vs. Collector Current

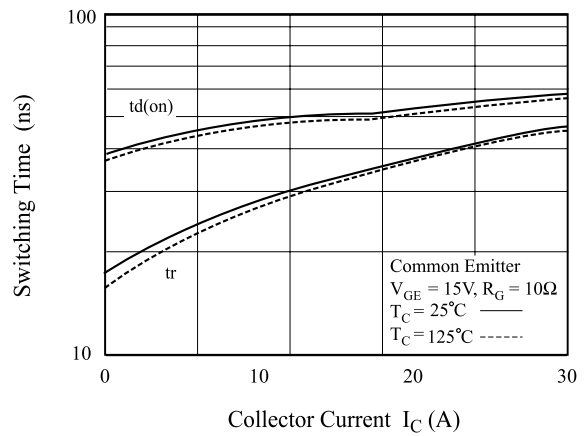


Fig 11. Turn-Off Characteristics vs. Collector Current

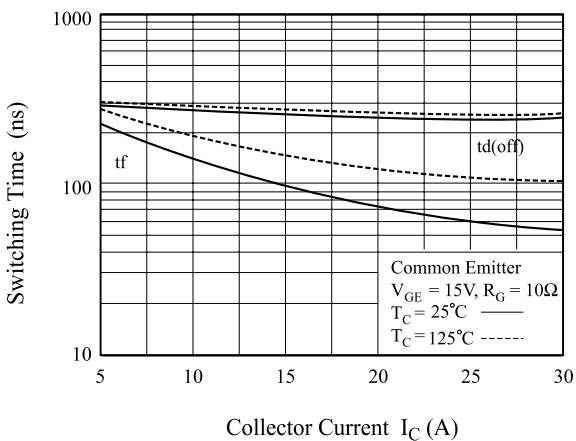
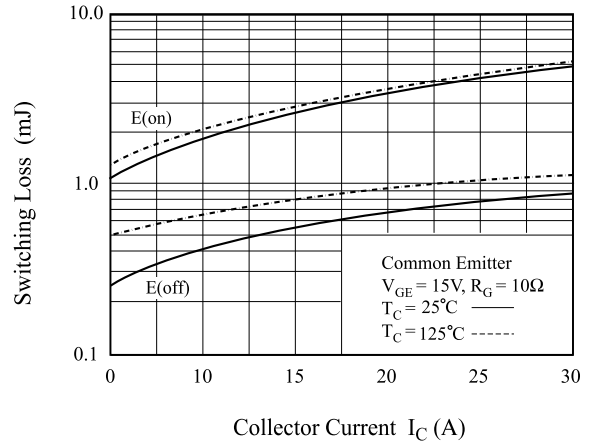


Fig 12. Switching Loss vs. Collector Current



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Typical Performance Characteristics (Continued)

Fig 13. Gate Charge Characteristics

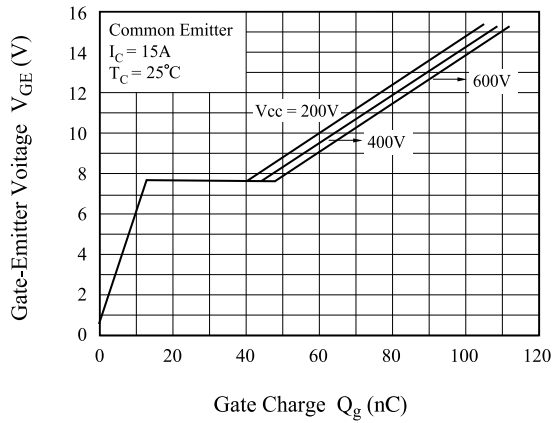


Fig 14. SOA Characteristics

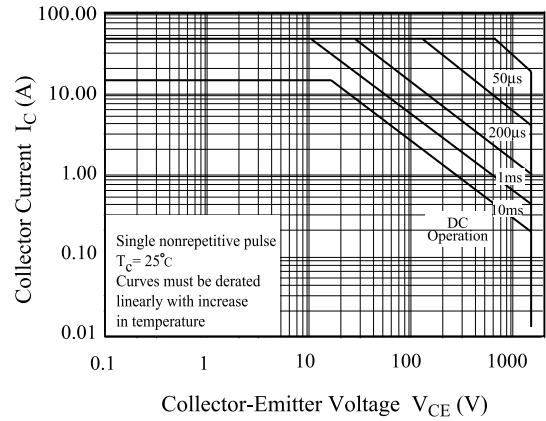


Fig 15. Turn-Off SOA

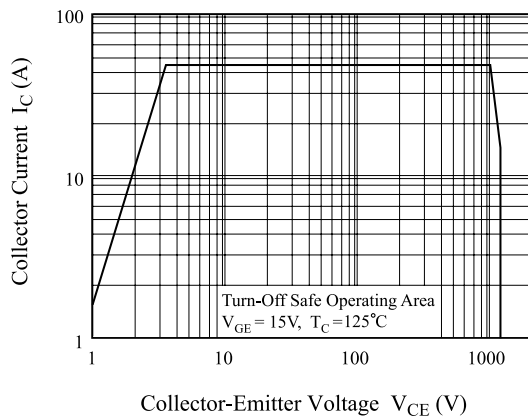
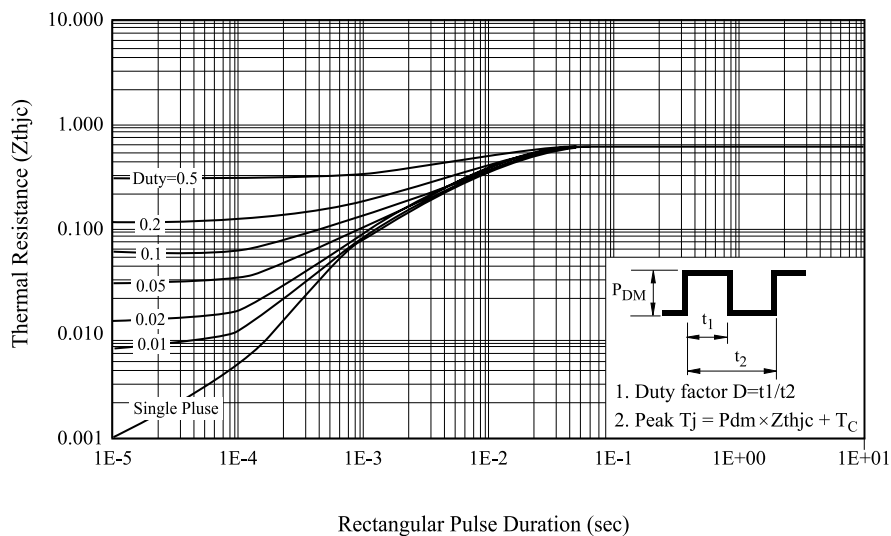


Fig 16. Transient Thermal Impedance of IGBT



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Typical Performance Characteristics

Fig 17. Forward Characteristics

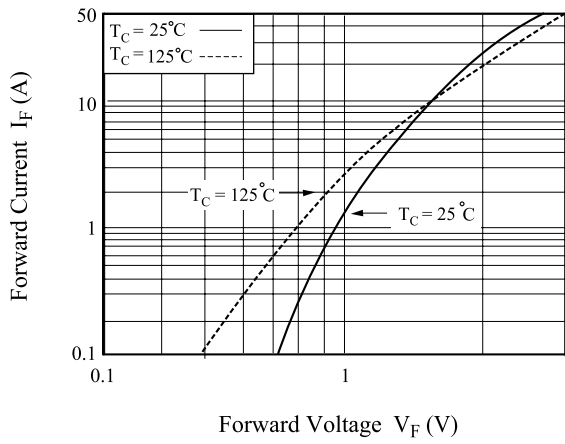


Fig 18. Reverse Recovery Current

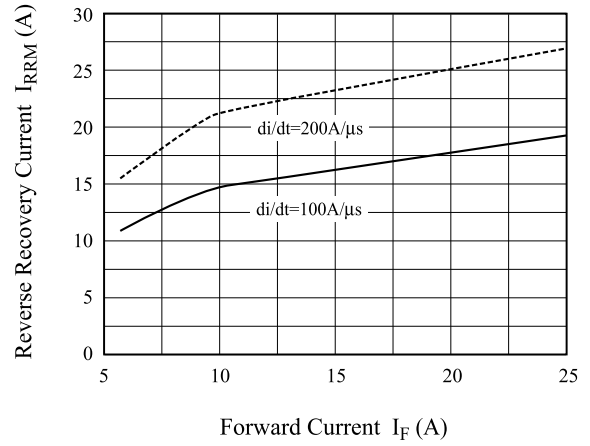
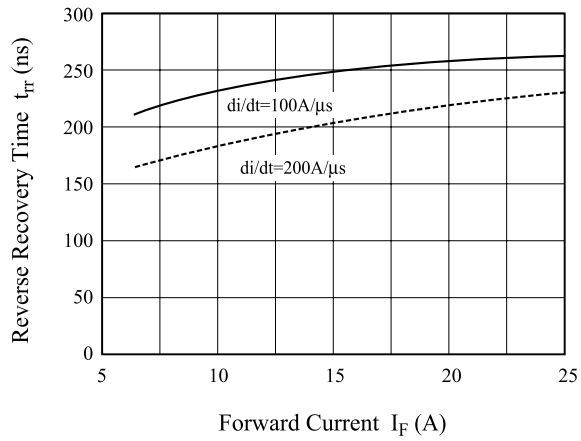


Fig 19. Reverse Recovery Time



Definition Switching Time & Loss.

Fig 20. Switching Test Circuit

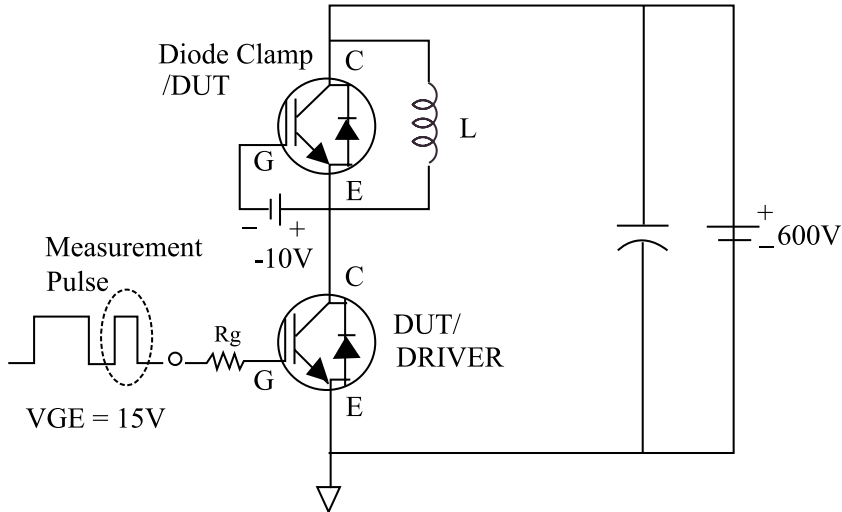


Fig 21. Definition Switching Time & Loss

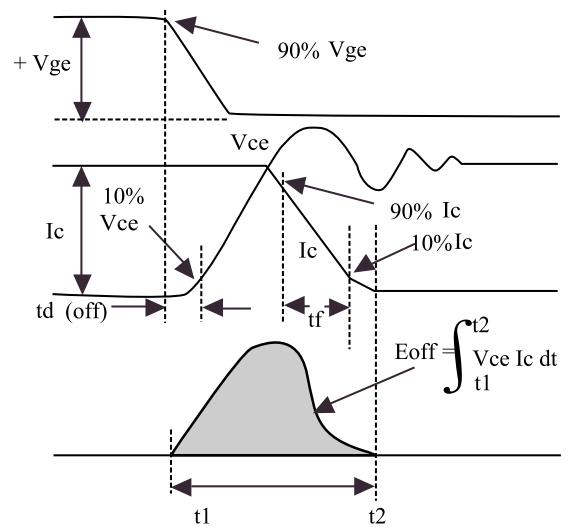
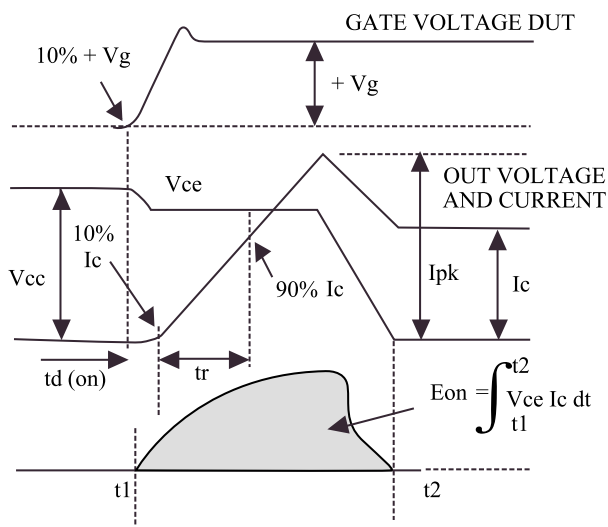


Fig 22. Definition Diode Switching Time

