

General Description

KEC NPT IGBTs offer low switching losses, high energy efficiency and high avalanche ruggedness for soft switching application such as IH(induction heating), microwave oven, etc.

FEATURES

- High speed switching
- High system efficiency
- Soft current turn-off waveforms
- Extremely enhanced avalanche capability

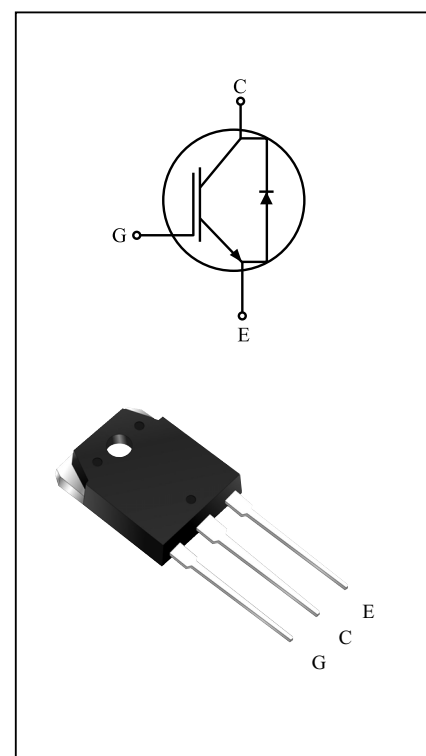
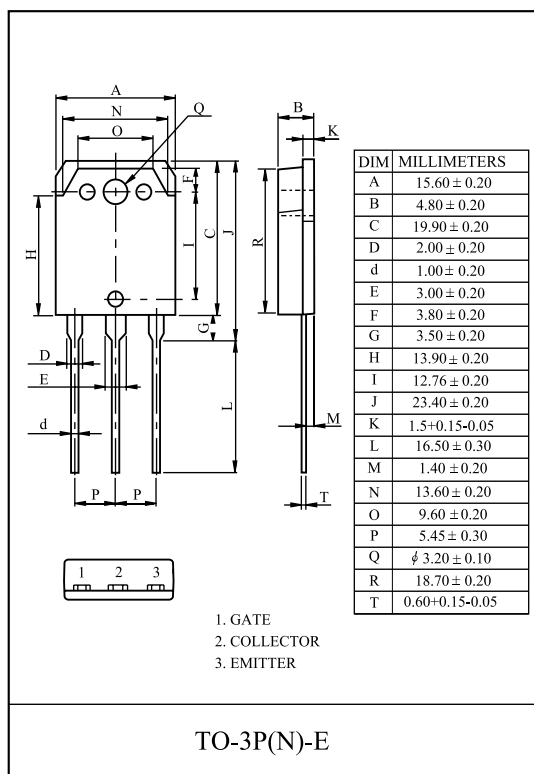
MAXIMUM RATING (Ta=25 °C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Collector-Emitter Voltage		V_{CES}	1200	V
Gate-Emitter Voltage		V_{GES}	± 20	V
Collector Current	@Tc=25	I_C	50	A
	@Tc=100		25	A
Pulsed Collector Current		I_{CM}^*	90	A
Diode Continuous Forward Current	@Tc=100	I_F	25	A
Diode Maximum Forward Current		I_{FM}	150	A
Maximum Power Dissipation	@Tc=25	P_D	312	W
	@Tc=100		125	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)	$R_{\theta JC}$	0.4	/W
Thermal Resistance, Junction to Case (DIODE)	$R_{\theta JC}$	2.0	/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	40	/W



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ELECTRICAL CHARACTERISTICS (Ta=25)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Static						
Collector-Emitter Breakdown Voltage	BV _{CES}	V _{GE} =0V , I _C =1mA	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 =25mA	4.0	5.5	7.0	V
Collector-Emitter Saturation Voltage	V _{CE(sat)}	V _{GE} =15V, I _C =25A	-	1.95	2.30	V
		V _{GE} =15V, I _C =25A, T _C = 125	-	2.25	-	V
		V _{GE} =15V, I _C =50A	-	2.50	-	V
Dynamic						
Total Gate Charge	Q _g	V _{CC} =600V, V _{GE} =15V, I _C = 25A	-	200	300	nC
Gate-Emitter Charge	Q _{ge}		-	20	-	nC
Gate-Collector Charge	Q _{gc}		-	80	-	nC
Turn-On Delay Time	t _{d(on)}	V _{CC} =600V, I _C =25A, V _{GE} =15V,R _G =10 Ω Inductive Load, T _C = 25	-	60	-	ns
Rise Time	t _r		-	50	-	ns
Turn-Off Delay Time	t _{d(off)}		-	290	-	ns
Fall Time	t _f		-	100	-	ns
Turn-On Switching Loss	E _{on}		-	4.1	6.1	mJ
Turn-Off Switching Loss	E _{off}		-	0.86	1.4	mJ
Total Switching Loss	E _{ts}		-	4.96	7.5	mJ
Turn-On Delay Time	t _{d(on)}		V _{CC} =600V, I _C =25A, V _{GE} =15V, R _G =10 Ω Inductive Load, T _C = 125	-	60	-
Rise Time	t _r	-		50	-	ns
Turn-Off Delay Time	t _{d(off)}	-		300	-	ns
Fall Time	t _f	-		150	-	ns
Turn-On Switching Loss	E _{on}	-		4.3	6.3	mJ
Turn-Off Switching Loss	E _{off}	-		1.2	2.1	mJ
Total Switching Loss	E _{ts}	-		5.5	8.4	mJ
Input Capacitance	C _{ies}	V _{CE} =30V, V _{GE} =0V, f=1MHz	-	3100	-	pF
Ouput Capacitance	C _{oes}		-	100	-	pF
Reverse Transfer Capacitance	C _{res}		-	80	-	pF

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ELECTRICAL CHARACTERISTIC OF DIODE

CHARACTERISTIC	SYMBOL	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Diode Forward Voltage	V _F	I _F = 25A	T _C =25	-	1.8	2.5	V
			T _C =125	-	1.9	-	
Diode Reverse Recovery Time	t _{rr}	I _F = 25A di/dt = 200A/ μs	T _C =25	-	230	330	ns
			T _C =125	-	300	-	
Diode Peak Reverse Recovery Current	I _{rr}		T _C =25	-	27	35	A
			T _C =125	-	31	-	
Diode Reverse Recovery Charge	Q _{rr}		T _C =25	-	3100	4700	nC
			T _C =125	-	4650	-	

Typical Performance Characteristics

Fig 1. Saturation Voltage Characteristics

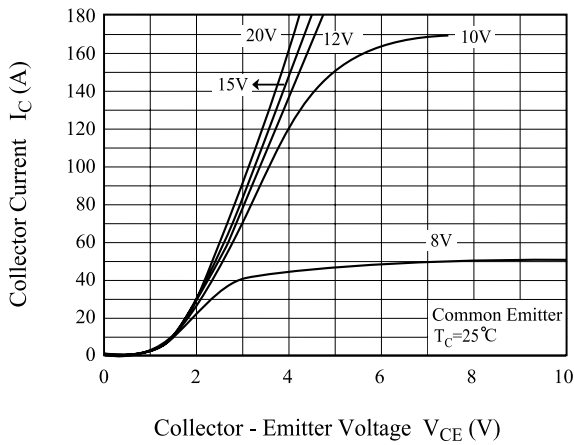


Fig 2. Saturation Voltage Characteristics

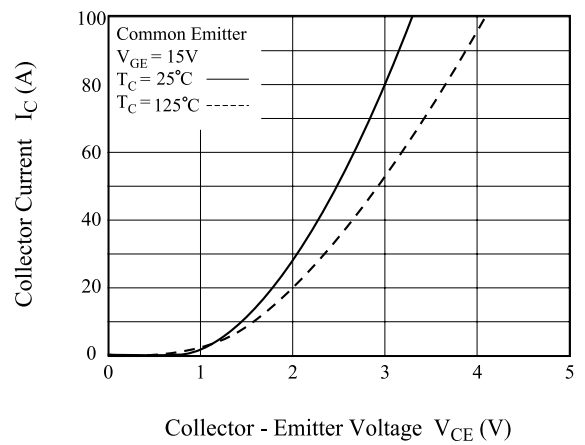


Fig 3. Saturation Voltage vs. Case Temperature

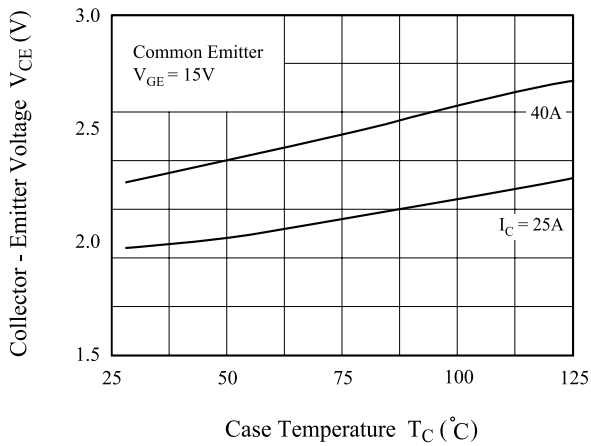


Fig 4. Saturation Voltage vs. V_{GE}

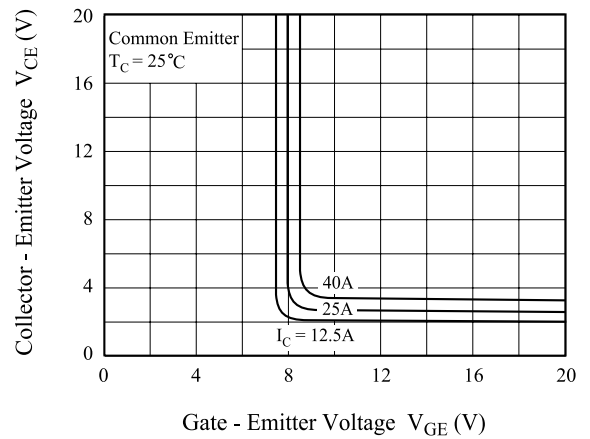


Fig 5. Saturation Voltage vs. V_{GE}

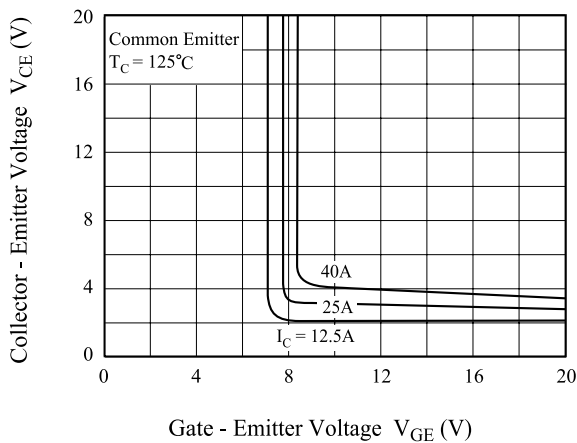
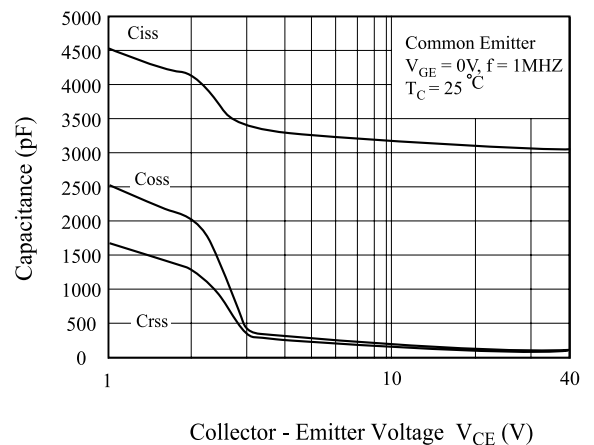


Fig 6. Capacitance Characteristics



Typical Performance Characteristics (Continued)

Fig 7. Turn-On Characteristics vs. Gate Resistance

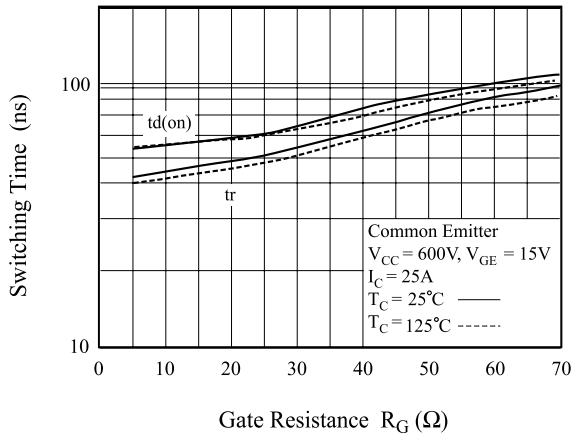


Fig 8. Turn-Off Characteristics vs. Gate Resistance

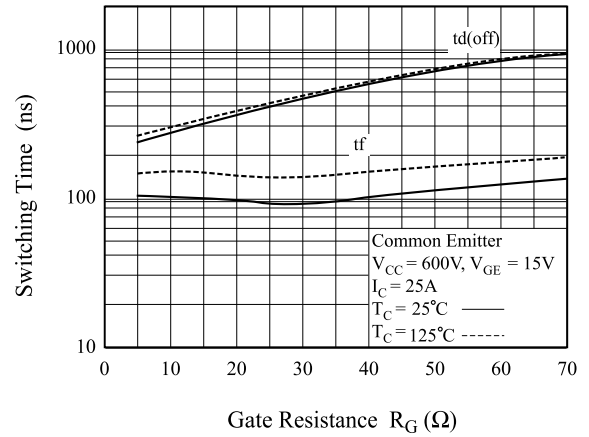


Fig 9. Switching Loss vs. Gate Resistance

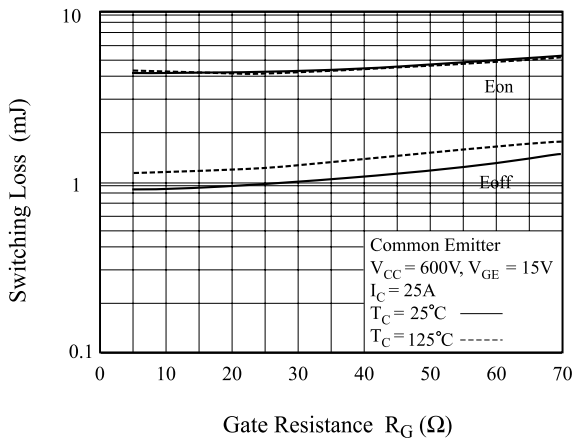


Fig 10. Turn-On Characteristics vs. Collector Current

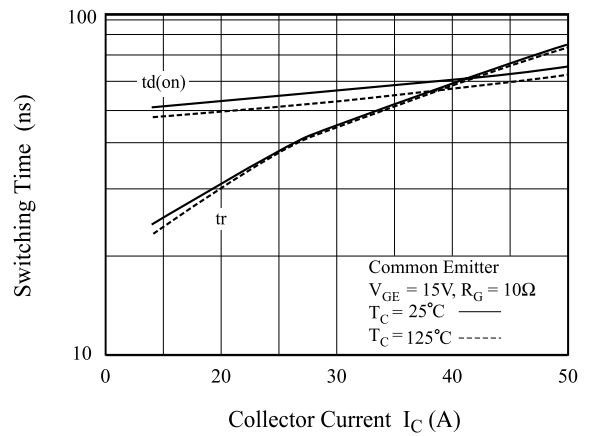


Fig 11. Turn-Off Characteristics vs. Collector Current

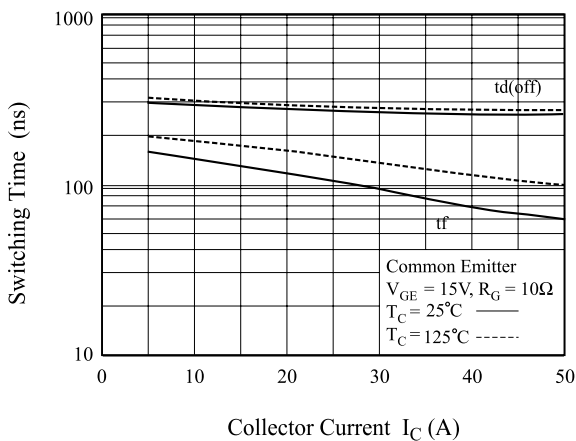
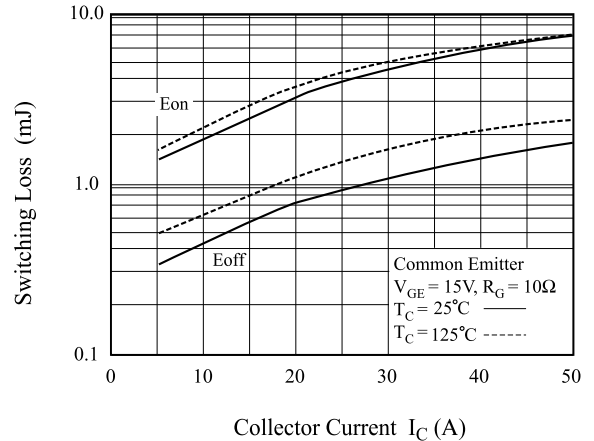


Fig 12. Switching Loss vs. Collector Current



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Typical Performance Characteristics (Continued)

Fig 13. Gate Charge Characteristics

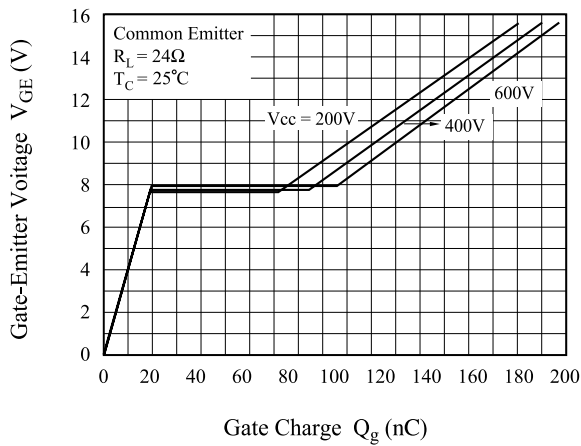


Fig 14. SOA Characteristics

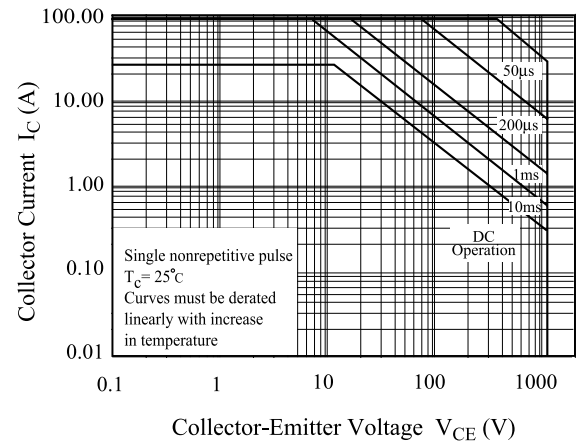


Fig 15. Turn-Off SOA

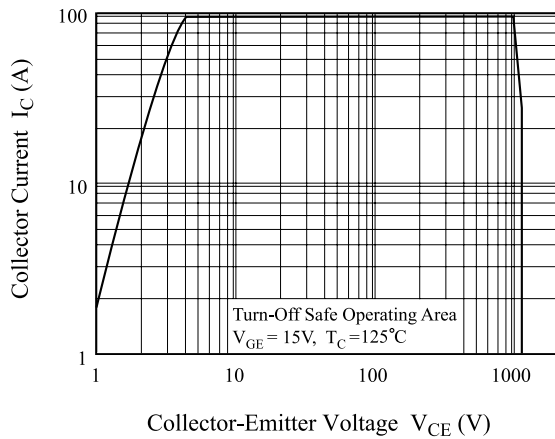
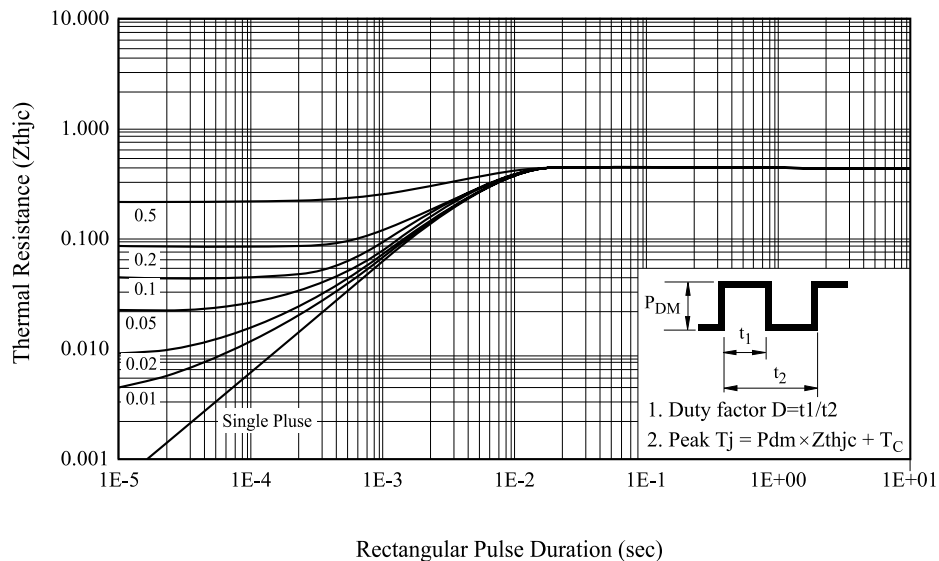


Fig 16. Transient Thermal Impedance of IGBT



Typical Performance Characteristics

Fig 17. Forward Characteristics

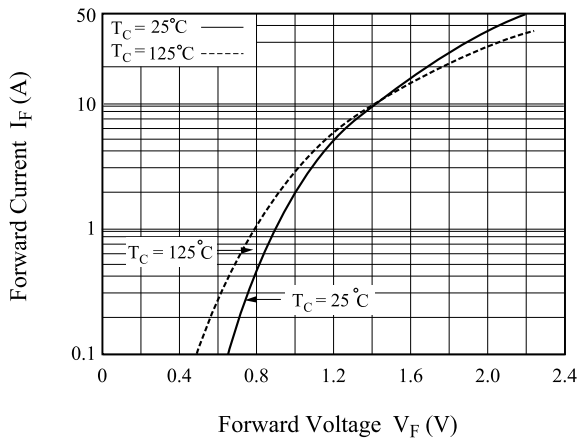


Fig 18. Reverse Recovery Current

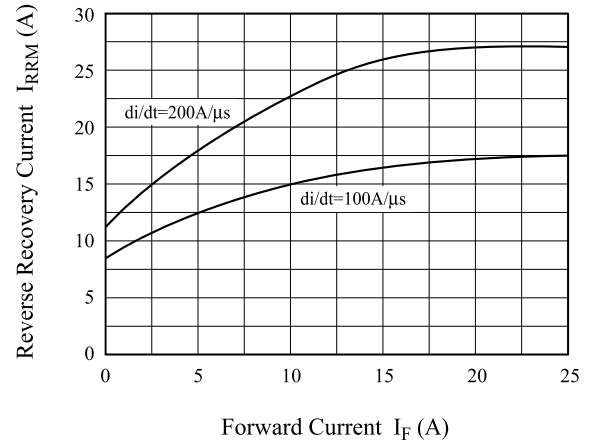
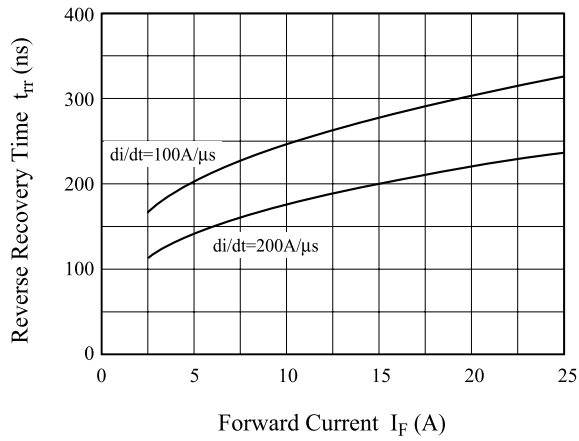


Fig 19. Reverse Recovery Time



Definition Switching Time & Loss.

Fig 21. Switching Test Circuit

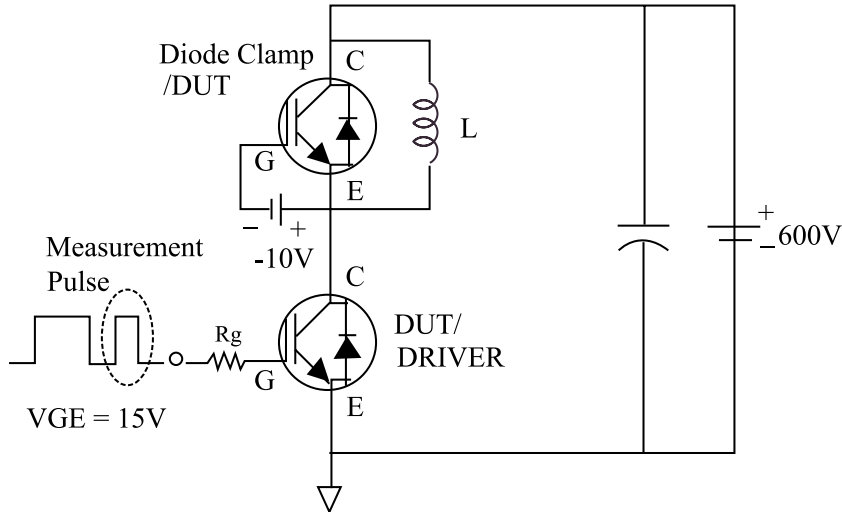


Fig 22. Definition Switching Time & Loss

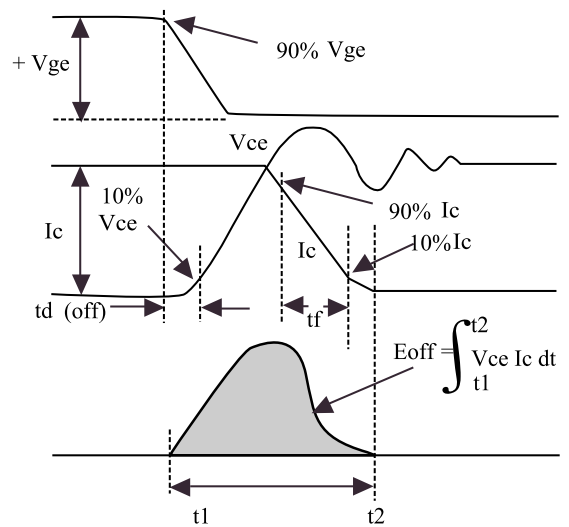
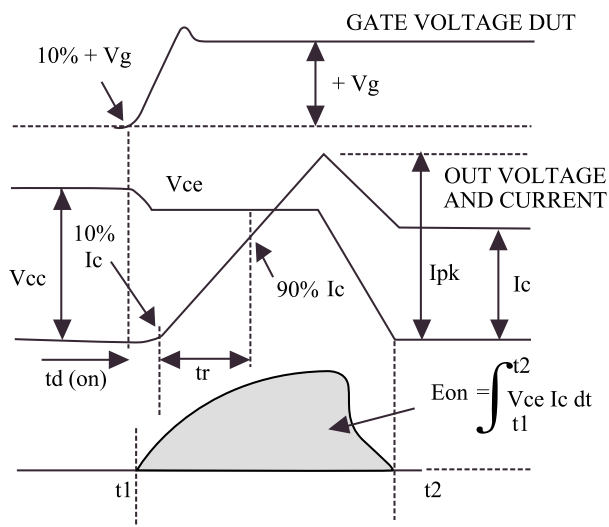


Fig 23. Definition Diode Switching Time

