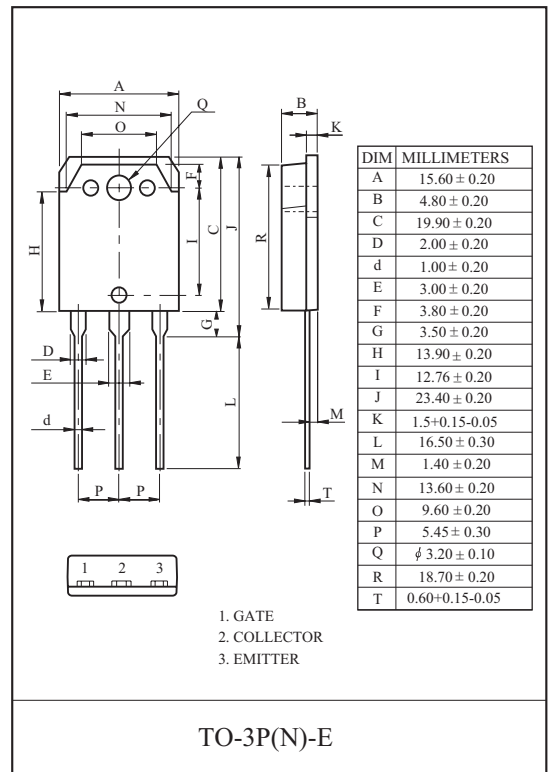


General Description

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



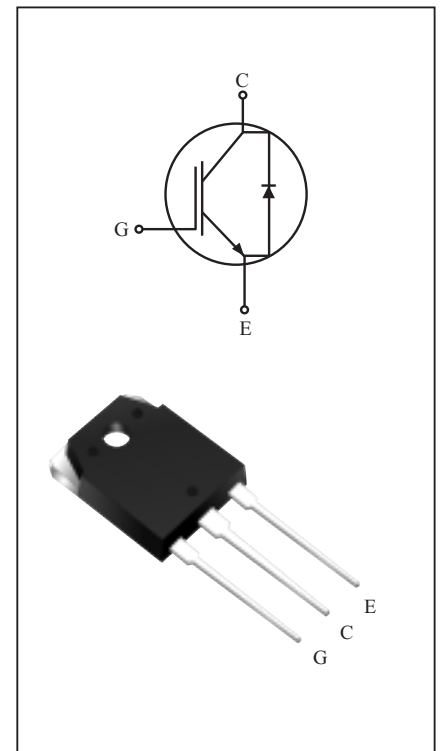
MAXIMUM RATING (Ta=25 °C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Collector-Emitter Voltage		V_{CES}	1200	V
Gate-Emitter Voltage		V_{GES}	± 20	V
Collector Current	@T _C =25 °C	I_C	30	A
	@T _C =100 °C		15	A
Pulsed Collector Current		I_{CM}^*	45	A
Diode Continuous Forward Current	@T _C =100 °C	I_F	15	A
Diode Maximum Forward Current		I_{FM}	45	A
Maximum Power Dissipation	@T _C =25 °C	P_D	200	W
	@T _C =100 °C		80	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)	$R_{\theta JC}$	0.6	/W
Thermal Resistance, Junction to Case (DIODE)	$R_{\theta JC}$	2.8	/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 =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	-	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 =10 Ω Inductive Load, T _C = 25	-	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 =10 Ω Inductive Load, T _C = 125	-	50	-
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	-
Ouput Capacitance	C _{oes}		-	80	-	pF
Reverse Transfer Capacitance	C _{res}		-	55	-	pF

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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℃	-	1.8	2.5	V
			T _C =125℃	-	1.9	-	
Diode Reverse Recovery Time	t _{rr}	I _F = 15A di/dt = 200A/μs	T _C =25℃	-	230	300	ns
			T _C =125℃	-	270	-	
Diode Peak Reverse Recovery Current	I _{rr}		T _C =25℃	-	24	31	A
			T _C =125℃	-	27	-	
Diode Reverse Recovery Charge	Q _{rr}		T _C =25℃	-	2400	4000	nC
			T _C =125℃	-	3640	-	

Typical Performance Characteristics

Fig 1. Saturation Voltage Characteristics

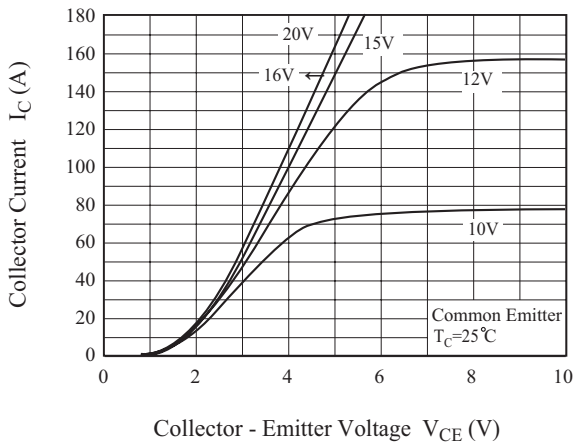


Fig 2. Saturation Voltage Characteristics

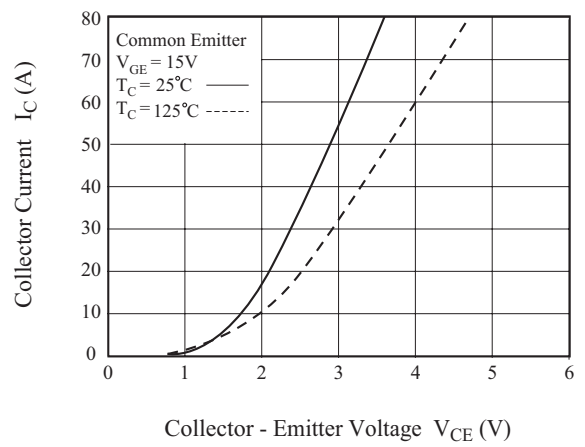


Fig 3. Saturation Voltage vs. Case Temperature

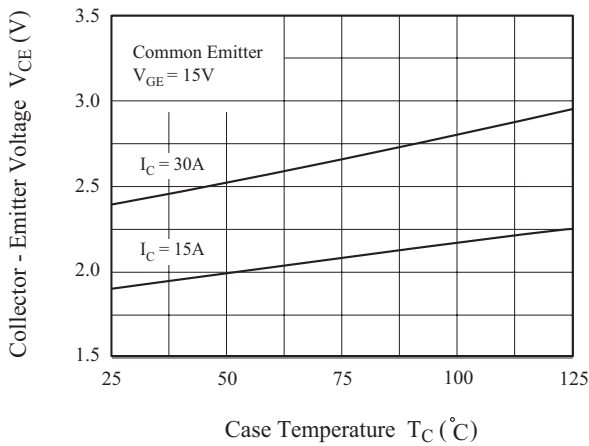


Fig 4. Saturation Voltage vs. V_{GE}

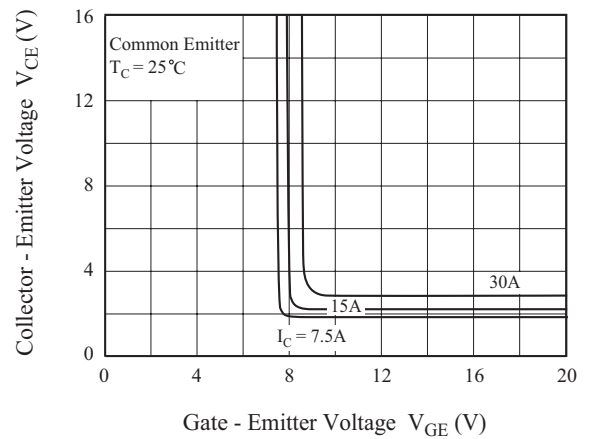


Fig 5. Saturation Voltage vs. V_{GE}

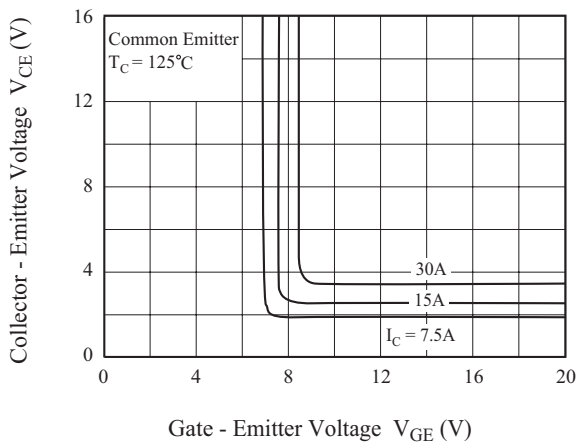
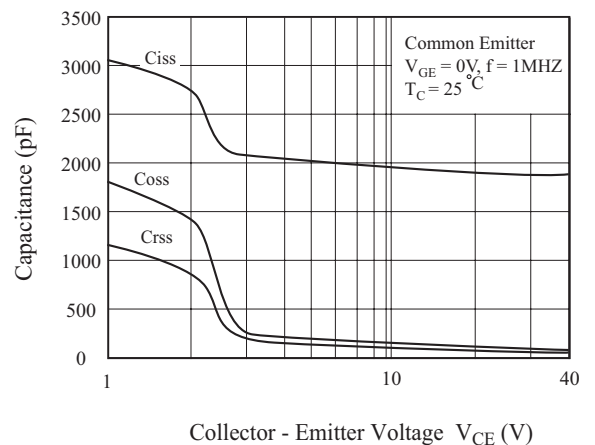


Fig 6. Capacitance Characteristics



Typical Performance Characteristics (Continued)

Fig 7. Turn-On Characteristics vs. Gate Resistance

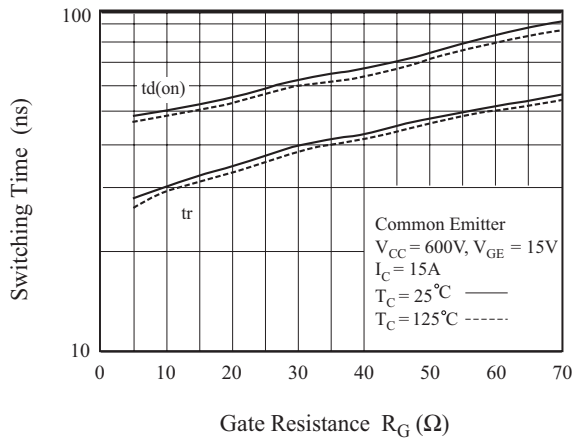


Fig 8. Turn-Off Characteristics vs. Gate Resistance

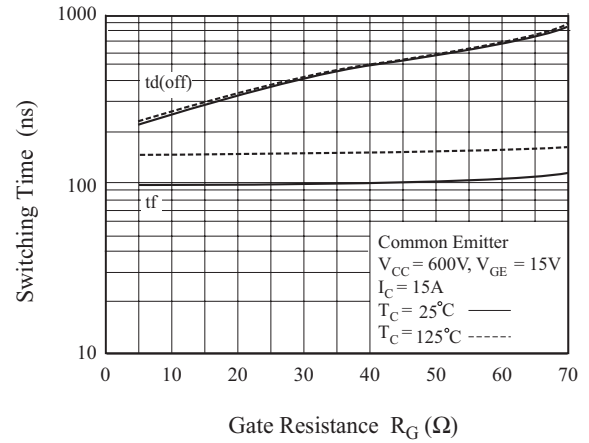


Fig 9. Switching Loss vs. Gate Resistance

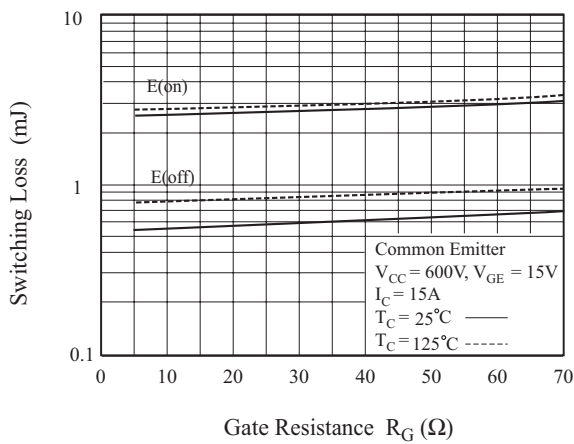


Fig 10. Turn-On Characteristics vs. Collector Current

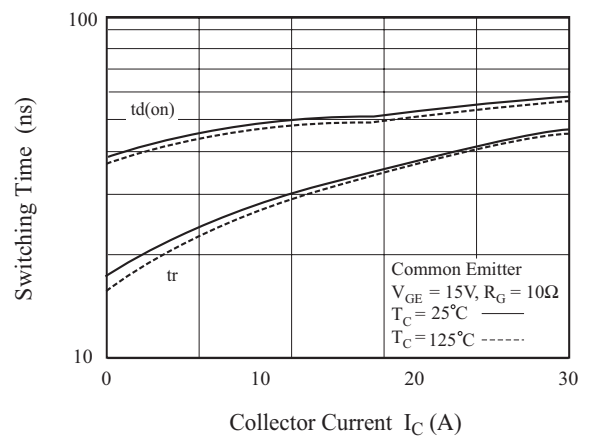


Fig 11. Turn-Off Characteristics vs. Collector Current

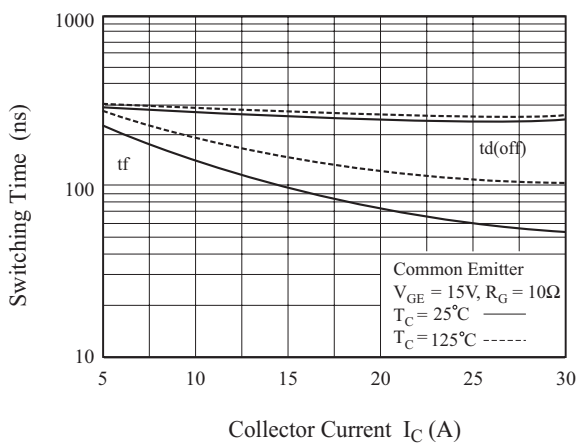
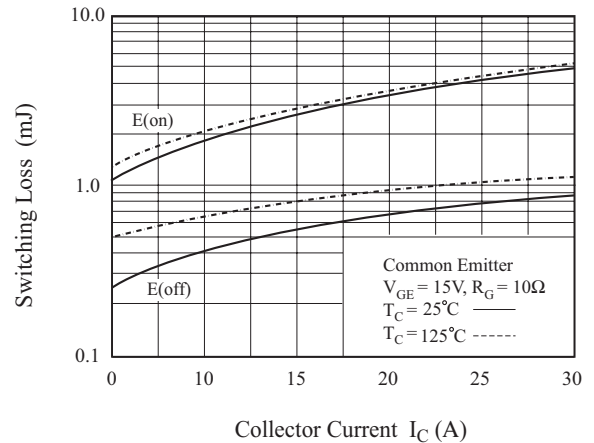


Fig 12. Switching Loss vs. Collector Current



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Typical Performance Characteristics (Continued)

Fig 13. Gate Charge Characteristics

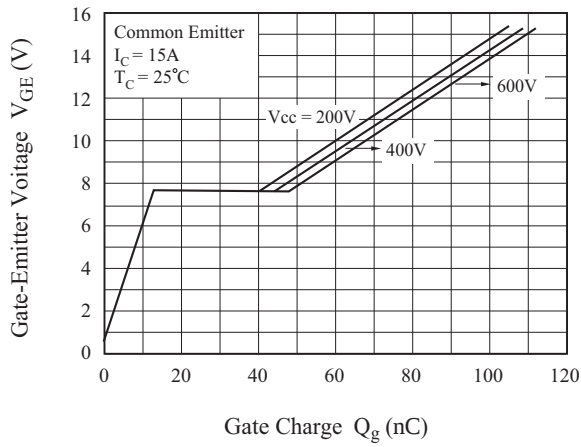


Fig 14. SOA Characteristics

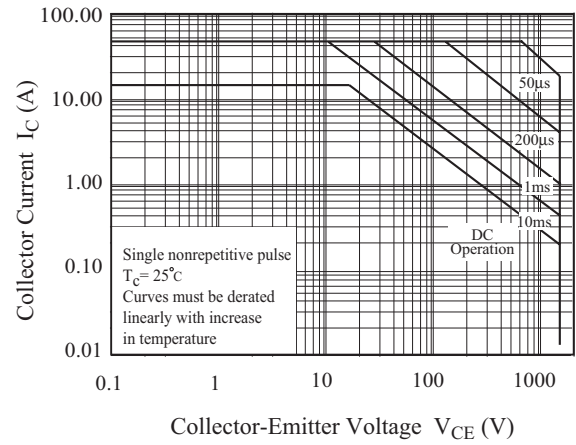


Fig 15. Turn-Off SOA

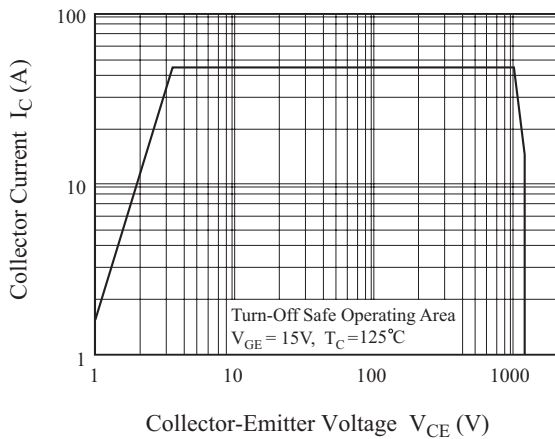
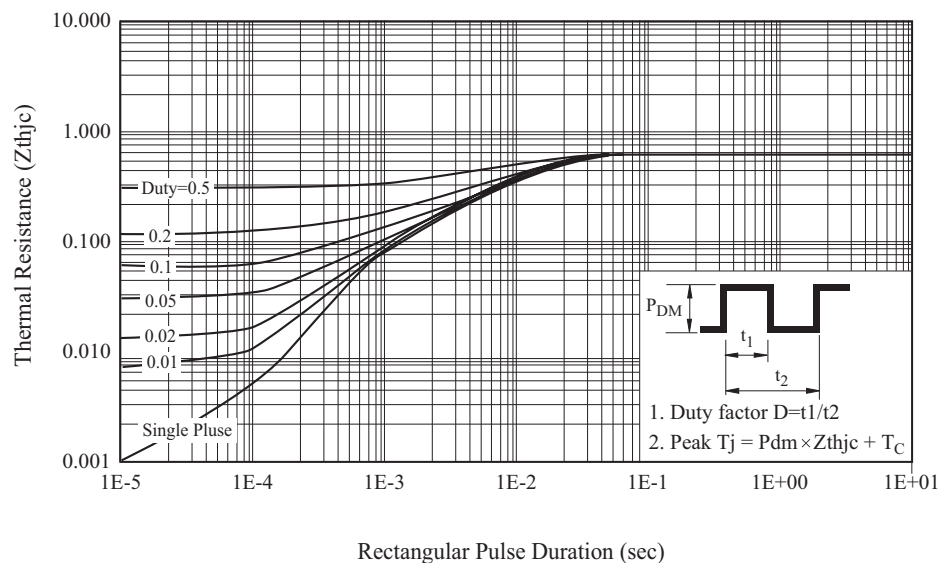


Fig 16. Transient Thermal Impedance of IGBT



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Typical Performance Characteristics

Fig 17. Forward Characteristics

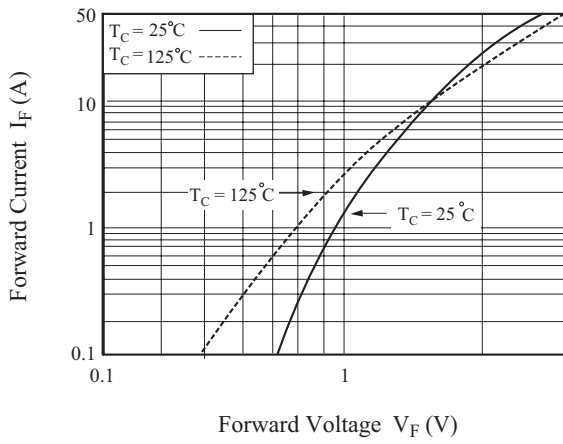


Fig 18. Reverse Recovery Current

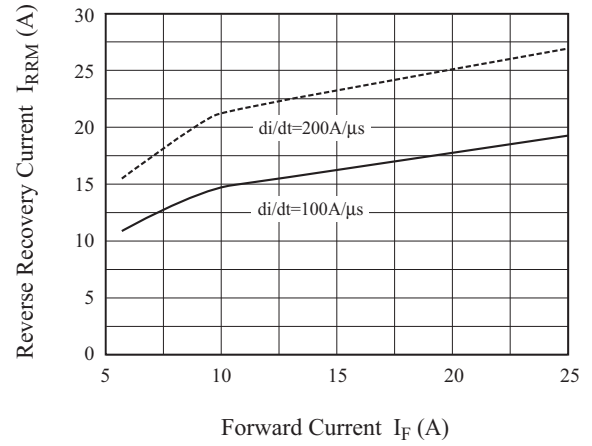
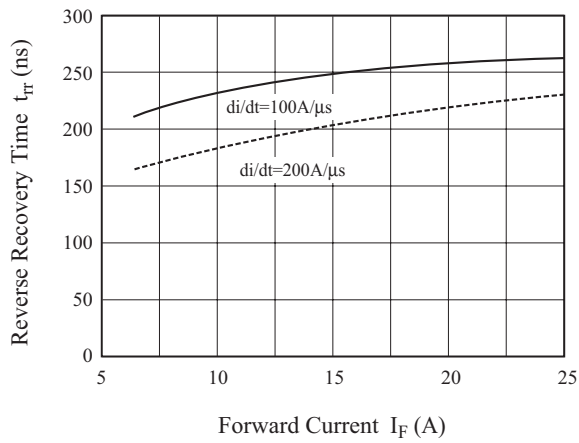


Fig 19. Reverse Recovery Time



Definition Switching Time & Loss.

Fig 20. Switching Test Circuit

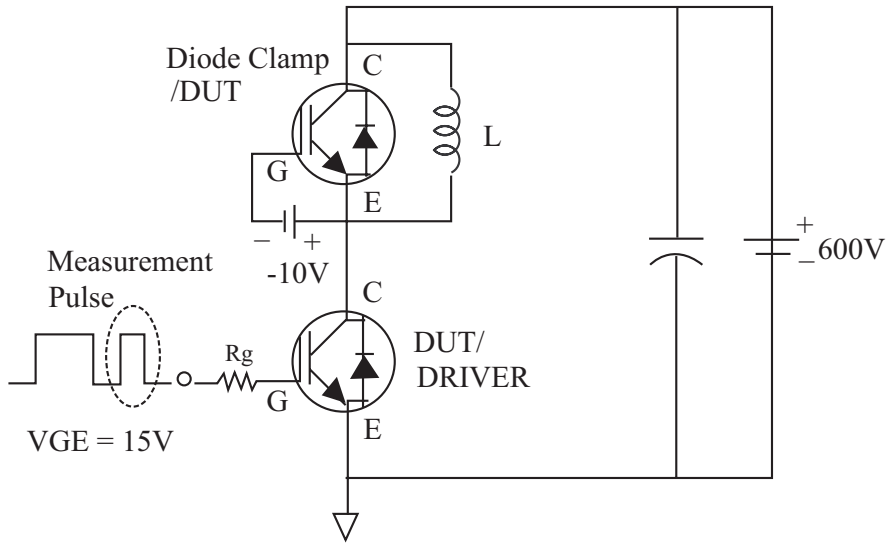


Fig 21. Definition Switching Time & Loss

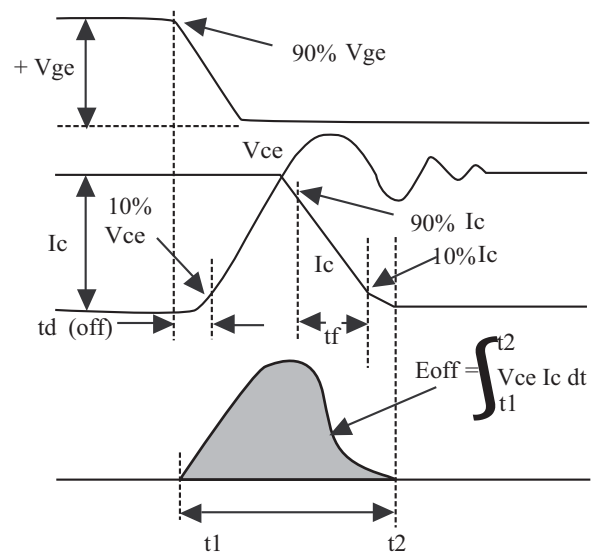
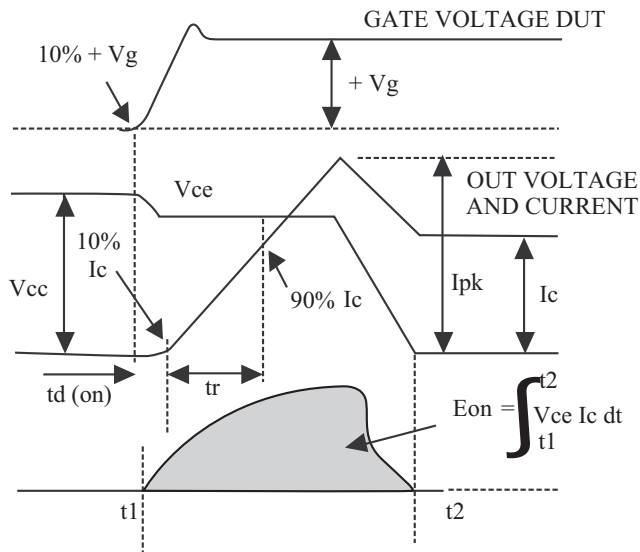


Fig 22. Definition Diode Switching Time

