

General Description

KEC Field Stop Trench 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 ruggedness, temperature stable behavior
- Soft current turn-off waveforms
- Extremely enhanced avalanche capability

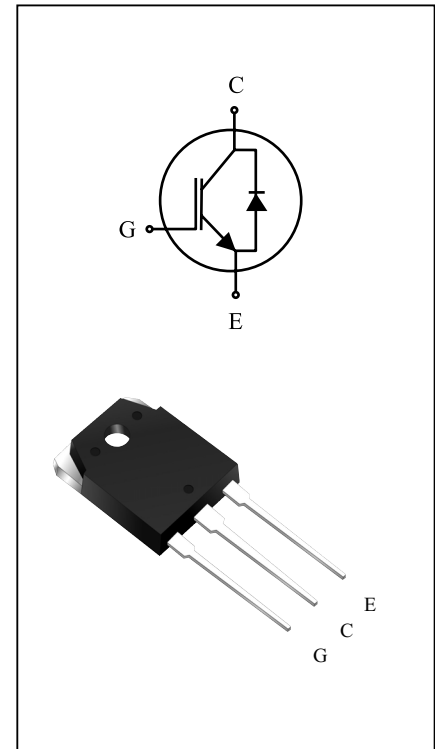
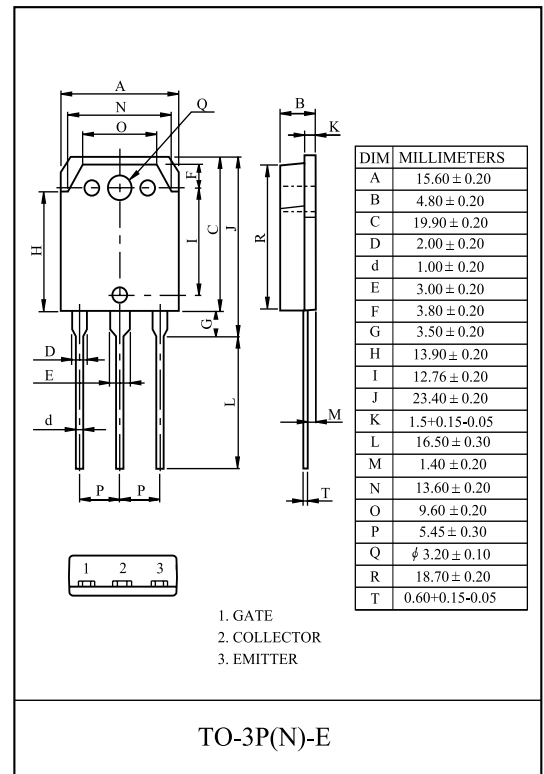
MAXIMUM RATING (Ta=25°C)

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	136	W
	@T _C =100°C		54	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}	0.92	°C/W
Thermal Resistance, Junction to Case (DIODE)	R_{thJC}	2.8	°C/W
Thermal Resistance, Junction to Ambient	R_{thJA}	40	°C/W

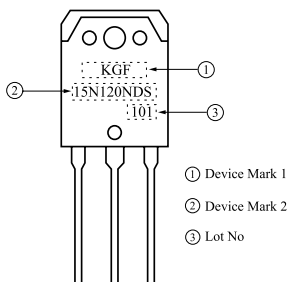


KGF15N120NDS

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}	$V_{CE}=0V, V_{GE}=\pm 20V$	-	-	± 100	nA	
Gate Threshold Voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}, I_C=15mA$	5.0	6.0	7.5	V	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_{GE}=15V, I_C=15A$	-	1.8	2.1	V	
		$V_{GE}=15V, I_C=15A, T_C = 125^\circ C$	-	2.1	-	V	
		$V_{GE}=15V, I_C=30A$	-	2.3	-	V	
Dynamic							
Total Gate Charge	Q_g	$V_{CC}=600V, V_{GE}=15V, I_C=15A$	-	135	-	nC	
Gate-Emitter Charge	Q_{ge}		-	15	-	nC	
Gate-Collector Charge	Q_{gc}		-	85	-	nC	
Turn-On Delay Time	$t_{d(on)}$	$V_{CC}=600V, I_C=15A, V_{GE}=15V, R_G=10\Omega$ Inductive Load, $T_C = 25^\circ C$	-	45	-	ns	
Rise Time	t_r		-	20	-	ns	
Turn-Off Delay Time	$t_{d(off)}$		-	170	-	ns	
Fall Time	t_f		-	180	-	ns	
Turn-On Switching Loss	E_{on}		-	2.0	2.6	mJ	
Turn-Off Switching Loss	E_{off}		-	0.9	1.2	mJ	
Total Switching Loss	E_{ts}		-	2.9	3.8	mJ	
Turn-On Delay Time	$t_{d(on)}$		$V_{CC}=600V, I_C=15A, V_{GE}=15V, R_G=10\Omega$ Inductive Load, $T_C = 125^\circ C$	-	45	-	ns
Rise Time	t_r			-	20	-	ns
Turn-Off Delay Time	$t_{d(off)}$			-	180	-	ns
Fall Time	t_f	-		290	-	ns	
Turn-On Switching Loss	E_{on}	-		2.1	-	mJ	
Turn-Off Switching Loss	E_{off}	-		1.4	-	mJ	
Total Switching Loss	E_{ts}	-		3.5	-	mJ	
Input Capacitance	C_{ies}	$V_{CE}=30V, V_{GE}=0V, f=1MHz$	-	1550	2050	pF	
Output Capacitance	C_{oes}		-	50	-	pF	
Reverse Transfer Capacitance	C_{res}		-	35	-	pF	

Marking



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ELECTRICAL CHARACTERISTIC OF DIODE

CHARACTERISTIC	SYMBOL	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Diode Forward Voltage	V_F	$I_F = 15A$	$T_C = 25^\circ C$	-	2.1	2.5	V
			$T_C = 125^\circ C$	-	2.4	-	
Diode Reverse Recovery Time	t_{rr}	$I_F = 15A$	$T_C = 25^\circ C$	-	160	-	ns
			$T_C = 125^\circ C$	-	170	-	
Diode Peak Reverse Recovery Current	I_{rr}	$I_F = 15A$ $di/dt = 200A/\mu s$	$T_C = 25^\circ C$	-	25	-	A
			$T_C = 125^\circ C$	-	27	-	
Diode Reverse Recovery Charge	Q_{rr}	$I_F = 15A$ $di/dt = 200A/\mu s$	$T_C = 25^\circ C$	-	1800	-	nC
			$T_C = 125^\circ C$	-	2250	-	

Fig 1. Saturation Voltage Characteristics

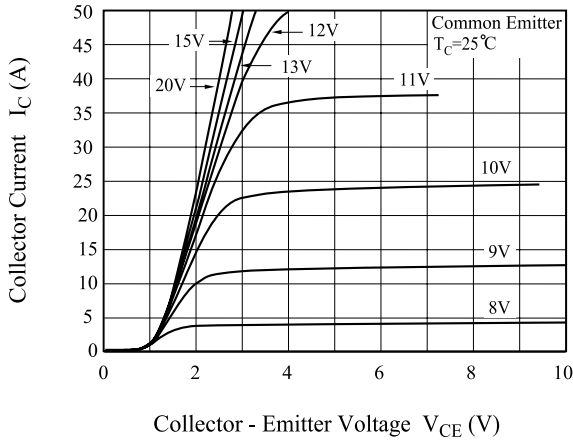


Fig 2. Saturation Voltage Characteristics

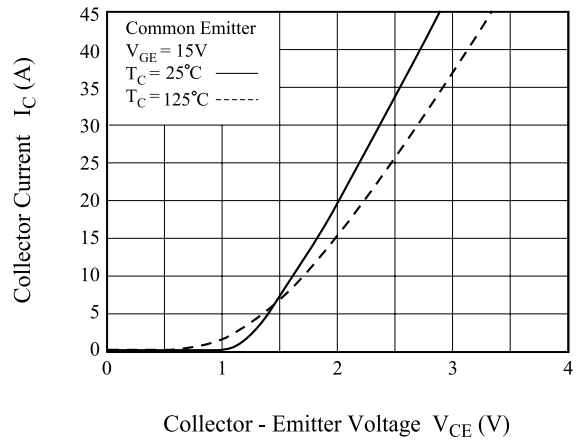


Fig 3. Saturation Voltage vs. Case Temperature

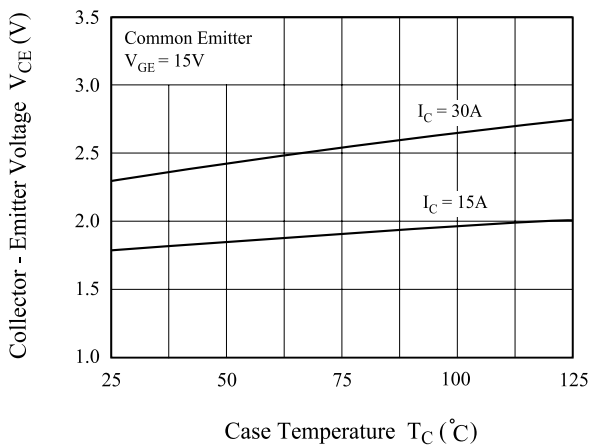


Fig 4. Saturation Voltage vs. V_{GE}

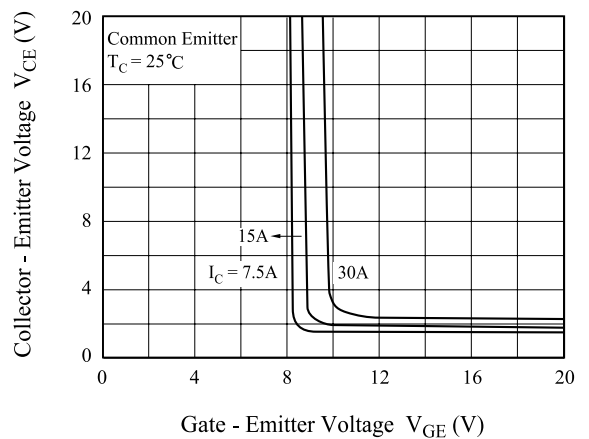


Fig 5. Saturation Voltage vs. V_{GE}

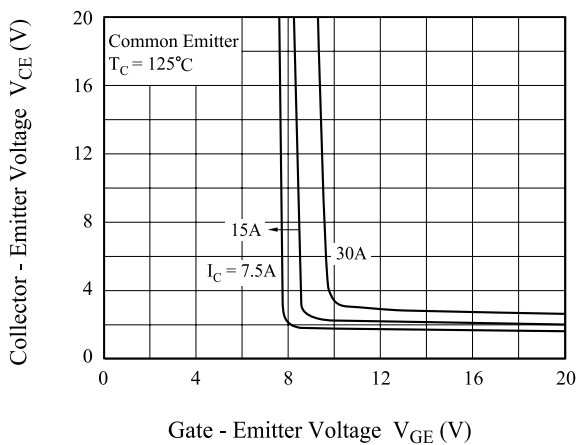


Fig 6. Capacitance Characteristics

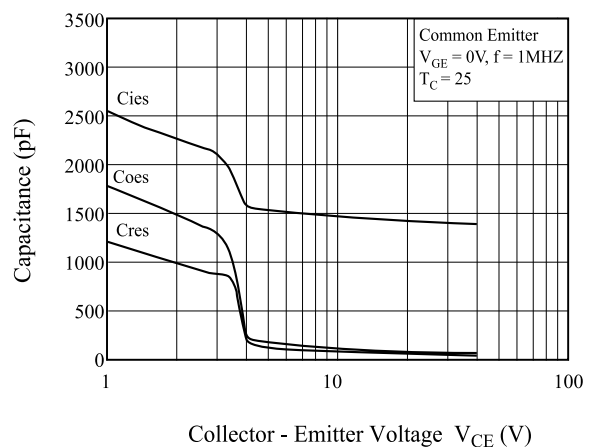


Fig 7. Turn-On Characteristics vs. Gate Resistance

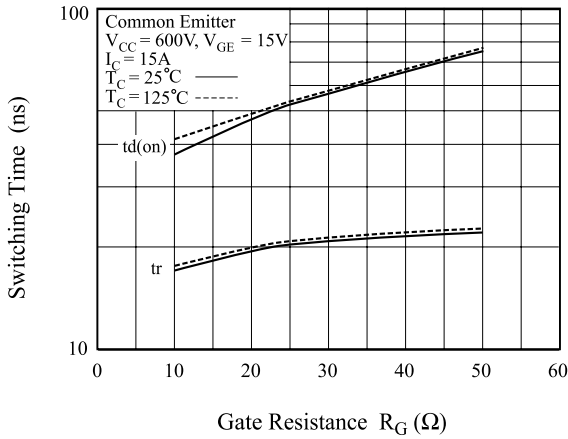


Fig 8. Turn-Off Characteristics vs. Gate Resistance

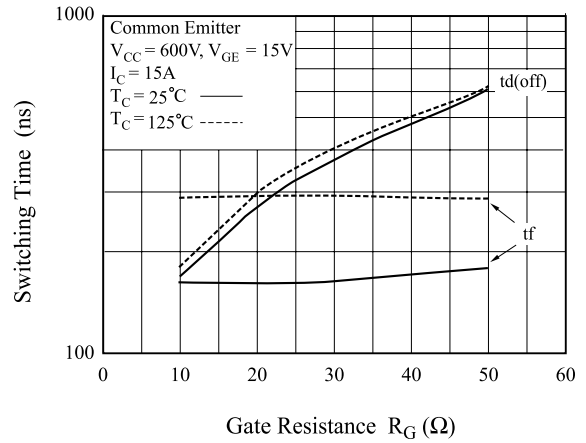


Fig 9. Switching Loss vs. Gate Resistance

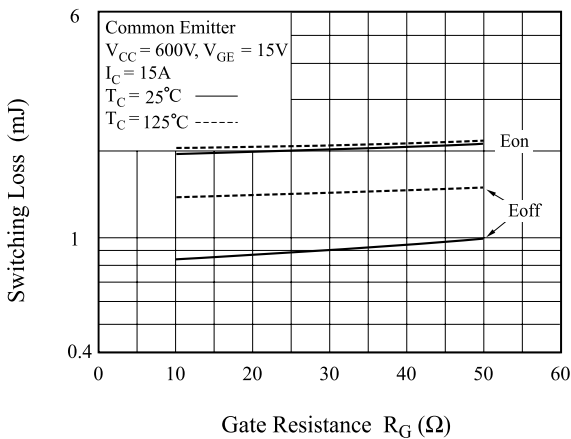


Fig 10. Turn-On Characteristics vs. Collector Current

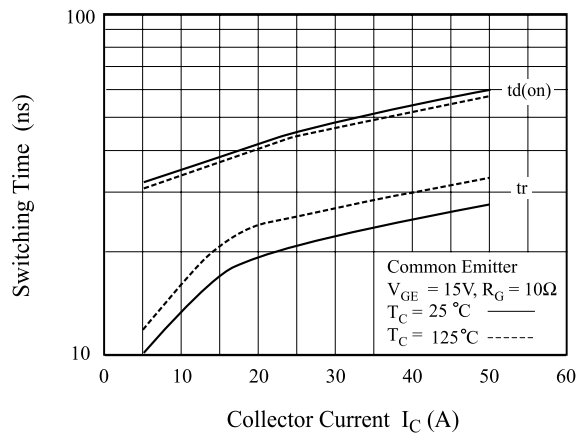


Fig 11. Turn-Off Characteristics vs. Collector Current

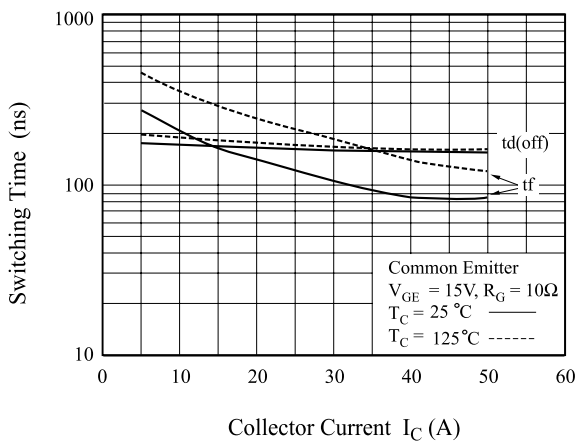


Fig 12. Switching Loss vs. Collector Current

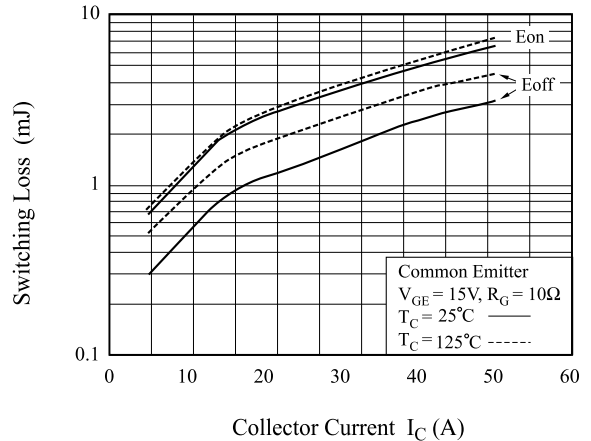


Fig 13. Gate Charge Characteristics

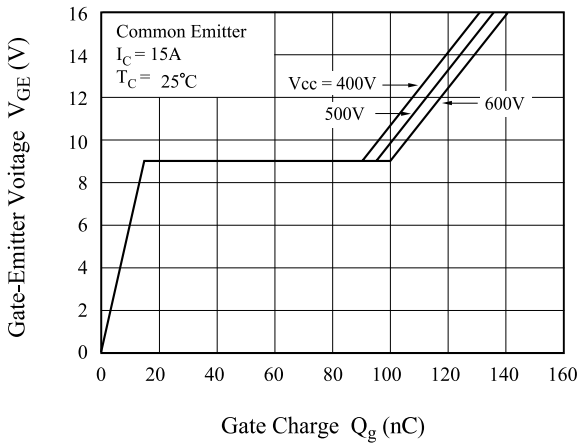


Fig 14. SOA Characteristics

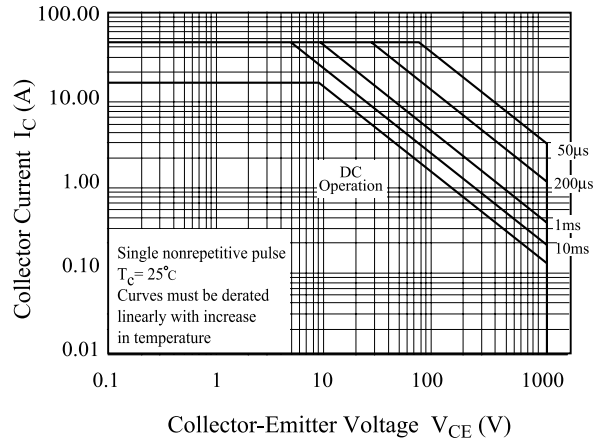


Fig 15. Turn-Off SOA

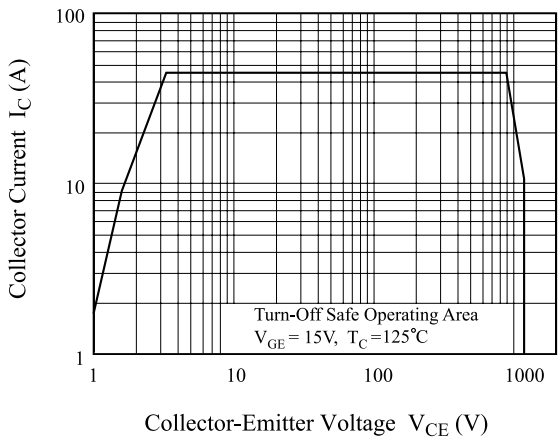
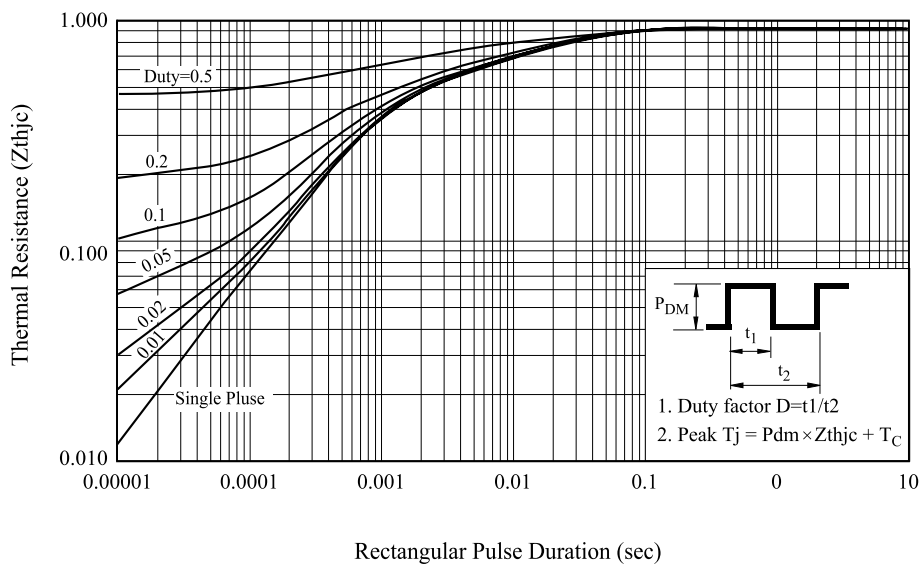


Fig 16. Transient Thermal Impedance of IGBT



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Fig 17. Forward Characteristics

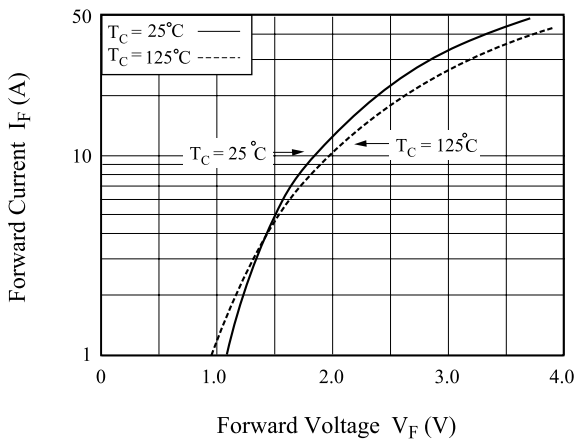


Fig 18. Reverse Recovery Current

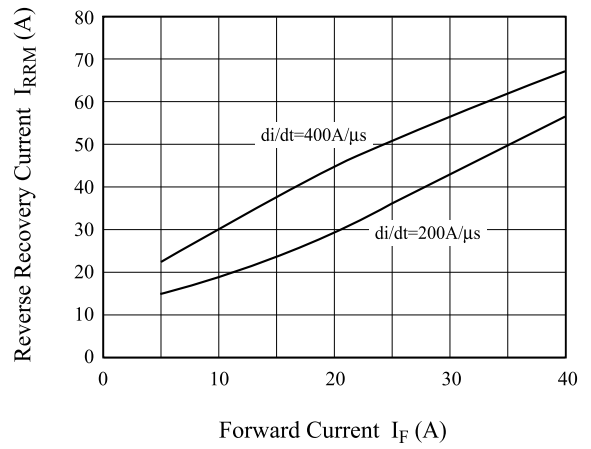


Fig 19. Reverse Recovery Time

