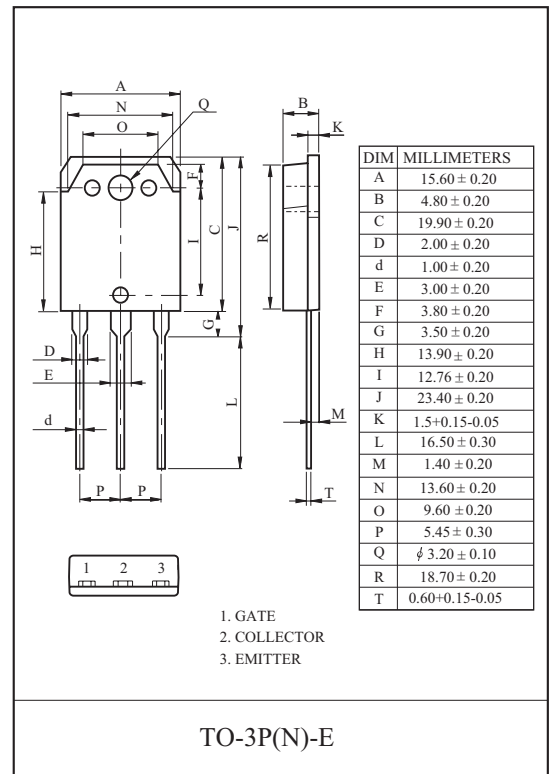


## General Description

KEC NPT IGBTs offer lowest losses and highest energy efficiency for application such as IH (induction heating), UPS, General inverter and other soft switching applications.

## FEATURES

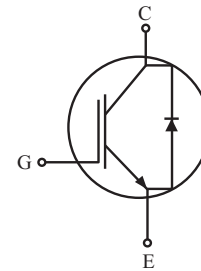
- High speed switching
- Higher system efficiency
- Soft current turn-off waveforms
- Square RBSOA using NPT technology



## 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	$I_C$	24	A	
		@T <sub>C</sub> =100 °C	15	A
Pulsed Collector Current	$I_{CM}^*$	45	A	
Diode Continuous Forward Current	@T <sub>C</sub> =100 °C	$I_F$	15	A
Diode Maximum Forward Current		$I_{FM}$	45	A
Maximum Power Dissipation	$P_D$	200	W	
		@T <sub>C</sub> =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)	$R_{JC}$	0.6	/W
Thermal Resistance, Junction to Case (DIODE)	$R_{JC}$	2.8	/W

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## ELECTRICAL CHARACTERISTICS (Ta=25 °C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
<b>Static</b>							
Collector-Emitter Breakdown Voltage	$BV_{CES}$	$V_{GE}=0V, I_C=3mA$	1200	-	-	V	
Collector Cut-off Current	$I_{CES}$	$V_{GE}=0V, V_{CE}=1200V$	-	-	3	mA	
Gate Leakage Current	$I_{GES}$	$V_{CE}=0V, V_{GE}= \pm 20V$	-	-	$\pm 100$	nA	
Gate Threshold Voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}, I_C=15mA$	3.5	5.5	7.5	V	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_{GE}=15V, I_C=15A$	-	2.2	2.7	V	
<b>Dynamic</b>							
Total Gate Charge	$Q_g$	$V_{CC}=600V, V_{GE}=15V, I_C= 15A$	-	140	-	nC	
Gate-Emitter Charge	$Q_{ge}$		-	12	-	nC	
Gate-Collector Charge	$Q_{gc}$		-	65	-	nC	
Turn-On Delay Time	$t_{d(on)}$	$V_{CC}=600V, I_C=15A, V_{GE}=15V, R_G=10$ Inductive Load, $T_C = 25$	-	60	-	ns	
Rise Time	$t_r$		-	50	-	ns	
Turn-Off Delay Time	$t_{d(off)}$		-	180	-	ns	
Fall Time	$t_f$		-	70	-	ns	
Turn-On Switching Loss	$E_{on}$		-	3.0	-	mJ	
Turn-Off Switching Loss	$E_{off}$		-	0.6	-	mJ	
Total Switching Loss	$E_{is}$		-	3.6	-	mJ	
Turn-On Delay Time	$t_{d(on)}$		$V_{CC}=600V, I_C=25A, V_{GE}=15V, R_G=10$ Inductive Load, $T_C = 125$	-	60	-	ns
Rise Time	$t_r$			-	50	-	ns
Turn-Off Delay Time	$t_{d(off)}$			-	190	-	ns
Fall Time	$t_f$	-		100	-	ns	
Turn-On Switching Loss	$E_{on}$	-		3.1	-	mJ	
Turn-Off Switching Loss	$E_{off}$	-		0.8	-	mJ	
Total Switching Loss	$E_{is}$	-		3.9	-	mJ	
Input Capacitance	$C_{ies}$	$V_{CE}=30V, V_{GE}=0V, f=1MHz$	-	1400	-	pF	
Output Capacitance	$C_{oes}$		-	140	-	pF	
Reverse Transfer Capacitance	$C_{res}$		-	57	-	pF	

## ELECTRICAL CHARACTERISTIC OF DIODE

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Diode Forward Voltage	$V_F$	$I_F = 15A$	$T_C=25\text{ }^\circ\text{C}$	-	1.5	1.9	V
			$T_C=125\text{ }^\circ\text{C}$	-	1.6	-	
Diode Reverse Recovery Time	$t_{rr}$	$I_F = 15A$	$T_C=25\text{ }^\circ\text{C}$	-	200	300	ns
			$T_C=125\text{ }^\circ\text{C}$	-	270	-	
Diode Peak Reverse Recovery Current	$I_{rr}$	$di/dt = 200A/\mu s$	$T_C=25\text{ }^\circ\text{C}$	-	26	34	A
			$T_C=125\text{ }^\circ\text{C}$	-	30	-	

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Fig 1. Typical Output Characteristics

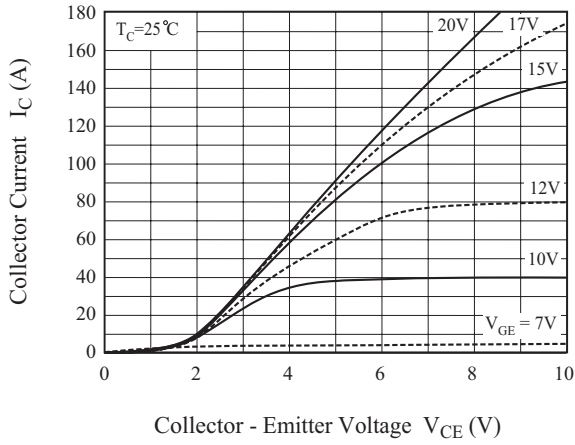


Fig 2. Typical Saturation Voltage Characteristics

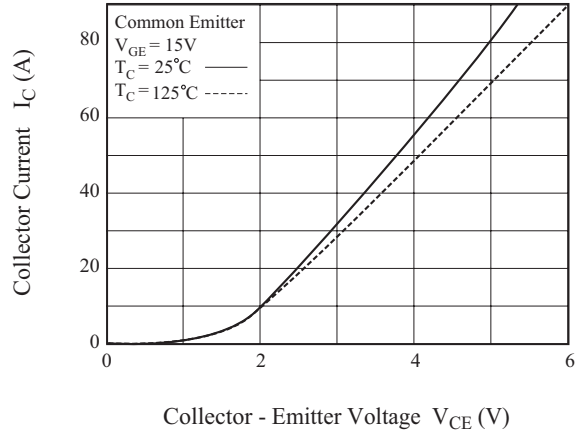


Fig 3. Saturation Voltage vs. Case Temperature at Variant Current Level

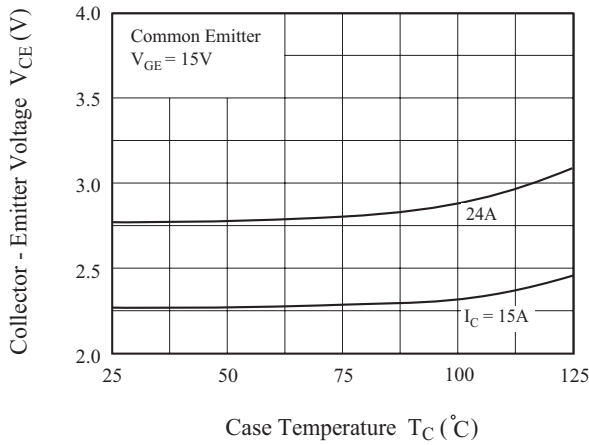


Fig 4. Saturation Voltage vs. V\_GE

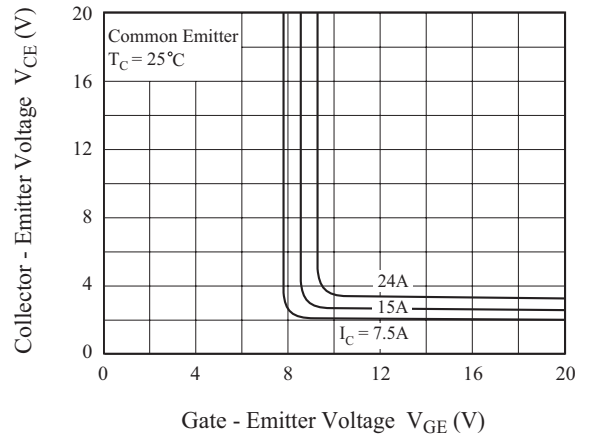


Fig 5. Saturation Voltage vs. V\_GE

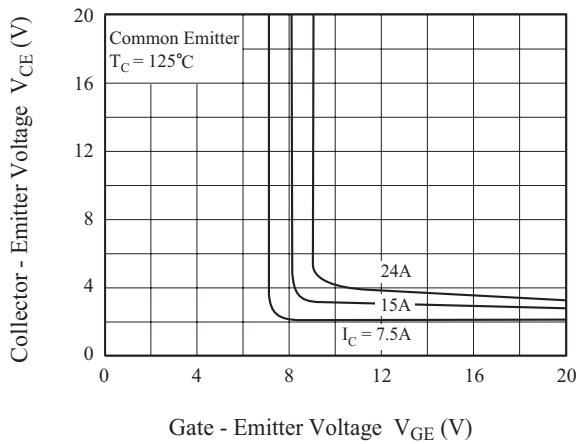
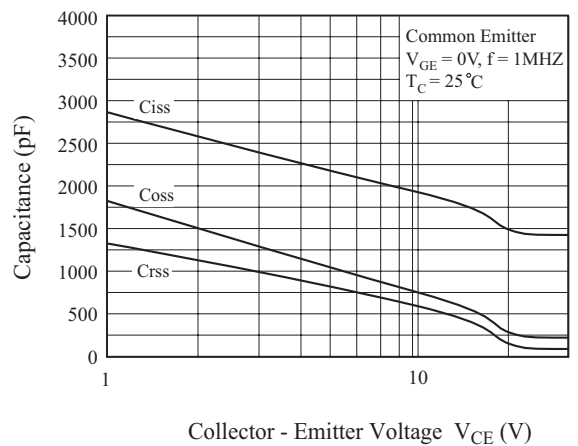


Fig 6. Capacitance Characteristics



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Fig 7. Turn-On Characteristics vs. Gate Resistance

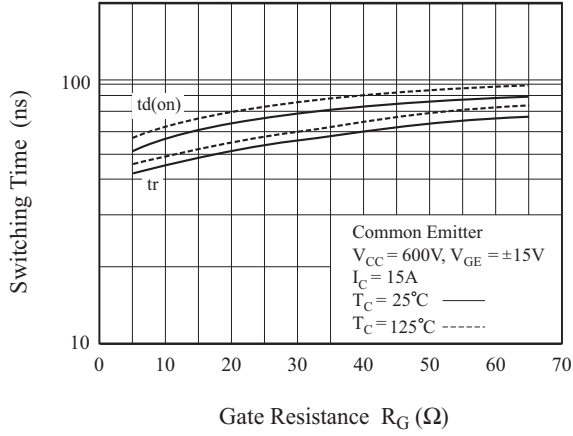


Fig 8. Turn-Off Characteristics vs. Gate Resistance

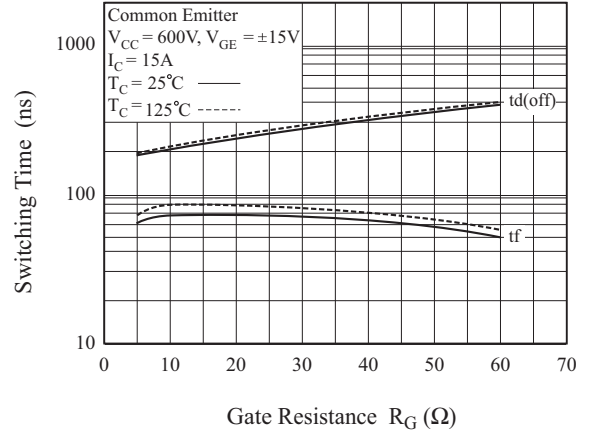


Fig 9. Switching Loss vs. Gate Resistance

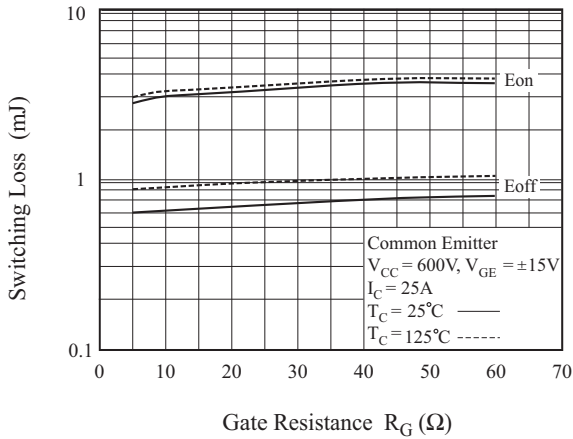


Fig 10. Turn-On Characteristics vs. Collector Current

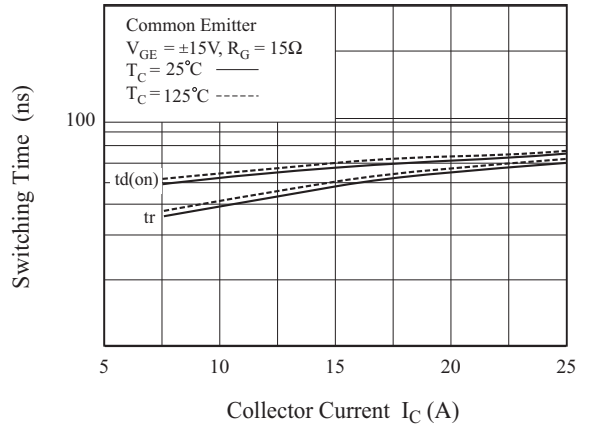


Fig 11. Turn-Off Characteristics vs. Collector Current

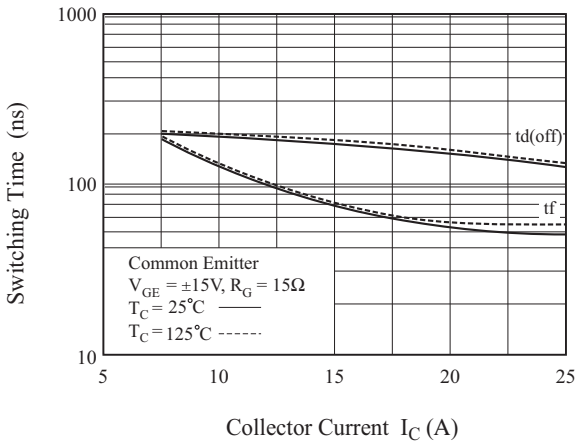
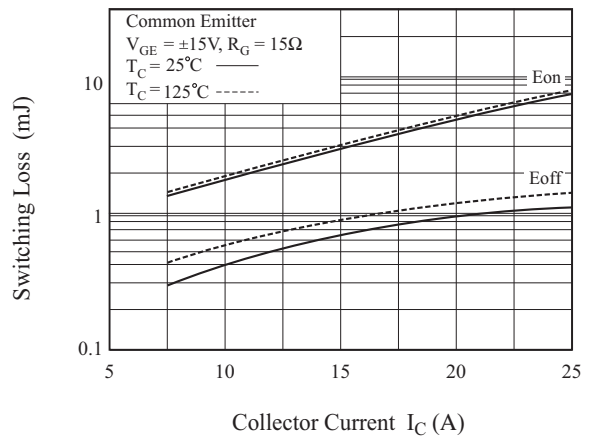


Fig 12. Switching Loss vs. Collector Current



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Fig 13. Gate Charge Characteristics

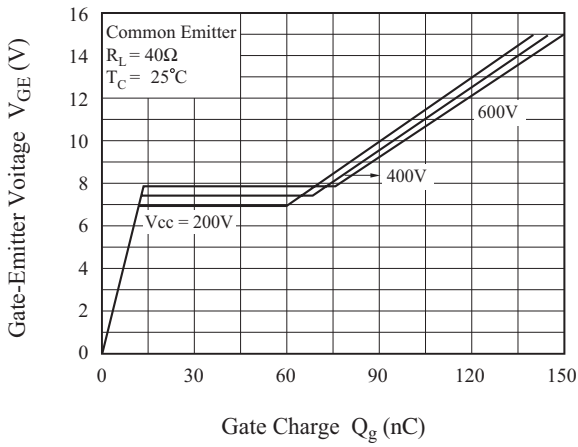


Fig 14. SOA Characteristics

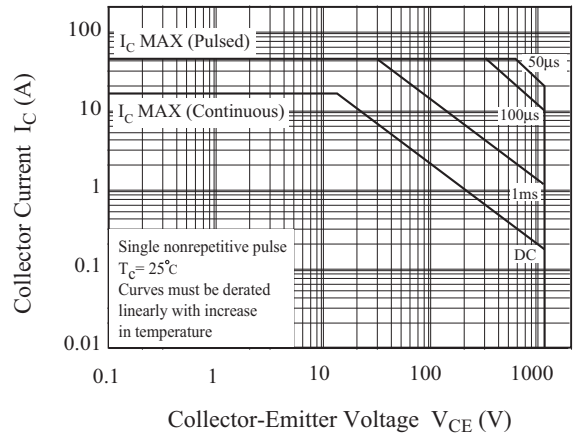


Fig 15. Turn-Off SOA

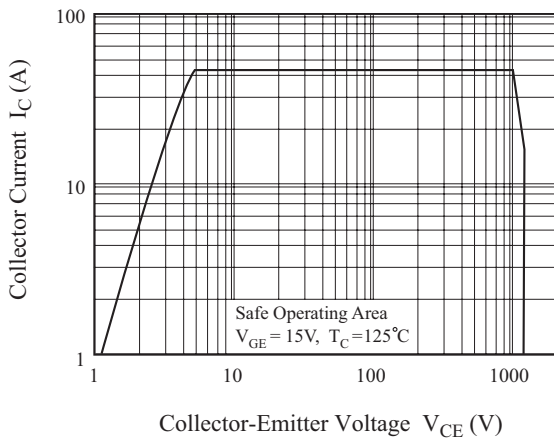
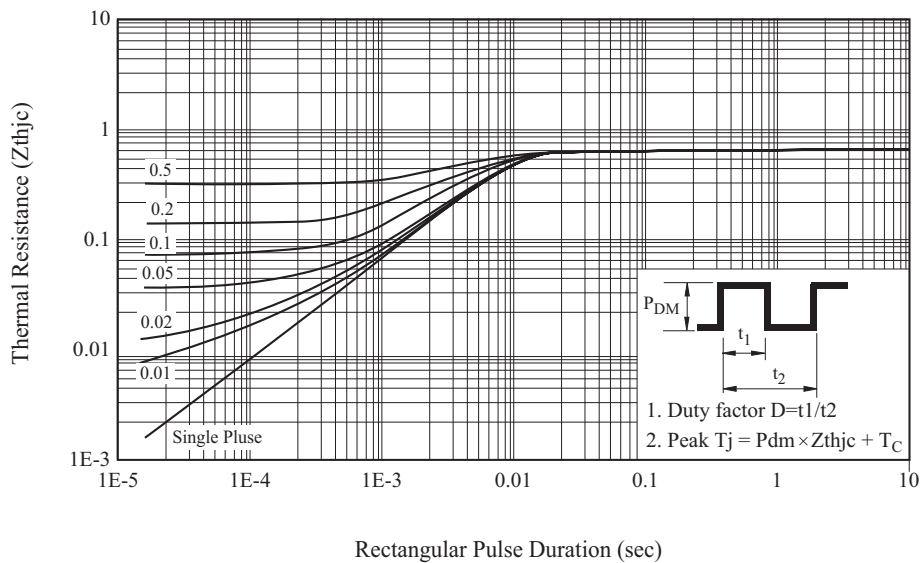


Fig 16. Transient Thermal Impedance of IGBT



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Fig 17. Forward Characteristics

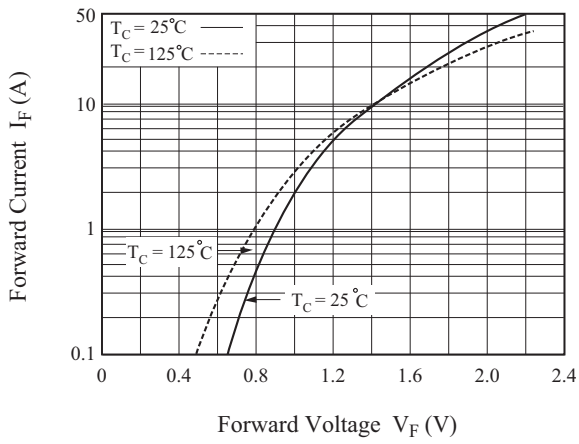


Fig 18. Reverse Recovery Current

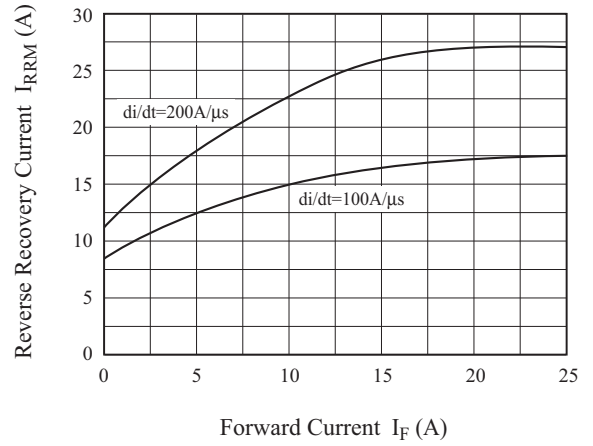


Fig 19. Reverse Recovery Time

