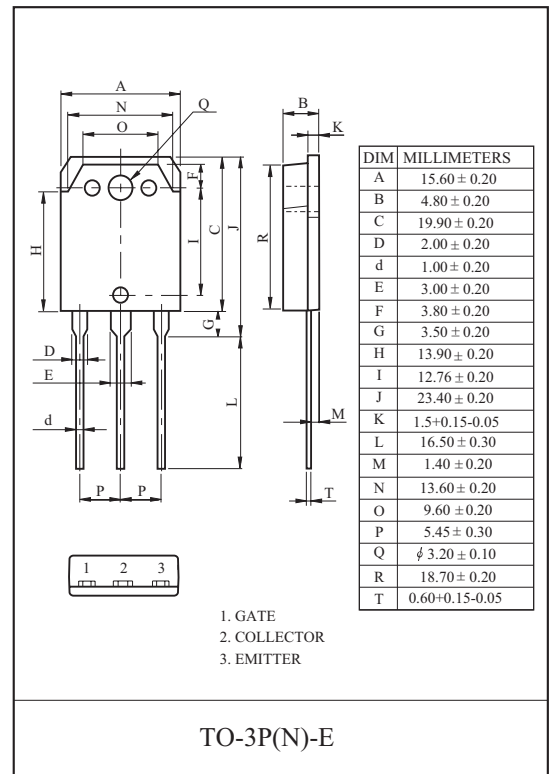


## General Description

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

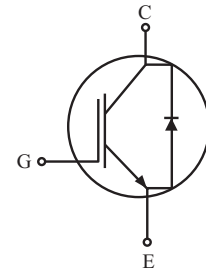
- High speed switching
- Higher system efficiency
- Soft current turn-off waveforms
- Square RBSOA using NPT technology



## 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	@T <sub>C</sub> =25 °C	$I_C$	40	A
	@T <sub>C</sub> =100 °C		25	A
Pulsed Collector Current		$I_{CM}^*$	75	A
Diode Continuous Forward Current	@T <sub>C</sub> =100 °C	$I_F$	25	A
Diode Maximum Forward Current		$I_{FM}$	110	A
Maximum Power Dissipation	@T <sub>C</sub> =25 °C	$P_D$	300	W
	@T <sub>C</sub> =100 °C		120	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)	$R_{JC}$	0.4	/W
Thermal Resistance, Junction to Case (DIODE)	$R_{JC}$	1.2	/W

# KGH25N120NDA

## ELECTRICAL CHARACTERISTICS (Ta=25 )

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	$V_{GE(th)}$	$V_{GE}=V_{CE}, I_C=25mA$	3.5	5.5	7.5	V	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_{GE}=15V, I_C=25A$	-	2.2	2.5	V	
<b>Dynamic</b>							
Total Gate Charge	$Q_g$	$V_{CC}=600V, V_{GE}=15V, I_C=25A$	-	200	-	nC	
Gate-Emitter Charge	$Q_{ge}$		-	20	-	nC	
Gate-Collector Charge	$Q_{gc}$		-	100	-	nC	
Turn-On Delay Time	$t_{d(on)}$	$V_{CC}=600V, I_C=25A, V_{GE}=15V, R_G=10$ Inductive Load, $T_C=25$	-	60	-	ns	
Rise Time	$t_r$		-	50	-	ns	
Turn-Off Delay Time	$t_{d(off)}$		-	190	-	ns	
Fall Time	$t_f$		-	70	-	ns	
Turn-On Switching Loss	$E_{on}$		-	4.8	-	mJ	
Turn-Off Switching Loss	$E_{off}$		-	1.0	-	mJ	
Total Switching Loss	$E_{is}$		-	5.8	-	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	$t_{d(off)}$			-	200	-	ns
Fall Time	$t_f$	-		100	-	ns	
Turn-On Switching Loss	$E_{on}$	-		4.9	-	mJ	
Turn-Off Switching Loss	$E_{off}$	-		1.4	-	mJ	
Total Switching Loss	$E_{is}$	-		6.3	-	mJ	
Input Capacitance	$C_{ies}$	$V_{CE}=30V, V_{GE}=0V, f=1MHz$	-	2400	-	pF	
Output Capacitance	$C_{oes}$		-	200	-	pF	
Reverse Transfer Capacitance	$C_{res}$		-	100	-	pF	

## ELECTRICAL CHARACTERISTIC OF DIODE

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Diode Forward Voltage	$V_F$	$I_F=25A$	$T_C=25^\circ C$	-	1.8	2.2	V
			$T_C=125^\circ C$	-	1.9	-	
Diode Reverse Recovery Time	$t_{rr}$	$I_F=25A$	$T_C=25^\circ C$	-	230	330	ns
			$T_C=125^\circ C$	-	300	-	
Diode Peak Reverse Recovery Current	$I_{rr}$	$di/dt=200A/\mu s$	$T_C=25^\circ C$	-	27	35	A
			$T_C=125^\circ C$	-	31	-	

# KGH25N120NDA

Fig 1. Typical Output Characteristics

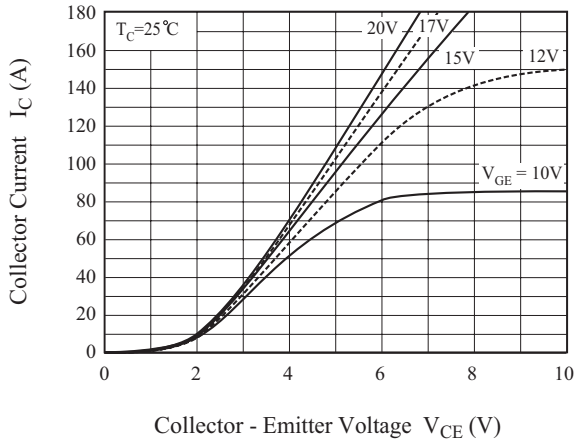


Fig 2. Typical Saturation Voltage Characteristics

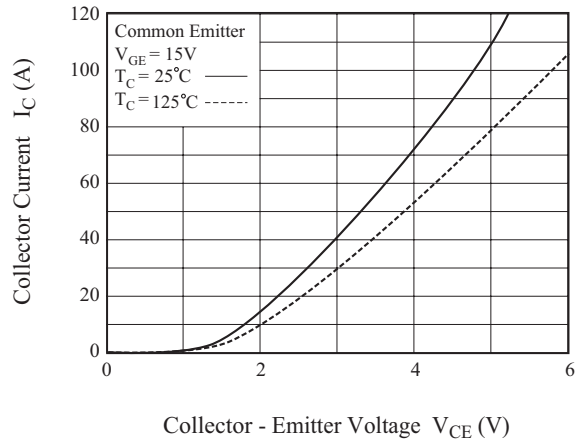


Fig 3. Saturation Voltage vs. Case Temperature at Variant Current Level

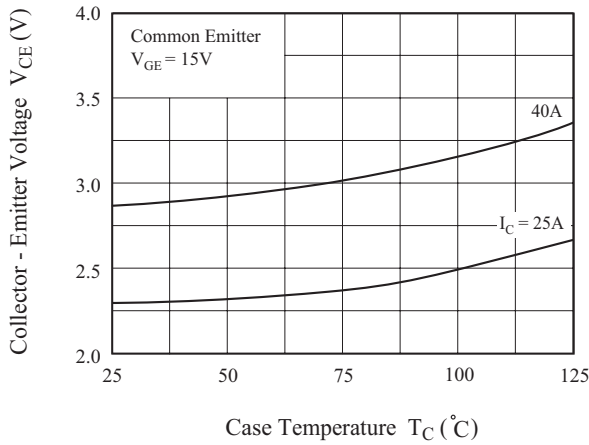


Fig 4. Saturation Voltage vs.  $V_{GE}$

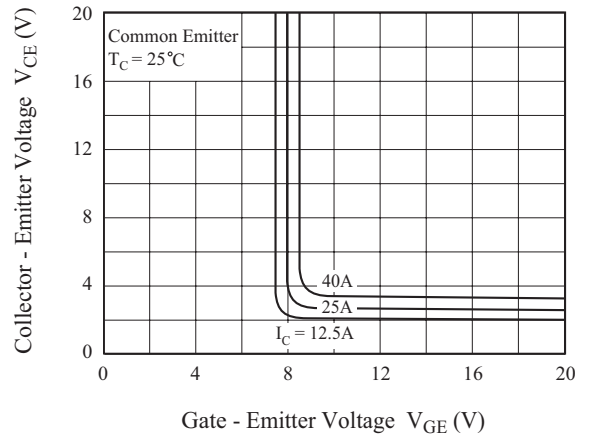


Fig 5. Saturation Voltage vs.  $V_{GE}$

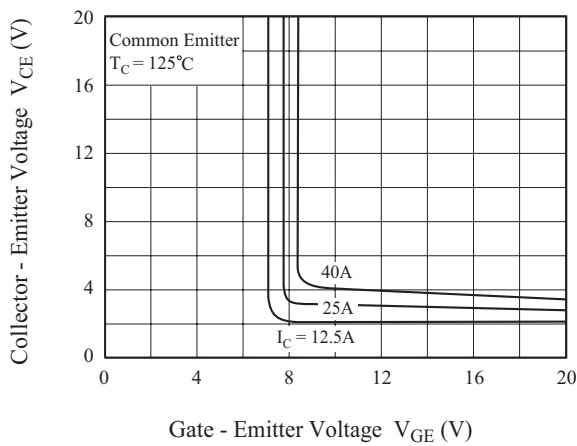
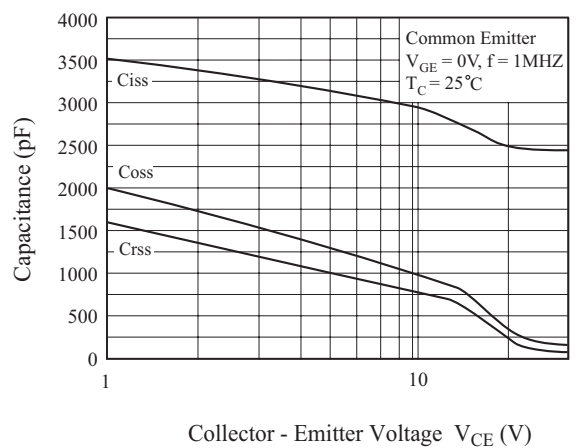


Fig 6. Capacitance Characteristics



# KGH25N120NDA

Fig 7. Turn-On Characteristics vs. Gate Resistance

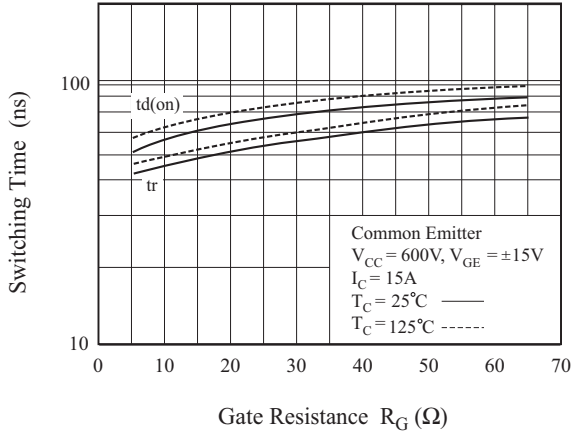


Fig 8. Turn-Off Characteristics vs. Gate Resistance

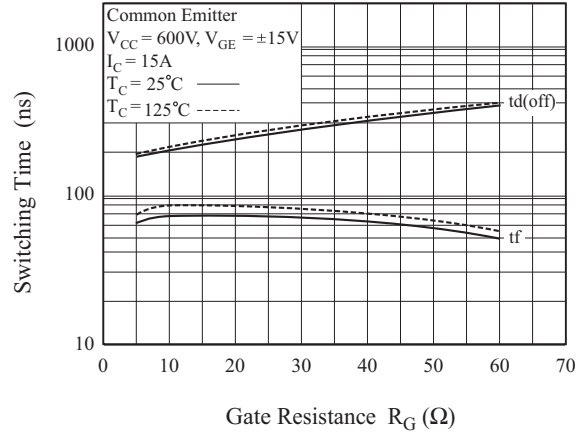


Fig 9. Switching Loss vs. Gate Resistance

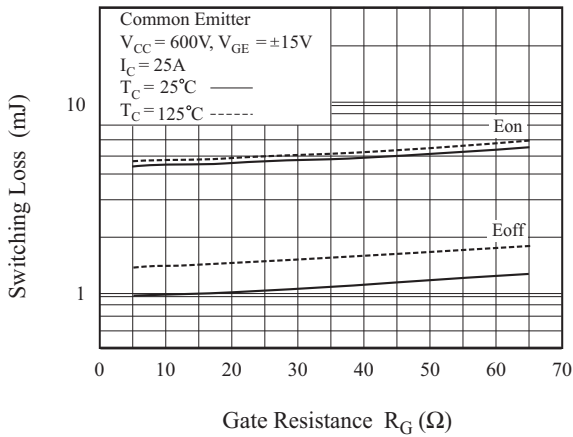


Fig 10. Turn-On Characteristics vs. Collector Current

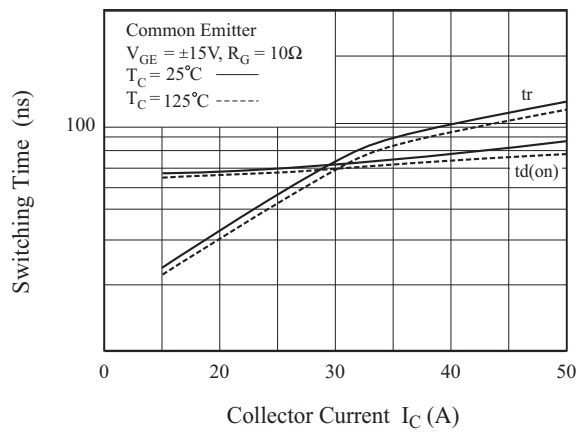


Fig 11. Turn-Off Characteristics vs. Collector Current

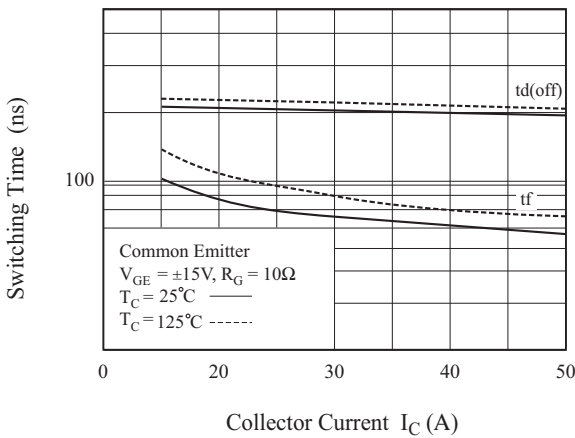
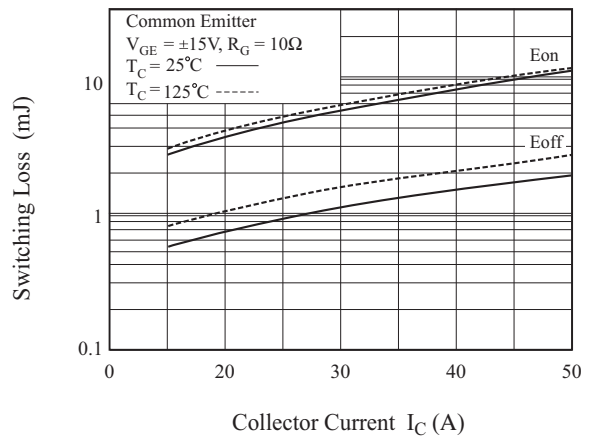


Fig 12. Switching Loss vs. Collector Current



# KGH25N120NDA

Fig 13. Gate Charge Characteristics

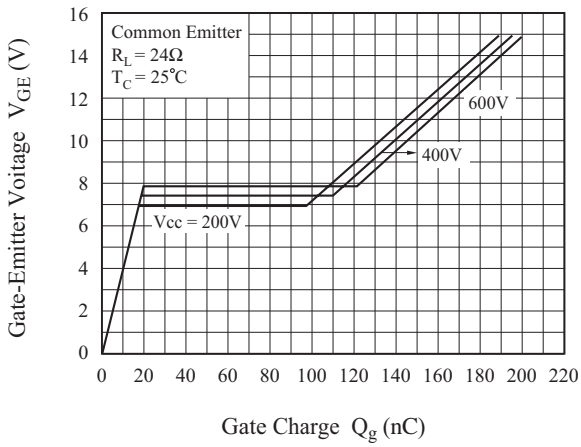


Fig 14. SOA Characteristics

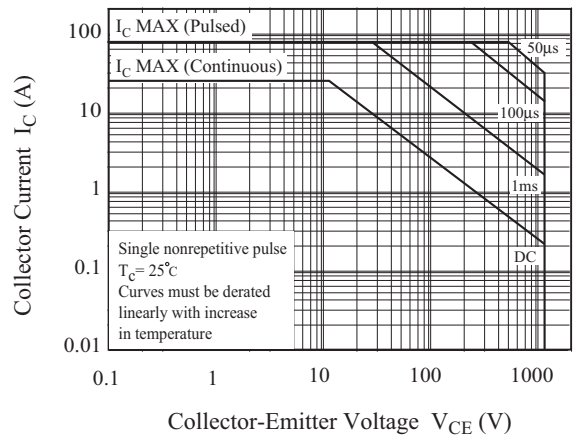


Fig 15. Turn-Off SOA

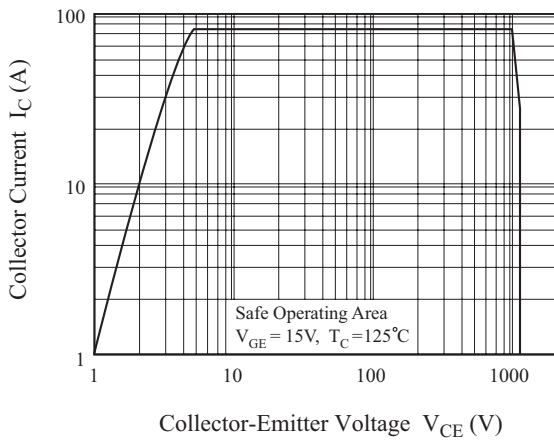
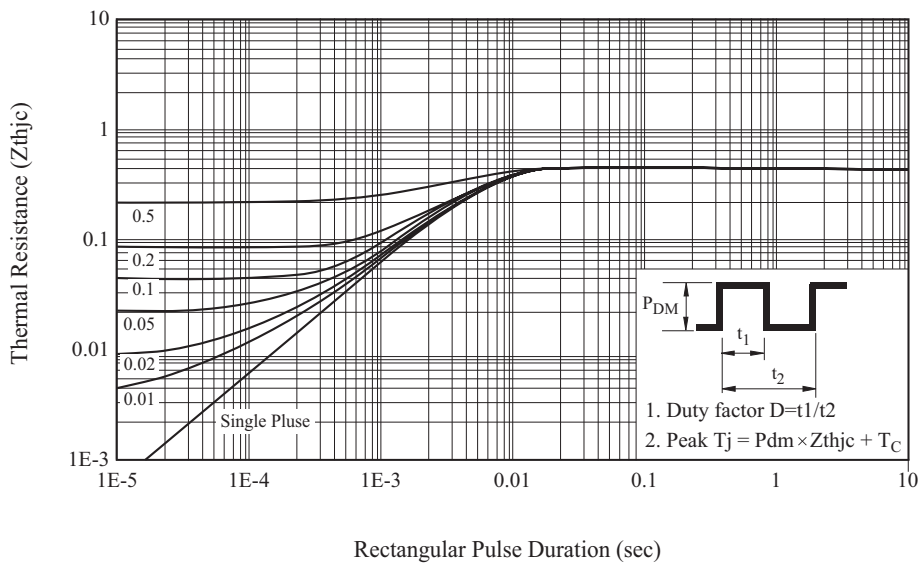


Fig 16. Transient Thermal Impedance of IGBT



# KGH25N120NDA

Fig 17. Forward Characteristics

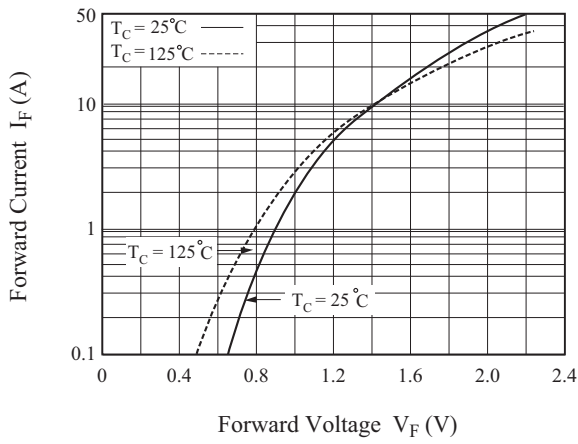


Fig 18. Reverse Recovery Current

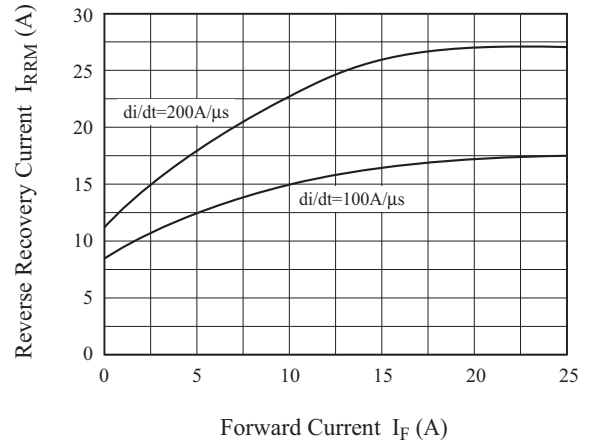


Fig 19. Reverse Recovery Time

