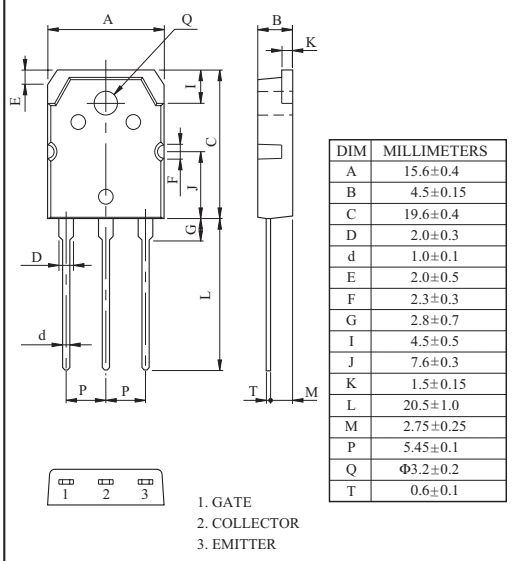
General Description

KEC's RC IGBTs offer low $V_{CE(sat)}$ and switching losses using advanced Trench Field Stop and reverse conducting technology. The RC IGBT is designed for IH(Induction Heating), Microwave oven and Soft-switching applications.



DIM	MILLIMETERS
A	15.6±0.4
B	4.5±0.15
C	19.6±0.4
D	2.0±0.3
d	1.0±0.1
E	2.0±0.5
F	2.3±0.3
G	2.8±0.7
I	4.5±0.5
J	7.6±0.3
K	1.5±0.15
L	20.5±1.0
M	2.75±0.25
P	5.45±0.1
Q	Φ3.2±0.2
T	0.6±0.1

TO-3PN(1)

FEATURES

- High speed switching
- Soft current turn-off waveform
- Low saturation voltage : $V_{CE(sat)}$ = 1.78V (@I_C=20A)
- Low EMI

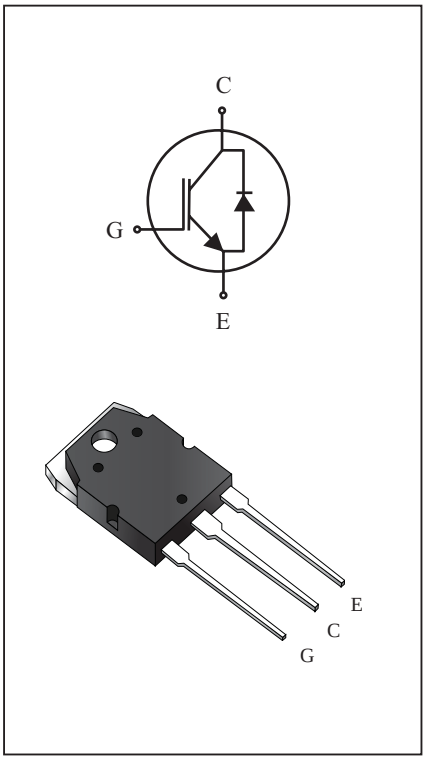
APPLICATIONS

- Induction heating
- Microwave ovens
- Soft switching applications

MAXIMUM RATING (Ta=25℃)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Collector-Emitter Voltage		V_{CES}	1200	V
Gate-Emitter Voltage		V_{GES}	±20	V
Collector Current	@Tc=25℃	I_C	40	A
	@Tc=100℃		20	A
Pulsed Collector Current		I_{CM}*	60	A
Diode Continuous Forward Current	@Tc=100℃	I_F	20	A
Diode Maximum Forward Current		I_{FM}	60	A
Maximum Power Dissipation	@Tc=25℃	P_D	192	W
	@Tc=100℃		77	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)	$R_{th\,JC}$	0.65	℃/W
Thermal Resistance, Junction to Case (DIODE)	$R_{th\,JC}$	0.65	℃/W
Thermal Resistance, Junction to Ambient	$R_{th\,JA}$	40	℃/W

ELECTRICAL CHARACTERISTICS (Ta=25℃)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Static						
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=20mA	5.5	6.5	7.4	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	V_{GE}=15V, I_C=20A	-	1.78	2.05	V
		V_{GE}=15V, I_C=20A, T_C = 125℃	-	1.88	-	V
		V_{GE}=15V, I_C=40A	-	2.24	-	V
Diode Forward Voltage	V_F	I_F=20A	-	1.98	2.28	V
		I_F=20A, T_C=125℃	-	2.35	-	V
Dynamic						
Total Gate Charge	Q_g	V_{CC}=600V, V_{GE}=15V, I_C= 20A	-	108	-	nC
Gate-Emitter Charge	Q_{ge}		-	22	-	nC
Gate-Collector Charge	Q_{gc}		-	56	-	nC
Turn-Off Delay Time	$t_{d(off)}$	V_{CC}=600V, V_{GE}=15V, I_C=20A, R_G=10Ω Resistive Load, T_C = 25℃	-	140	-	ns
Fall Time	t_f		-	180	-	ns
Turn-Off Switching Loss	E_{off}		-	0.5	-	mJ
Turn-Off Delay Time	$t_{d(off)}$	V_{CC}=600V, V_{GE}=15V, I_C=20A, R_G=10Ω Resistive Load, T_C = 125℃	-	154	-	ns
Fall Time	t_f		-	403	-	ns
Turn-Off Switching Loss	E_{off}		-	1.1	-	mJ
Input Capacitance	C_{ies}	V_{CE}=30V, V_{GE}=0V, f=1MHz	-	2273	-	pF
Ouput Capacitance	C_{oes}		-	63	-	pF
Reverse Transfer Capacitance	C_{res}		-	32	-	pF

MARKING

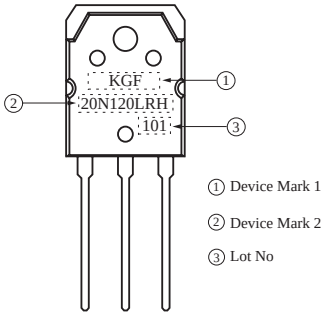


Fig 1. Saturation Voltage Characteristics

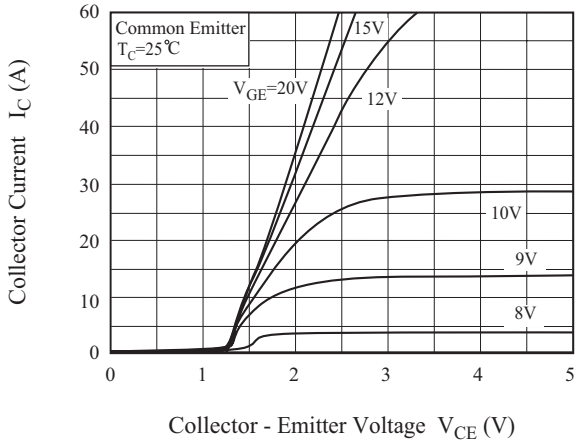


Fig 2. Saturation Voltage Characteristics

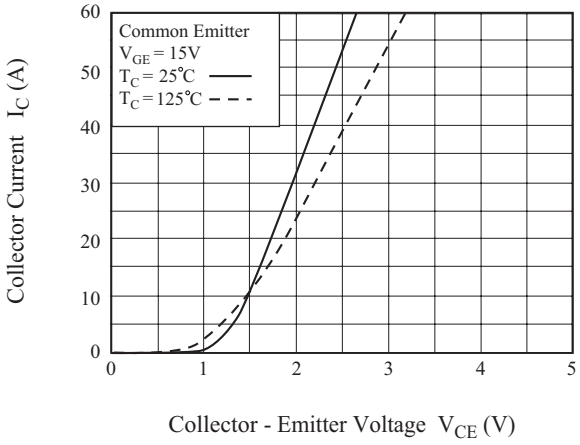


Fig 3. Saturation Voltage vs. Case Temperature

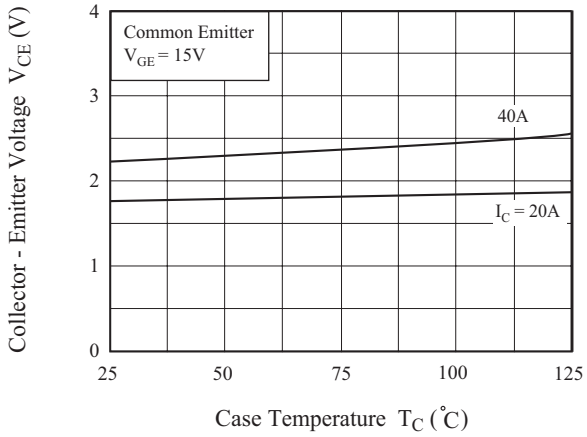


Fig 4. Saturation Voltage vs. V_{GE}

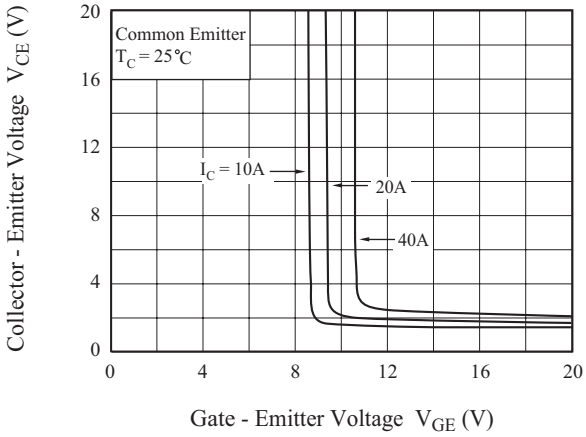


Fig 5. Saturation Voltage vs. V_{GE}

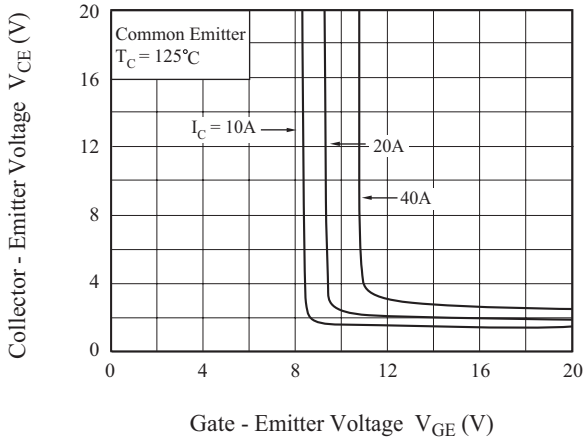


Fig 6. Capacitance Characteristics

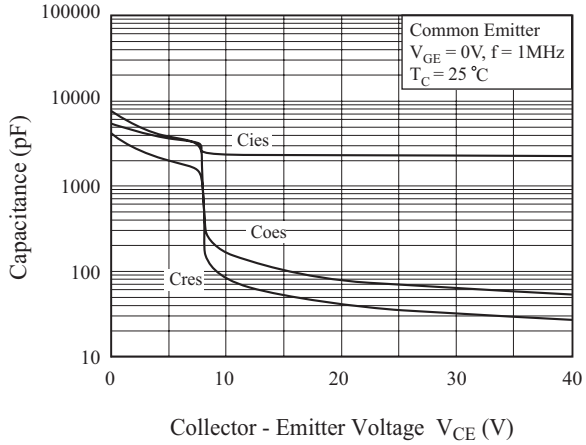


Fig 7. Turn-Off Characteristics vs. Gate Resistance

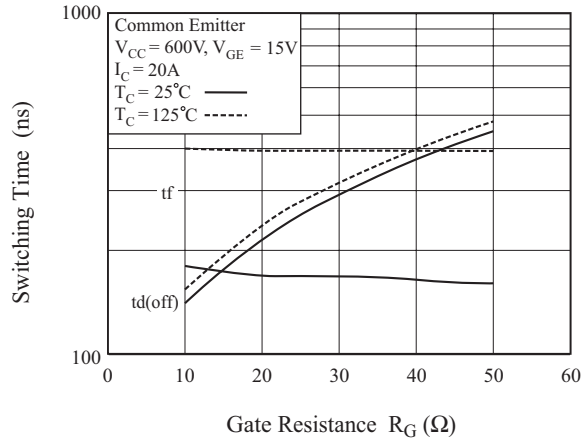


Fig 8. Switching Loss vs. Gate Resistance

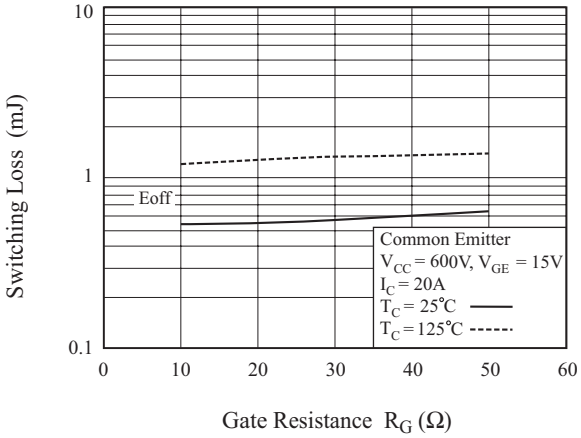


Fig 9. Turn-Off Characteristics vs. Collector Current

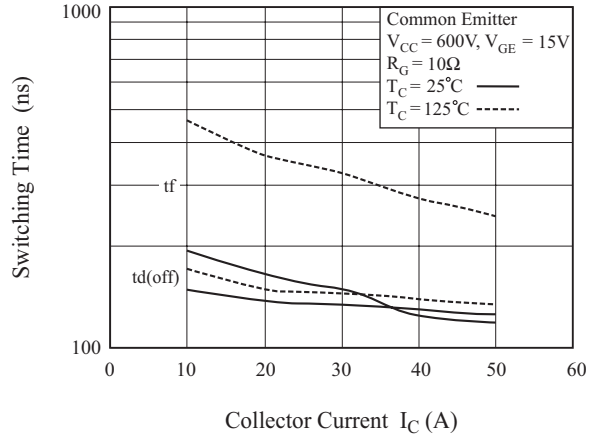


Fig 10. Switching Loss vs. Collector Current

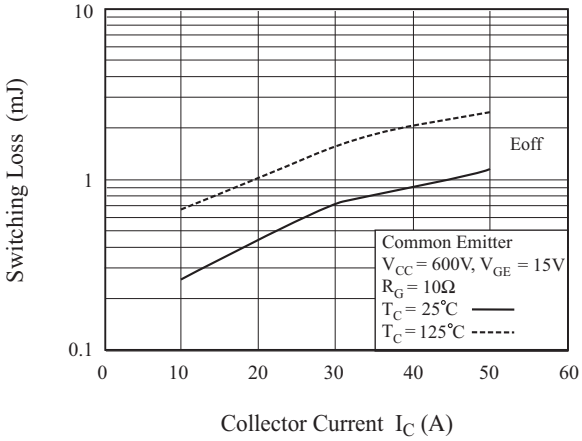


Fig 11. Gate Charge Characteristics

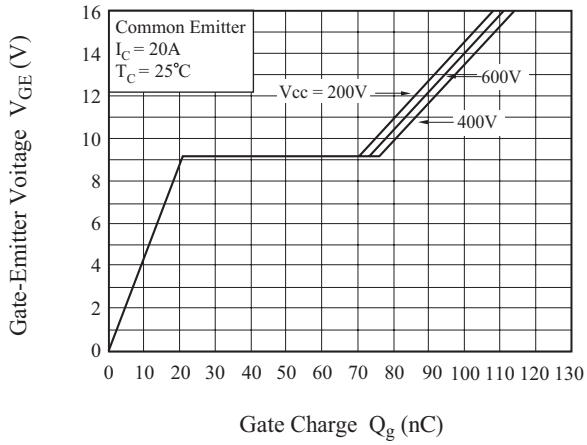


Fig 12. Forward Characteristics

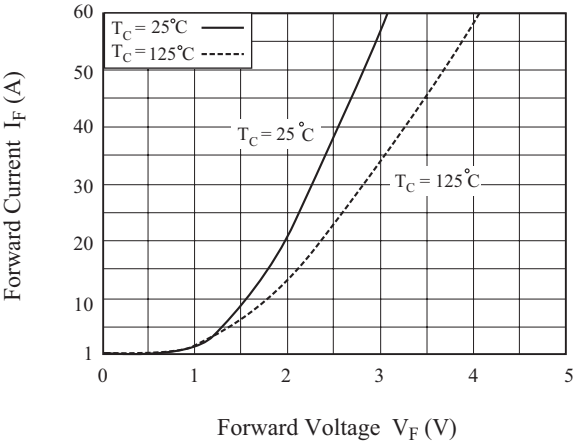


Fig 13. SOA Characteristics

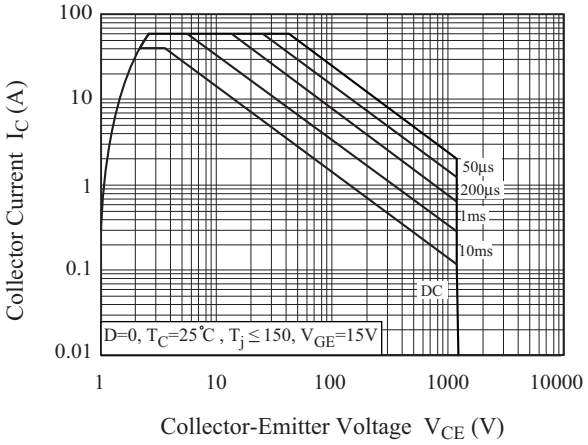


Fig 14. Transient Thermal Impedance of IGBT

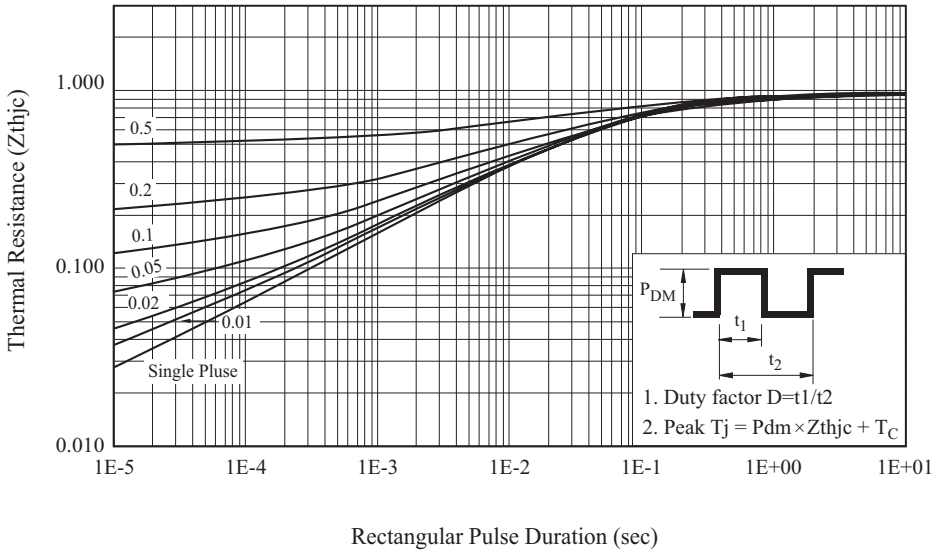


Fig 15. Switching Test Circuit

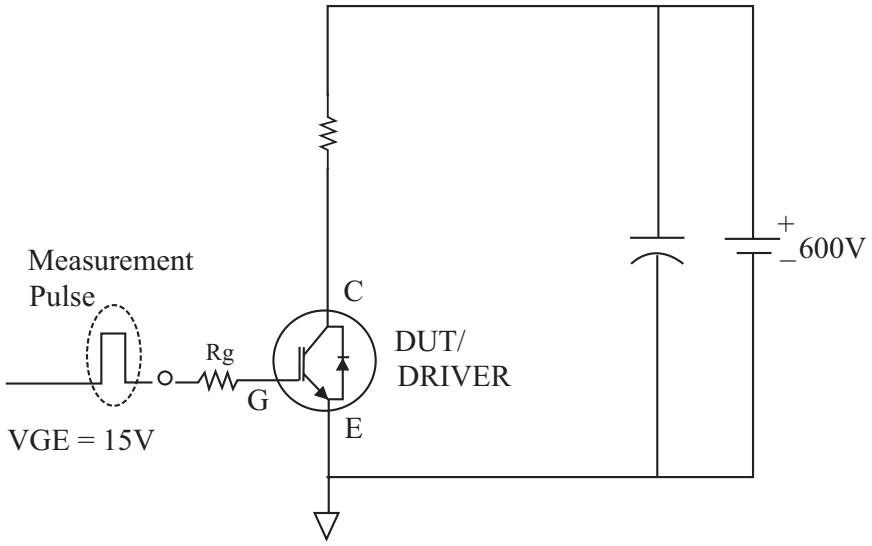


Fig 16. Definition Switching Time & Loss