

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.

FEATURES

- High speed switching
- Soft current turn-off waveform
- Low saturation voltage : $V_{CE(sat)} = 1.7V$ (@ $I_C=15A$)
- Low EMI

APPLICATIONS

- Induction heating
- Microwave ovens
- Soft switching applications

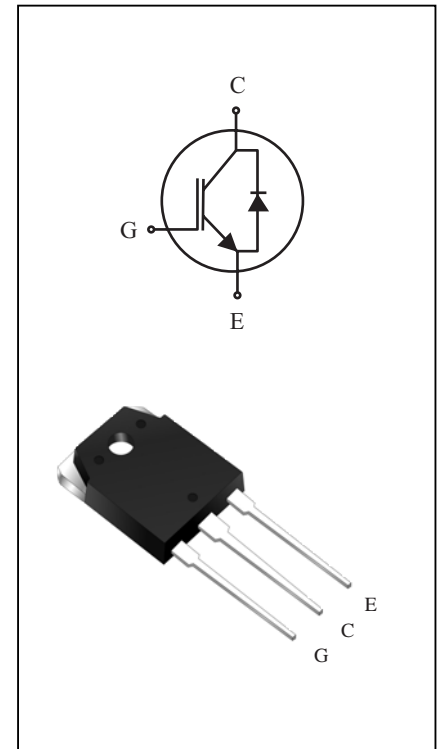
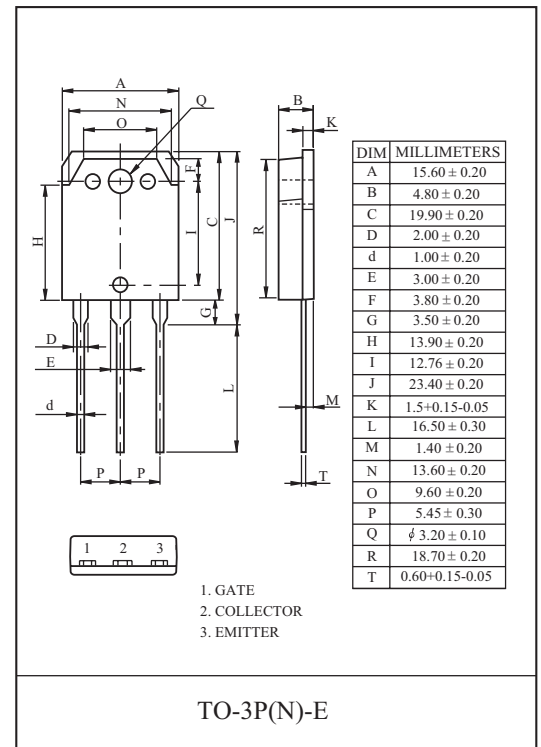
MAXIMUM RATING (Ta=25 °C)

| CHARACTERISTIC | SYMBOL | RATING | UNIT |
|----------------------------------|------------|-------------|-------|
| Collector-Emitter Voltage | V_{CES} | 1200 | V |
| Gate-Emitter Voltage | V_{GES} | ± 20 | V |
| Collector Current | I_C | @Tc=25 | 30 A |
| | | @Tc=100 | 15 A |
| Pulsed Collector Current | I_{CM}^* | 45 | A |
| Diode Continuous Forward Current | @Tc=100 | I_F | 15 A |
| Diode Maximum Forward Current | | I_{FM} | 45 A |
| Maximum Power Dissipation | P_D | @Tc=25 | 142 W |
| | | @Tc=100 | 56 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_{thJC} | 0.88 | /W |
| Thermal Resistance, Junction to Case (DIODE) | R_{thJC} | 0.88 | /W |
| Thermal Resistance, Junction to Ambient | R_{thJA} | 40 | /W |

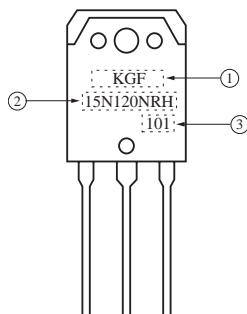


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ELECTRICAL CHARACTERISTICS (Ta=25)

| 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} | $V_{CE}=0V, V_{GE}= \pm 20V$ | - | - | ± 100 | nA |
| Gate Threshold Voltage | $V_{GE(th)}$ | $V_{GE}=V_{CE}, I_C=15mA$ | 5.0 | 6.1 | 7.2 | V |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $V_{GE}=15V, I_C=15A$ | - | 1.70 | 2.04 | V |
| | | $V_{GE}=15V, I_C=15A, T_C = 125$ | - | 1.9 | - | V |
| | | $V_{GE}=15V, I_C=30A$ | - | 2.2 | - | V |
| Diode Forward Voltage | V_F | $I_F=15A$ | - | 2.25 | 2.70 | V |
| | | $I_F=15A, T_C=125$ | - | 2.75 | - | V |
| Dynamic | | | | | | |
| Total Gate Charge | Q_g | $V_{CC}=600V, V_{GE}=15V, I_C= 15A$ | - | 76 | - | nC |
| Gate-Emitter Charge | Q_{ge} | | - | 14 | - | nC |
| Gate-Collector Charge | Q_{gc} | | - | 40 | - | nC |
| Turn-Off Delay Time | $t_{d(off)}$ | $V_{CC}=600V, I_C=15A, V_{GE}=15V, R_G=10$ Resistive Load, $T_C = 25$ | - | 124 | - | ns |
| Fall Time | t_f | | - | 213 | - | ns |
| Turn-Off Switching Loss | E_{off} | | - | 0.6 | - | mJ |
| Turn-Off Delay Time | $t_{d(off)}$ | $V_{CC}=600V, I_C=15A, V_{GE}=15V, R_G=10$ Resistive Load, $T_C = 125$ | - | 127 | - | ns |
| Fall Time | t_f | | - | 352 | - | ns |
| Turn-Off Switching Loss | E_{off} | | - | 0.92 | - | mJ |
| Input Capacitance | C_{ies} | $V_{CE}=30V, V_{GE}=0V, f=1MHz$ | - | 1620 | - | pF |
| Ouput Capacitance | C_{oes} | | - | 46 | - | pF |
| Reverse Transfer Capacitance | C_{res} | | - | 21 | - | pF |

MARKING



- ① Device Mark 1
- ② Device Mark 2
- ③ Lot No

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Fig 1. Saturation Voltage Characteristics

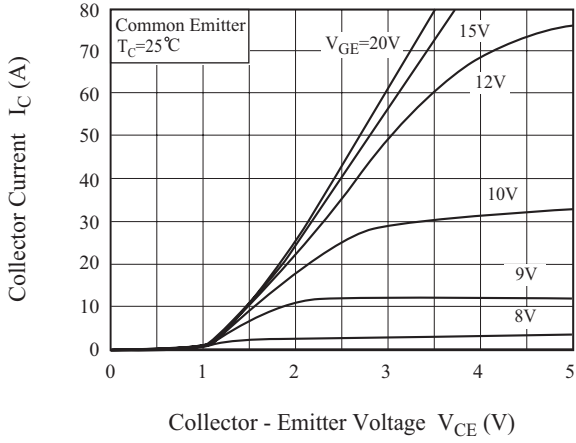


Fig 2. Saturation Voltage Characteristics

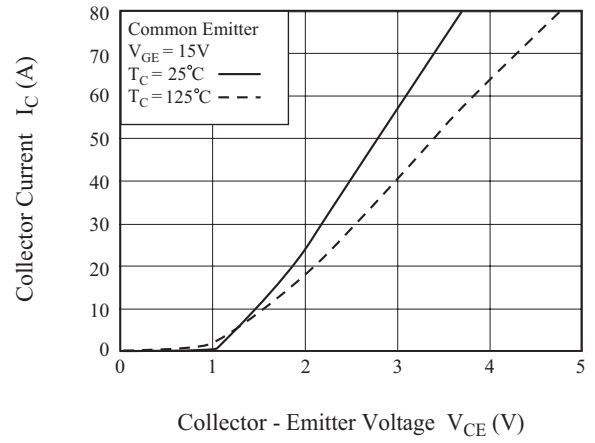


Fig 3. Saturation Voltage vs. Case Temperature

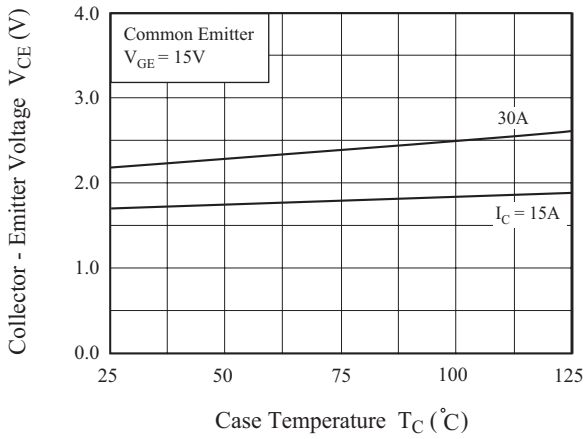


Fig 4. Saturation Voltage vs. V_{GE}

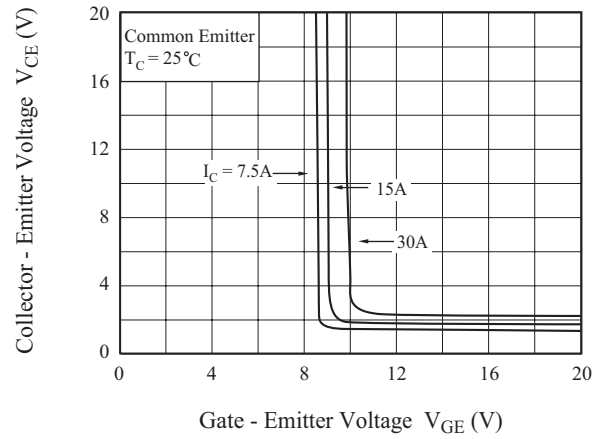


Fig 5. Saturation Voltage vs. V_{GE}

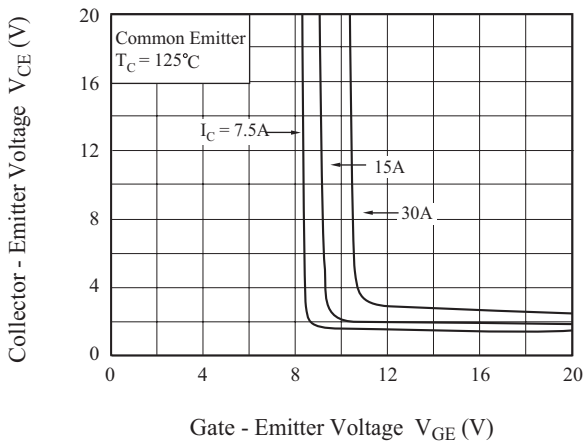
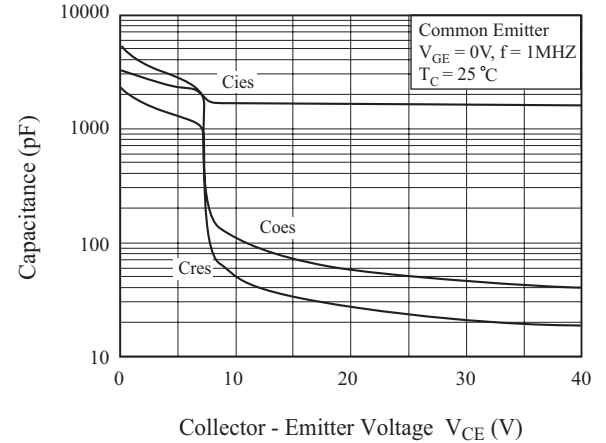


Fig 6. Capacitance Characteristics



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Fig 7. Turn-Off Characteristics vs. Gate Resistance

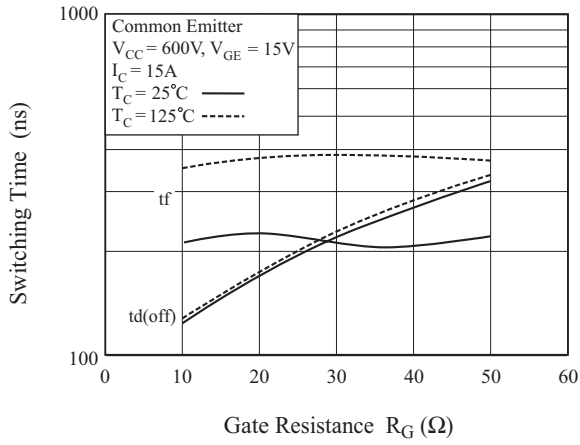


Fig 8. Switching Loss vs. Gate Resistance

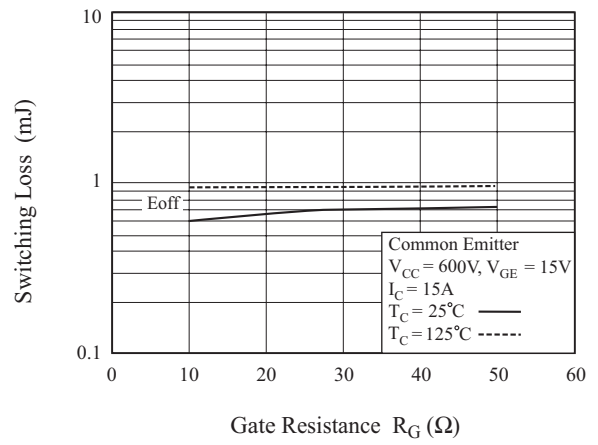


Fig 9. Turn-Off Characteristics vs. Collector Current

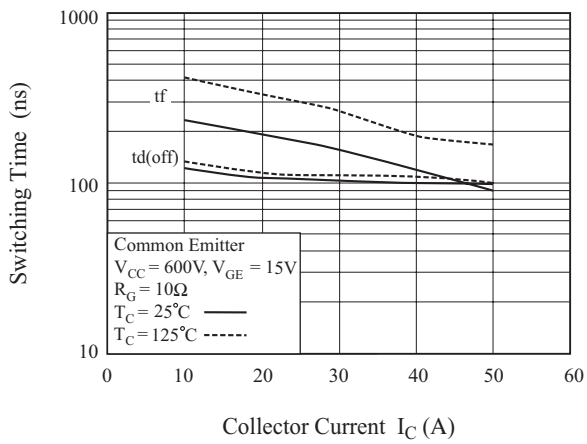


Fig 10. Switching Loss vs. Collector Current

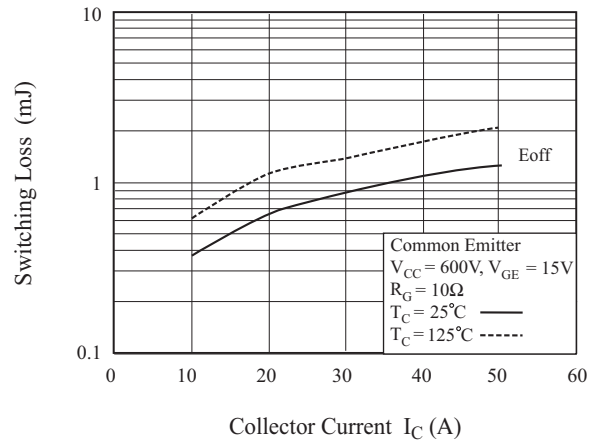


Fig 11. Gate Charge Characteristics

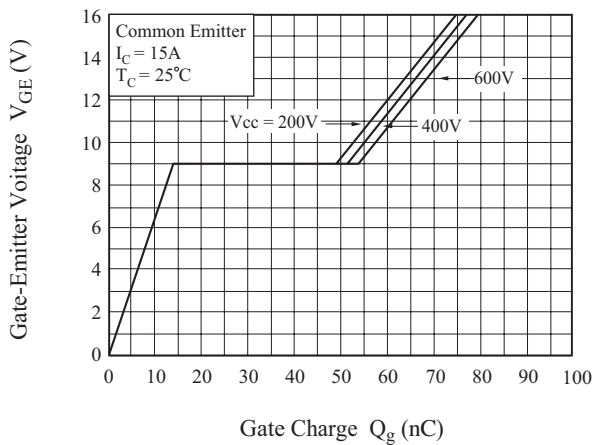
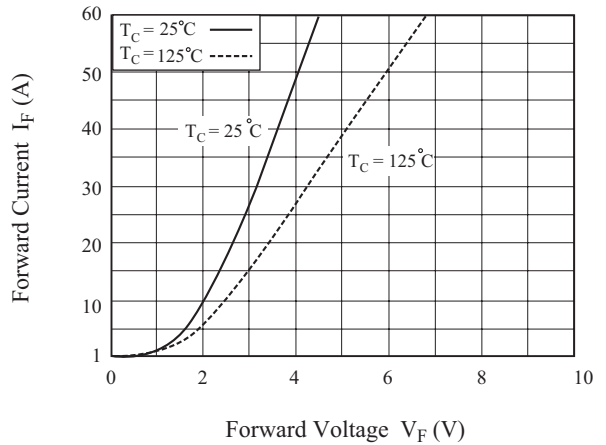


Fig 12. Forward Characteristics



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Fig 13. SOA Characteristics

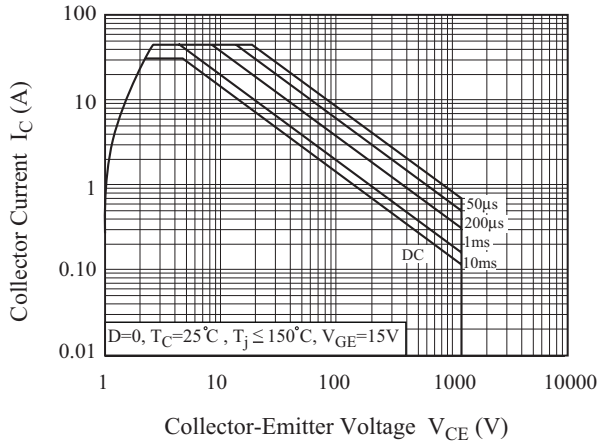


Fig 14. Transient Thermal Impedance of IGBT

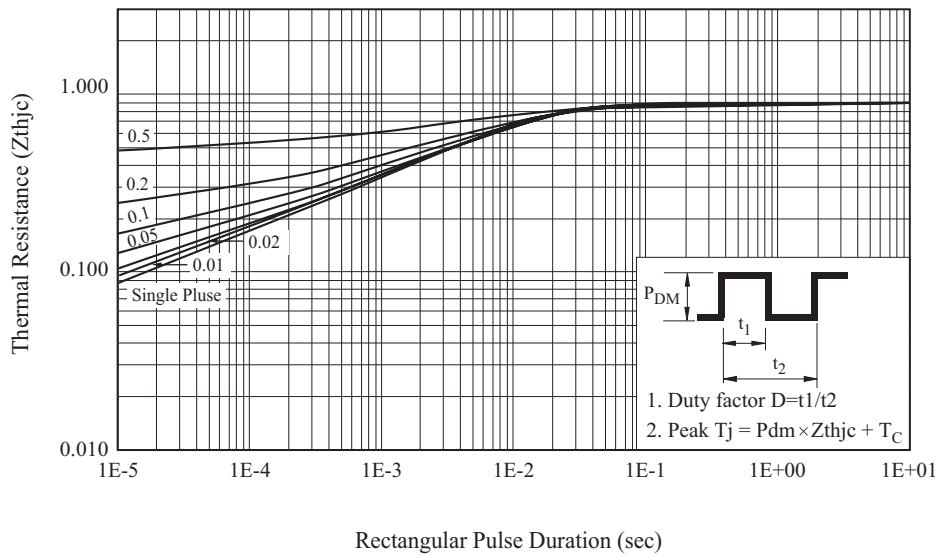


Fig 15. Switching Test Circuit

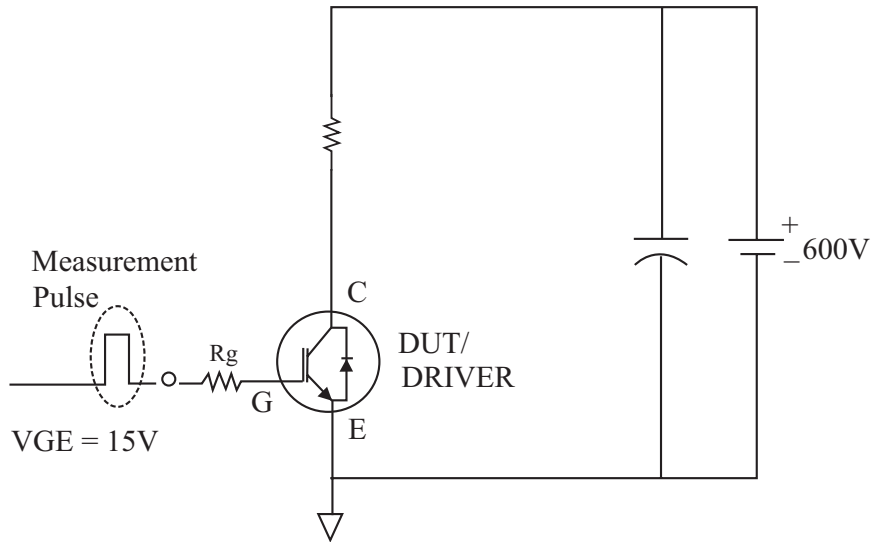


Fig 16. Definition Switching Time & Loss

