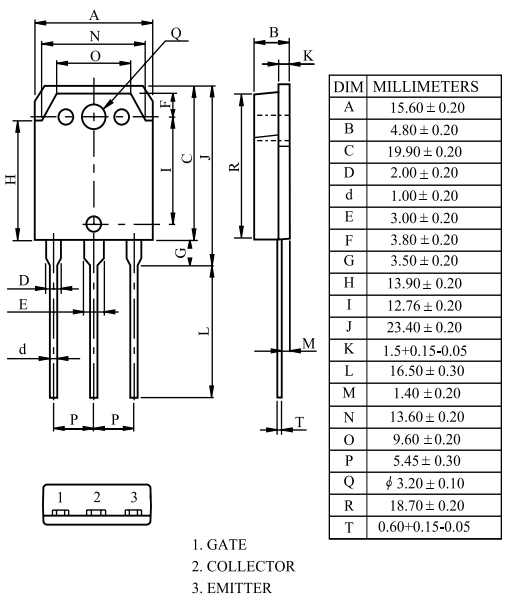
General Description

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



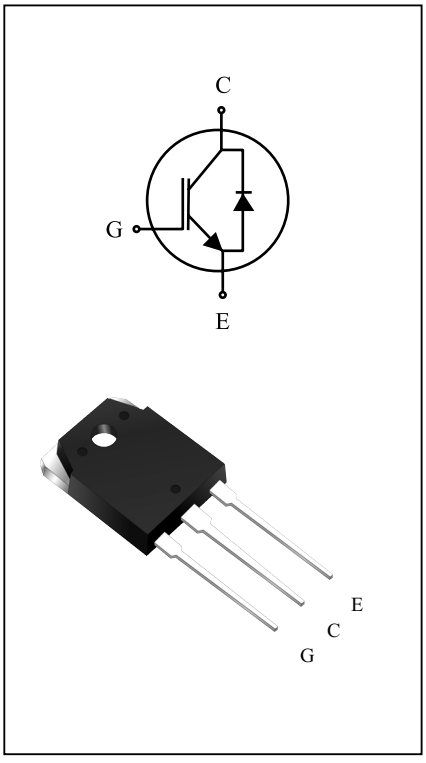
DIM	MILLIMETERS
A	15.60 ± 0.20
B	4.80 ± 0.20
C	19.90 ± 0.20
D	2.00 ± 0.20
d	1.00 ± 0.20
E	3.00 ± 0.20
F	3.80 ± 0.20
G	3.50 ± 0.20
H	13.90 ± 0.20
I	12.76 ± 0.20
J	23.40 ± 0.20
K	1.5+0.15-0.05
L	16.50 ± 0.30
M	1.40 ± 0.20
N	13.60 ± 0.20
O	9.60 ± 0.20
P	5.45 ± 0.30
Q	ϕ 3.20 ± 0.10
R	18.70 ± 0.20
T	0.60+0.15-0.05

TO-3P(N)-E

MAXIMUM RATING (Ta=25℃)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Collector-Emitter Voltage		V_{CES}	1200	V
Gate-Emitter Voltage		V_{GES}	±20	V
Collector Current	@T_C=25℃	I_C	30	A
	@T_C=100℃		15	A
Pulsed Collector Current		I_{CM}*	45	A
Diode Continuous Forward Current	@T_C=100℃	I_F	15	A
Diode Maximum Forward Current		I_{FM}	45	A
Maximum Power Dissipation	@T_C=25℃	P_D	136	W
	@T_C=100℃		54	W
Maximum Junction Temperature		T_j	150	℃
Storage Temperature Range		T_{stg}	-55 to + 150	℃

*Repetitive rating : Pulse width limited by max. junction temperature



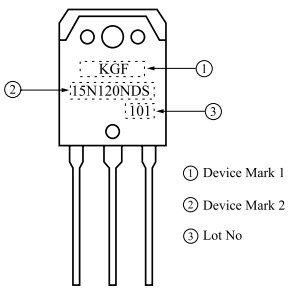
THERMAL CHARACTERISTIC

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Junction to Case (IGBT)	R_{thJC}	0.92	℃/W
Thermal Resistance, Junction to Case (DIODE)	R_{thJC}	2.8	℃/W
Thermal Resistance, Junction to Ambient	R_{thJA}	40	℃/W

ELECTRICAL CHARACTERISTICS (Ta=25℃)

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}=±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℃	-	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=10Ω Inductive Load, T_C = 25℃	-	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=10Ω Inductive Load, T_C = 125℃	-	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
Ouput Capacitance	C_{oes}		-	50	-	pF
Reverse Transfer Capacitance	C_{res}		-	35	-	pF

Marking



ELECTRICAL CHARACTERISTIC OF DIODE

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

Fig 1. Saturation Voltage Characteristics

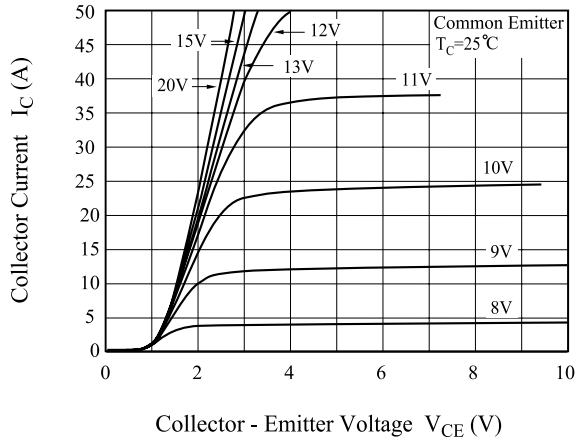


Fig 2. Saturation Voltage Characteristics

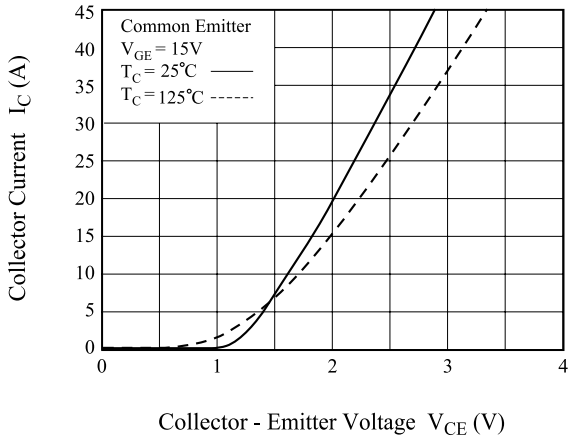


Fig 3. Saturation Voltage vs. Case Temperature

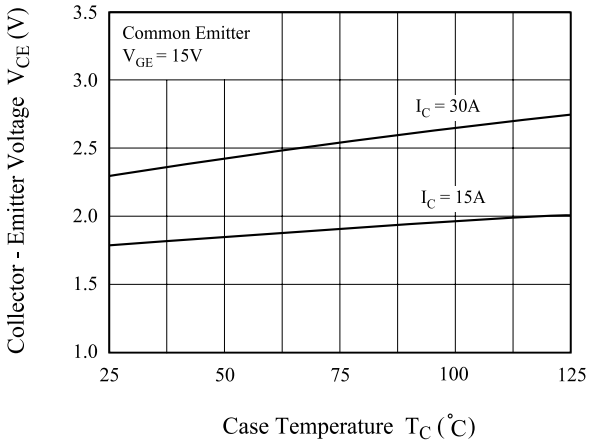


Fig 4. Saturation Voltage vs. V_{GE}

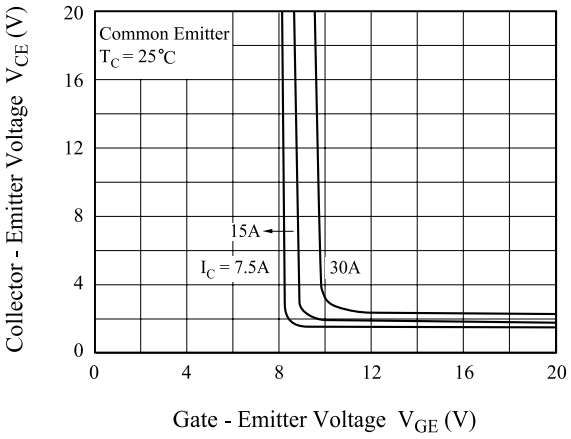


Fig 5. Saturation Voltage vs. V_{GE}

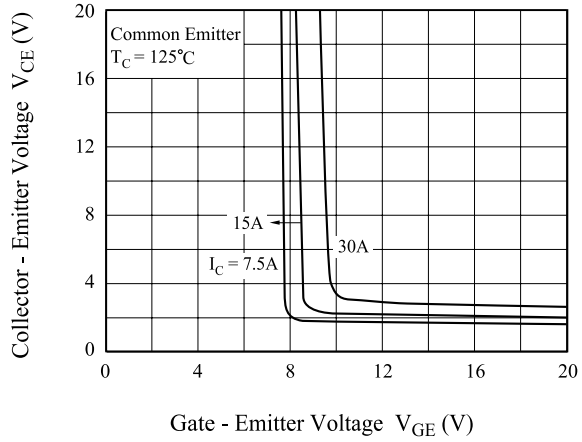


Fig 6. Capacitance Characteristics

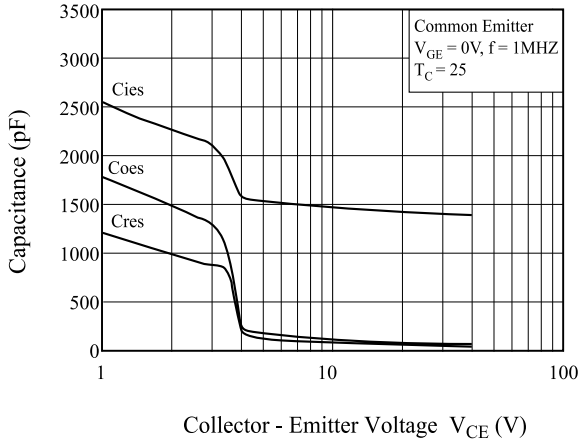


Fig 7. Turn-On Characteristics vs. Gate Resistance

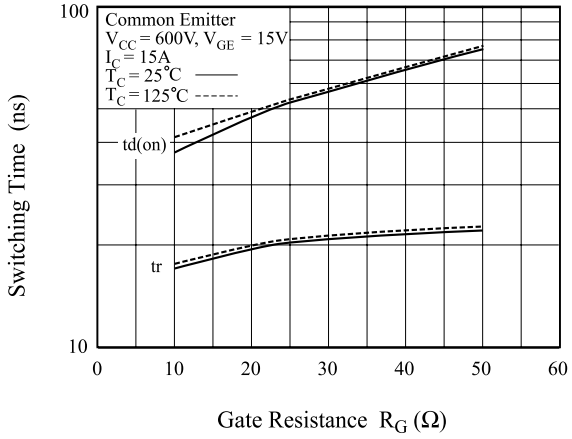


Fig 8. Turn-Off Characteristics vs. Gate Resistance

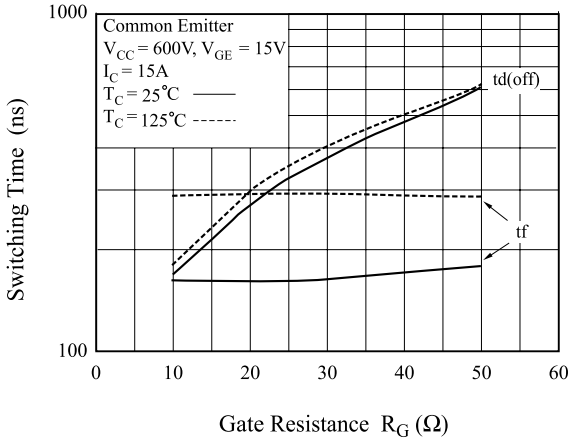


Fig 9. Switching Loss vs. Gate Resistance

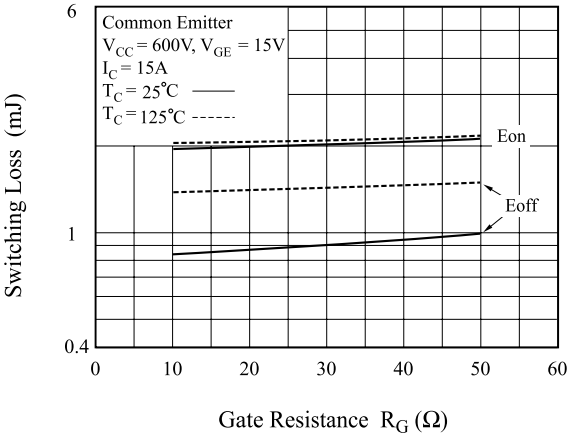


Fig 10. Turn-On Characteristics vs. Collector Current

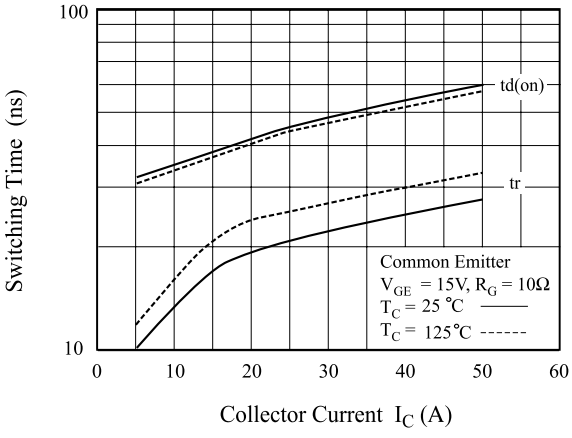


Fig 11. Turn-Off Characteristics vs. Collector Current

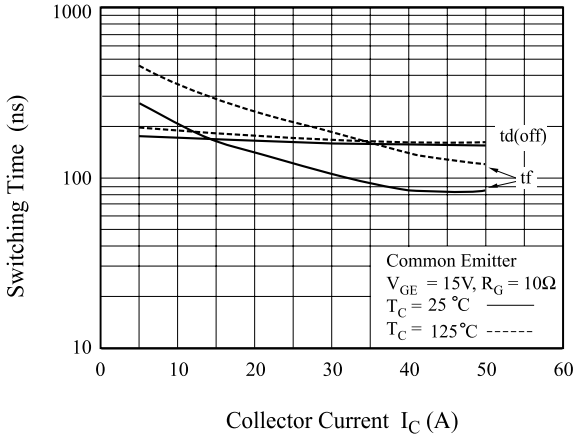


Fig 12. Switching Loss vs. Collector Current

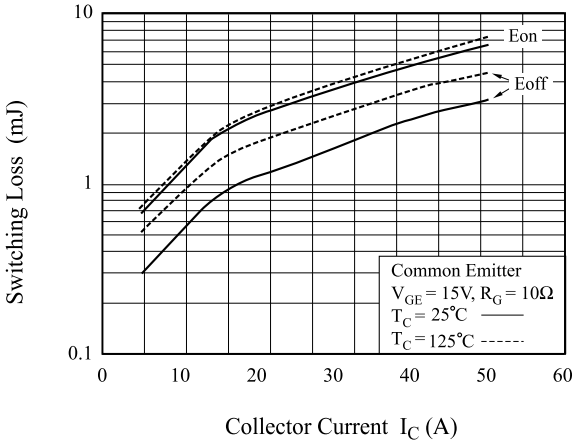


Fig 13. Gate Charge Characteristics

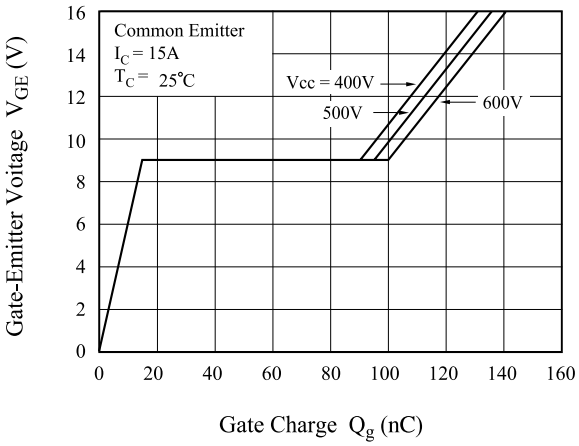


Fig 14. SOA Characteristics

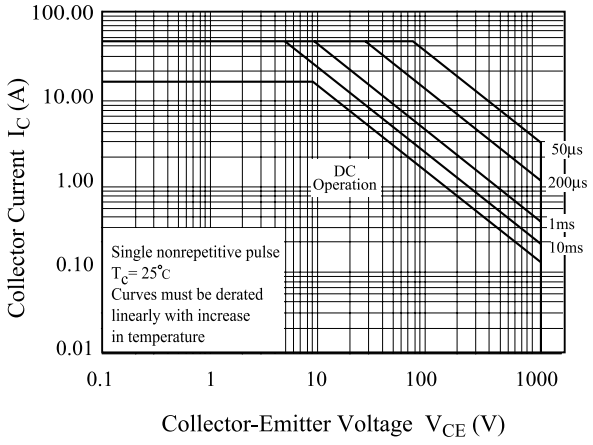


Fig 15. Turn-Off SOA

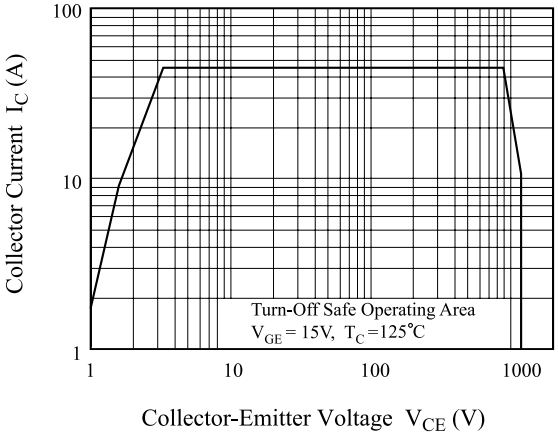


Fig 16. Transient Thermal Impedance of IGBT

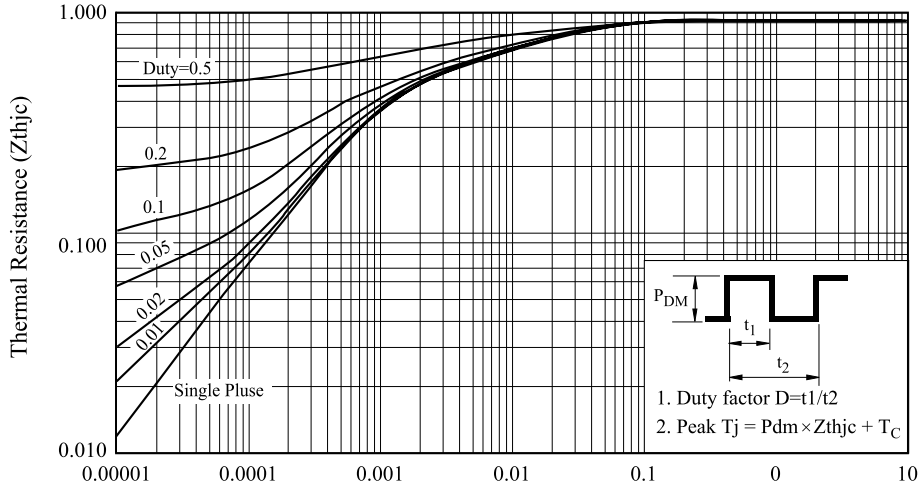


Fig 17. Forward Characteristics

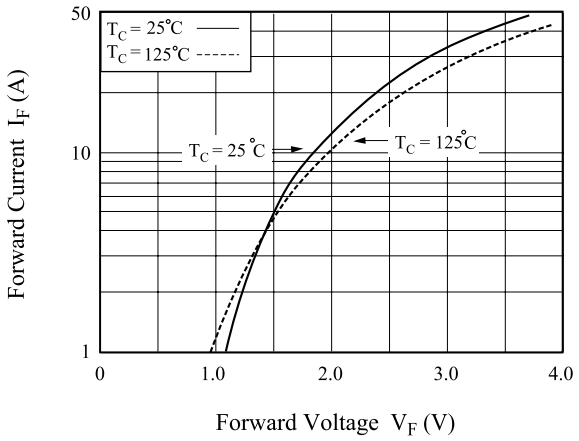


Fig 18. Reverse Recovery Current

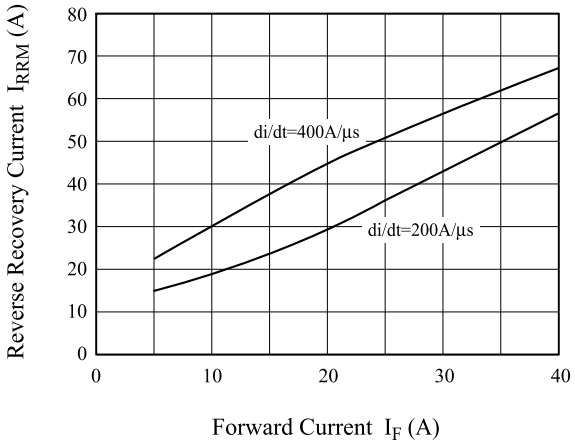


Fig 19. Reverse Recovery Time