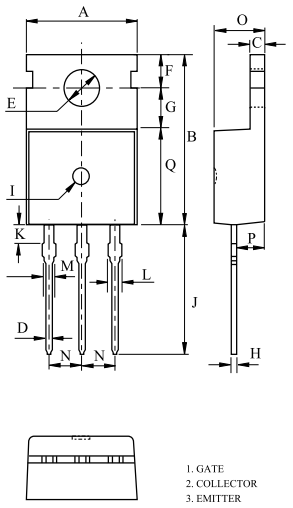
General Description

KEC Field Stop Trench IGBTs offer low switching losses, high energy efficiency and short circuit ruggedness.
It is designed for applications such as motor control, uninterrupted power supplies(UPS), general inverters.

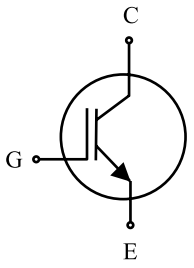
FEATURES

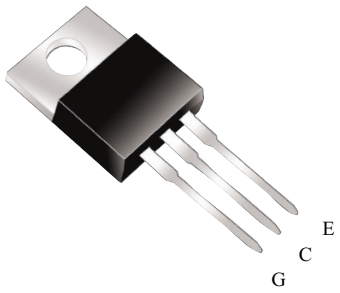
- High speed switching
- High ruggedness, temperature stable behavior
- Short Circuit Withstand Times 10us
- Extremely enhanced avalanche capability



DIM	MILLIMETERS
A	9.9± 0.2
B	15.95 MAX
C	1.3+0.1/-0.05
D	0.8± 0.1
E	ø 3.6 ±0.2
F	2.8± 0.1
G	3.7
H	0.5+0.1/-0.05
I	ø 1.5
J	13.08± 0.3
K	1.46
L	1.4± 0.1
M	1.27± 0.1
N	2.54± 0.2
O	4.5± 0.2
P	2.4± 0.2
Q	9.2± 0.2

TO-220AB





MAXIMUM RATING (Ta=25℃)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Collector-Emitter Voltage		V_{CES}	600	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
Maximum Power Dissipation	@Tc=25℃	P_D	156	W
	@Tc=100℃		62	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)	$R_{th\,JC}$	0.8	℃/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-Emitter Breakdown Voltage	BV_{CES}	V_{GE}=0V , I_C=250 μA	600	-	-	V
Collector Cut-off Current	I_{CES}	V_{GE}=0V, V_{CE}=600V	-	-	250	μA
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=2mA	4.5	5.5	7	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	V_{GE}=15V, I_C=20A	-	1.7	2.1	V
		V_{GE}=15V, I_C=40A	-	2.3	-	V
		V_{GE}=15V, I_C=20A, T_C = 125℃	-	1.95	-	V
Dynamic						
Total Gate Charge	Q_g	V_{CC}=300V, V_{GE}=15V, I_C= 20A	-	100	-	nC
Gate-Emitter Charge	Q_{ge}		-	20	-	nC
Gate-Collector Charge	Q_{gc}		-	55	-	nC
Turn-On Delay Time	$t_{d(on)}$	V_{CC}=300V, I_C=20A, V_{GE}=15V,R_G=10Ω Inductive Load, T_C = 25℃ (Note 1)	-	35	-	ns
Rise Time	t_r		-	20	-	ns
Turn-Off Delay Time	$t_{d(off)}$		-	120	-	ns
Fall Time	t_f		-	30	-	ns
Turn-On Switching Loss	E_{on}		-	0.4	0.55	mJ
Turn-Off Switching Loss	E_{off}		-	0.22	0.35	mJ
Total Switching Loss	E_{ts}		-	0.62	0.9	mJ
Turn-On Delay Time	$t_{d(on)}$	V_{CC}=300V, I_C=20A, V_{GE}=15V, R_G=10Ω Inductive Load, T_C = 125℃ (Note 1)	-	35	-	ns
Rise Time	t_r		-	25	-	ns
Turn-Off Delay Time	$t_{d(off)}$		-	125	-	ns
Fall Time	t_f		-	50	-	ns
Turn-On Switching Loss	E_{on}		-	0.45	-	mJ
Turn-Off Switching Loss	E_{off}		-	0.35	-	mJ
Total Switching Loss	E_{ts}		-	0.8	-	mJ
Input Capacitance	C_{ies}	V_{CE}=30V, V_{GE}=0V, f=1MHz	-	1700	2210	pF
Ouput Capacitance	C_{oes}		-	100	-	pF
Reverse Transfer Capacitance	C_{res}		-	65	-	pF
Short Circuit Withstand Time	t_{sc}	V_{CC}=300V, V_{GE}=15V, T_C=100℃	10	-	-	μs

Note 1 : · Energy loss include tail current and diode reverse recovery.

· Diode is used KGF40N60KDA.

Marking

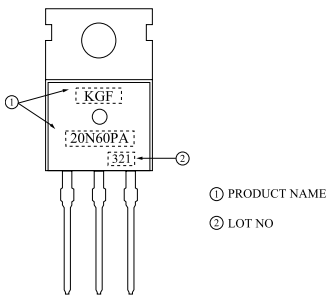


Fig 1. Saturation Voltage Characteristics

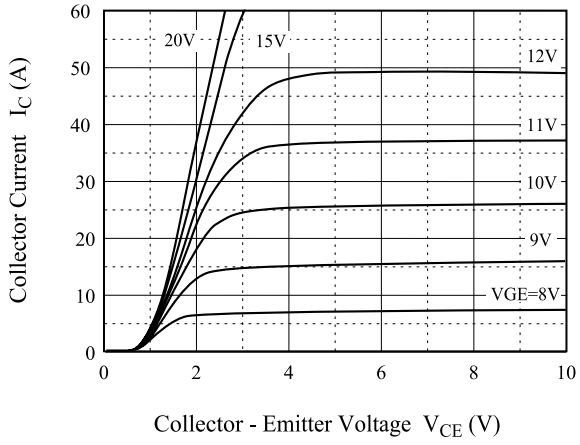


Fig 2. Saturation Voltage Characteristics

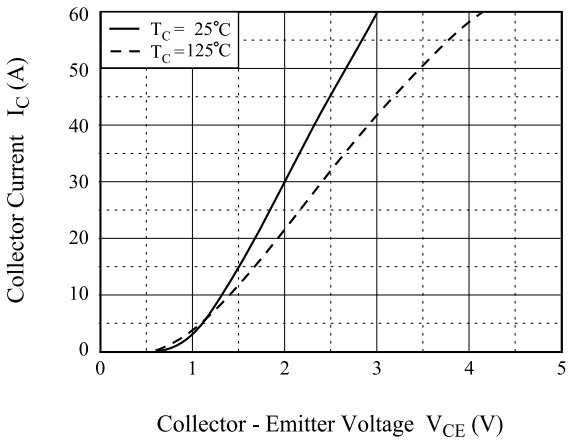


Fig 3. Saturation Voltage vs. Case Temperature

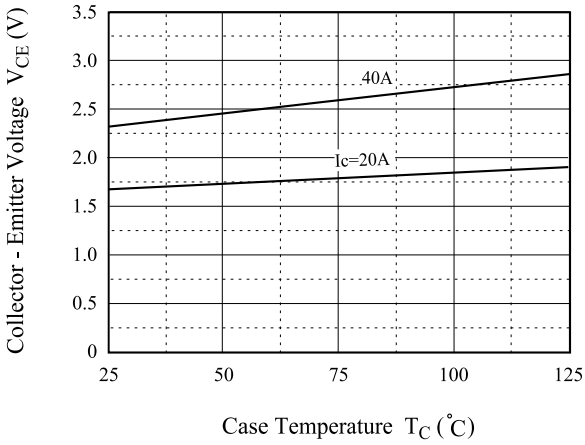


Fig 4. Saturation Voltage vs. V_{GE}

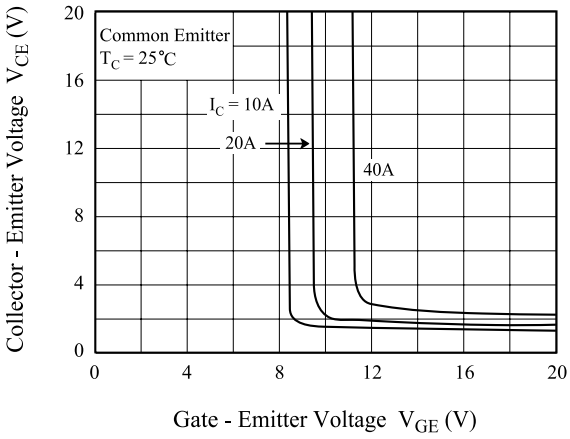


Fig 5. Saturation Voltage vs. V_{GE}

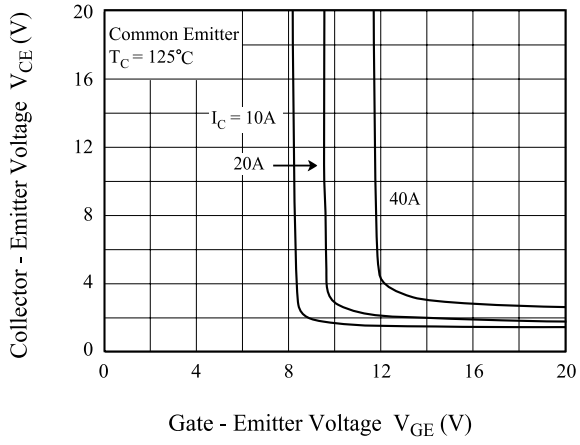


Fig 6. Capacitance Characteristics

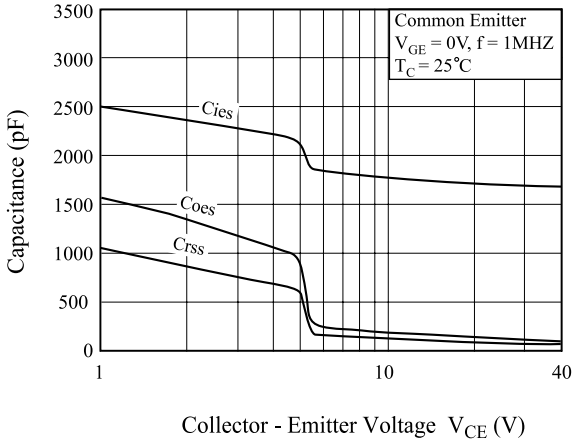


Fig 7. Turn-On Characteristics vs. Gate Resistance

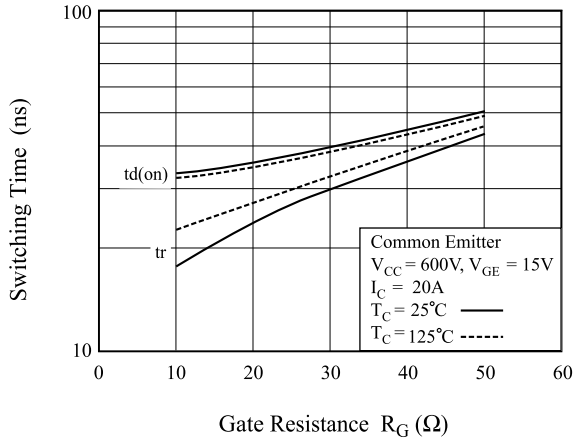


Fig 8. Turn-Off Characteristics vs. Gate Resistance

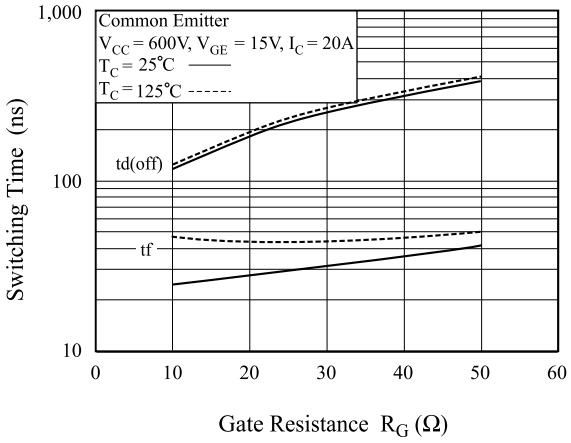


Fig 9. Switching Loss vs. Gate Resistance

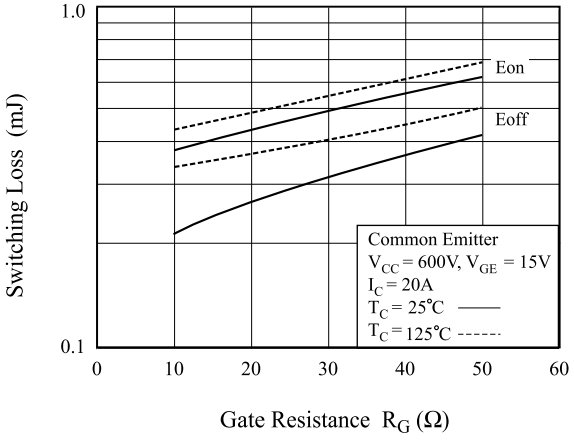


Fig 10. Turn-On Characteristics vs. Collector Current

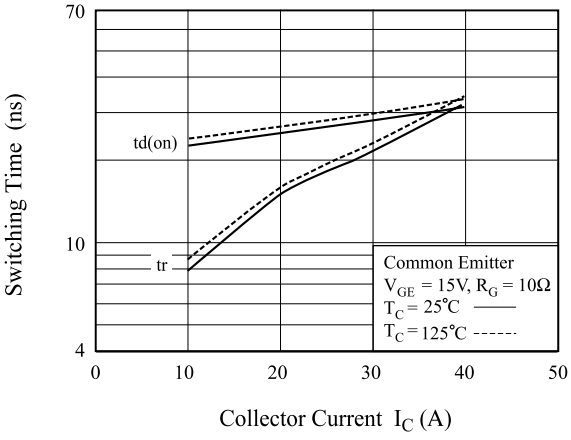


Fig 11. Turn-Off Characteristics vs. Collector Current

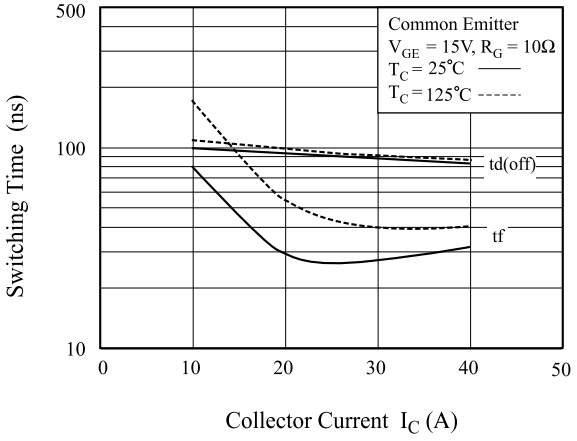


Fig 12. Switching Loss vs. Collector Current

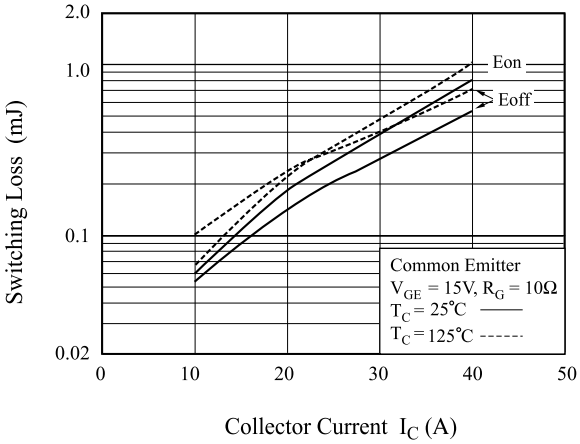


Fig 13. Gate Charge Characteristics

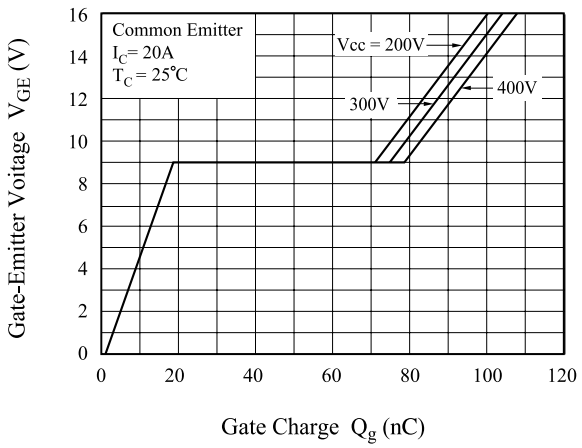


Fig 14. SOA Characteristics

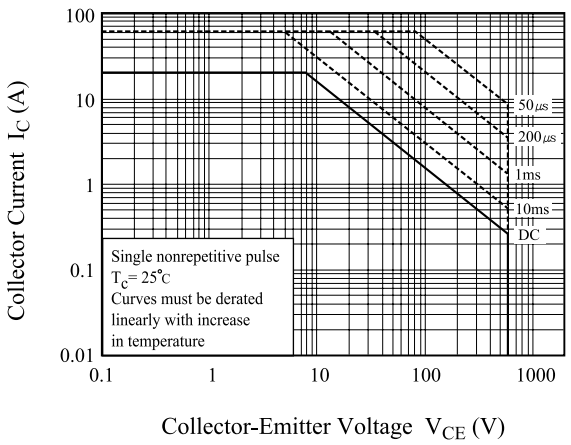


Fig 15. Turn-Off SOA

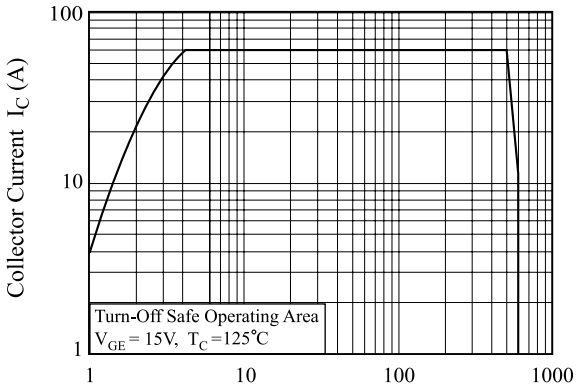


Fig 16. Transient Thermal Impedance of IGBT

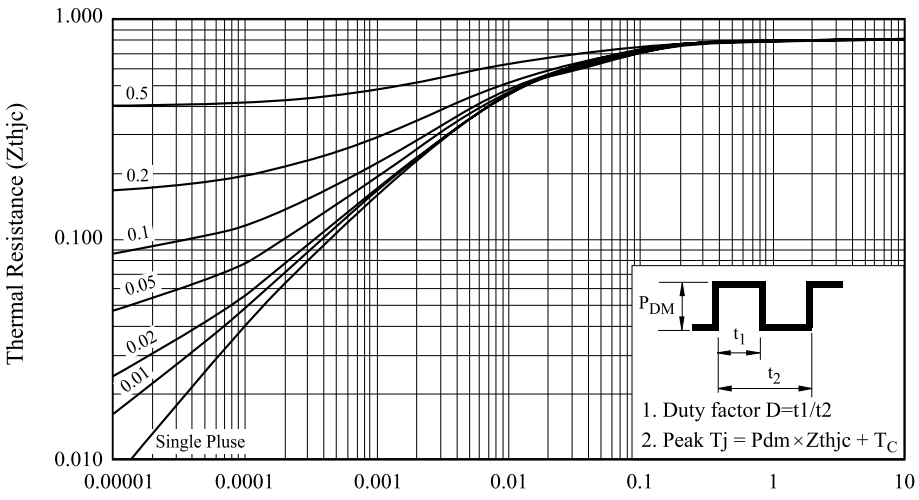


Fig 17. Switching Test Circuit

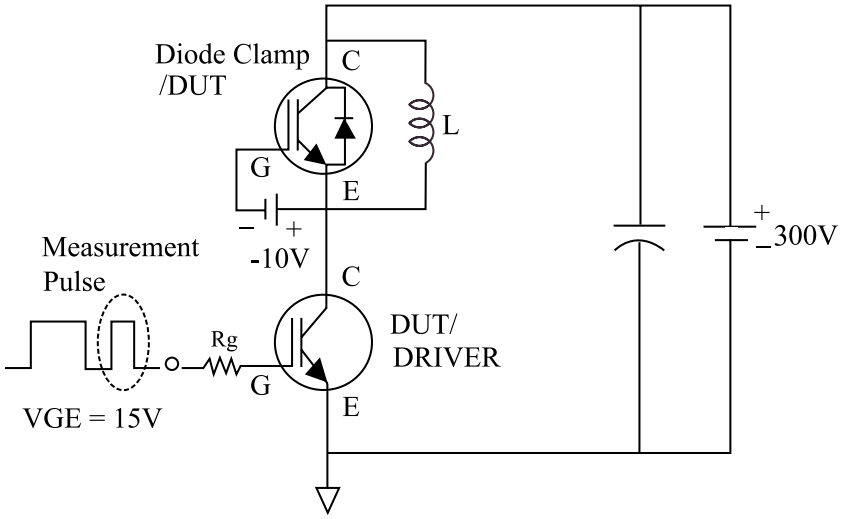
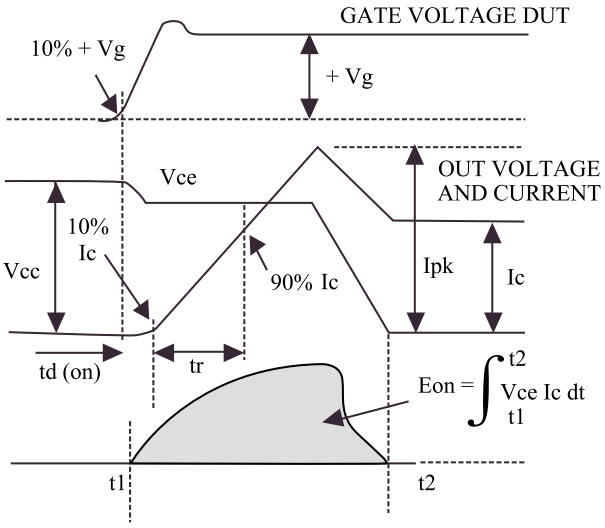


Fig 18. Definition Switching Time & Loss



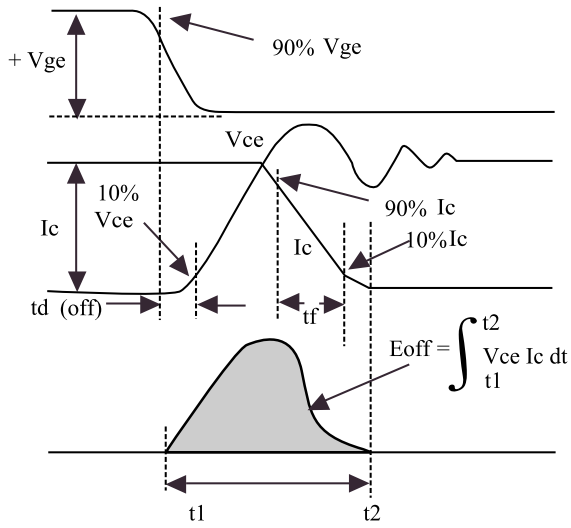


Fig 19. Definition Diode Switching Time