IKG75N1200DH

1200V 75A TRENCH IGBT

Features

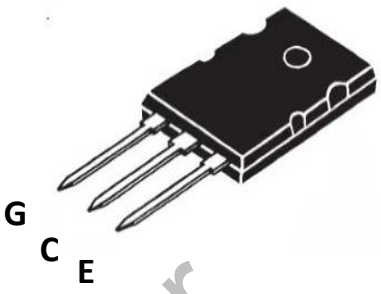
V_{CE}=1200V

I_C=75A

Fast switching

Trench FS technology

TO-264



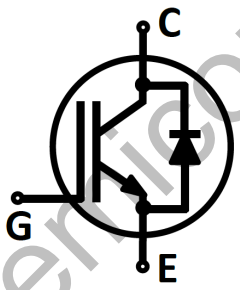
Potential applications

UPS

Welding

Induction Heating

Description



1 Package

Table 1 Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Storage temperature	T_{stg}		-55		150	˚C
Soldering temperature	T_{sold}				260	˚C
Thermal resistance, junction-ambient	$R_{th(j-a)}$				40	K/W
IGBT thermal resistance, junction-case	$R_{th(j-c)}$				0.28	K/W

2 IGBT

Table 2 Maximum rated values

Parameter	Symbol	Note or test condition		Values	Unit
Collector-emitter voltage	V_{CE}	T_{vj} ≥ 25 °C		1200	V
DC collector current, limited by T_{vjmax}	I_C	T_C =100 °C		75	A
Pulsed collector current, t_p limited by T_{vjmax}	I_{Cpulse}			300	A
Gate-emitter voltage	V_{GE}			±20	V
Power dissipation	P_{tot}	T_{vj} ≤ 175 °C	T_C = 25 °C	535	W
			T_C =100 °C	268	

Table 3 Characteristic values

Parameter	Symbol	Note or test condition		Values			Unit
				Min.	Typ.	Max.	
Collector-emitter saturation voltage	V_{CEsat}	I_C = 75A, V_{GE} = 15 V	T_C = 25 °C		1.85		V
			T_C =175 °C		2.25		
Gate-emitter threshold voltage	V_{GEth}	I_C = 1mA, V_{CE} = V_{GE}			6.0		V

Table 3 (continued) Characteristic values

Parameter	Symbol	Note or test condition		Values			Unit
				Min.	Typ.	Max.	
Zero gate-voltage collector current	I_{CES}	V_{CE} = 1200 V, V_{GE} = 0 V	T_C = 25 °C			20	µA
			T_C =175 °C			5	mA
Gate-emitter leakage current	I_{GES}	V_{CE} = 0 V, V_{GE} = 20 V				200	nA
Input capacitance	C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V, f = 100 kHz			11000		pF
Output capacitance	C_{oes}	V_{CE} = 25 V, V_{GE} = 0 V, f = 100 kHz			235		pF
Reverse transfer capacitance	C_{res}	V_{CE} = 25 V, V_{GE} = 0 V, f = 100 kHz			52		pF
Gate charge	Q_G	I_C = 75 A, V_{GE} = 15 V, V_{CC} = 960V			505		nC
Turn-on delay time (inductive load)	$t_{d(on)}$	V_{CC} = 600 V, V_{GE} = 0/15 V, $R_{G(on)}$ = 10 Ω	T_{vj} = 25 °C, I_C = 75 A		50		ns
			T_{vj} = 175 °C, I_C = 75 A		52		
Rise time (inductive load)	t_r	V_{CC} = 600 V, V_{GE} = 0/15 V, $R_{G(on)}$ = 10 Ω	T_{vj} = 25 °C, I_C = 75 A		62		ns
			T_{vj} = 175 °C, I_C = 75 A		65		
Turn-off delay time (inductive load)	$t_{d(off)}$	V_{CC} = 600 V, V_{GE} = 0/15 V, $R_{G(off)}$ = 10 Ω	T_{vj} = 25 °C, I_C = 75 A		452		ns
			T_{vj} = 175 °C, I_C = 75 A		520		
Fall time (inductive load)	t_f	V_{CC} = 600 V, V_{GE} = 0/15 V, $R_{G(off)}$ = 10 Ω	T_{vj} = 25 °C, I_C = 75 A		45		ns
			T_{vj} = 175 °C, I_C = 75 A		78		
Turn-on energy (inductive load)	E_{on}	V_{CC} = 600 V, V_{GE} = 0/15 V, $R_{G(on)}$ = 10 Ω	T_{vj} = 25 °C, I_C = 75 A		5.2		mJ
			T_{vj} = 175 °C, I_C = 75 A		8.0		
Turn-off energy (inductive load)	E_{off}	V_{CC} = 600 V, V_{GE} = 0/15 V, $R_{G(off)}$ = 10 Ω	T_{vj} = 25 °C, I_C = 75 A		1.8		mJ
			T_{vj} = 175 °C, I_C = 75 A		3.9		

Table 3 (continued) Characteristic values

Parameter	Symbol	Note or test condition		Values			Unit
				Min.	Typ.	Max.	
Total switching energy (inductive load)	E_{ts}	V_{CC} = 600 V, V_{GE} = 0/15 V, $R_{G(on)}$ = 10 Ω, $R_{G(off)}$ = 10 Ω	T_{vj} = 25 °C, I_C = 75 A		7.0		mJ
			T_{vj} = 175 °C, I_C = 75 A		11.9		
Operating junction temperature	T_{vj}			-40		175	℃

Note： Electrical Characteristic, at T_{vj} = 25°C, unless otherwise specified.

3 Diode

Table 4 Maximum rated values

Parameter	Symbol	Note or test condition		Values	Unit
Repetitive peak reverse voltage	V_{RRM}	T_{vj} ≥ 25 °C		1200	V
Diode forward current, limited by T_{vjmax}	I_F	T_C =100 °C		75	A
Power dissipation	P_{tot}	T_{vj} ≤ 175 °C	T_C = 25 °C	395	W
			T_C =100 °C	198	

Table 5 Characteristic values

Parameter	Symbol	Note or test condition		Values			Unit
				Min.	Typ.	Max.	
Diode forward voltage	V_F	I_F = 75A	T_C = 25 °C		2.1		V
			T_C =175 °C		1.9		
Diode reverse recovery time	t_{rr}	V_R = 600 V, $R_{G(on)}$ = 10 Ω	T_C = 25 °C		120		ns
			T_C =175 °C		230		
Diode reverse recovery charge	Q_{rr}	V_R = 600 V, $R_{G(on)}$ = 10 Ω	T_C = 25 °C		2.5		μC
			T_C =175 °C		6.5		
Diode peak reverse recovery current	I_{rrm}	V_R = 600 V, $R_{G(on)}$ = 10 Ω	T_C = 25 °C		30		A
			T_C =175 °C		52		
Operating junction temperature	T_{vj}			-40		175	℃

Figure 1. Reverse bias safe operating area

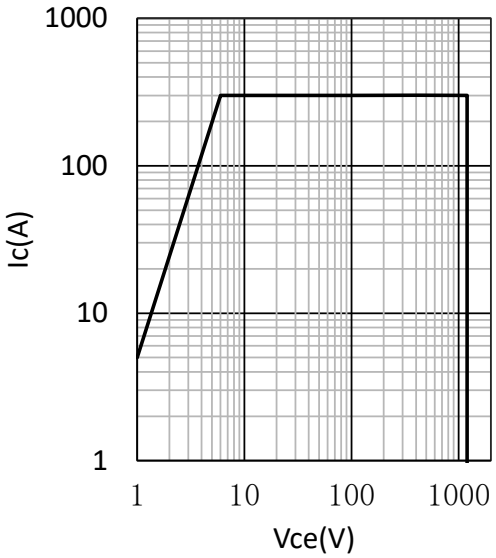


Figure 2. Maximum power dissipation as a function of case temperature (T_{Vj}≤175°C)

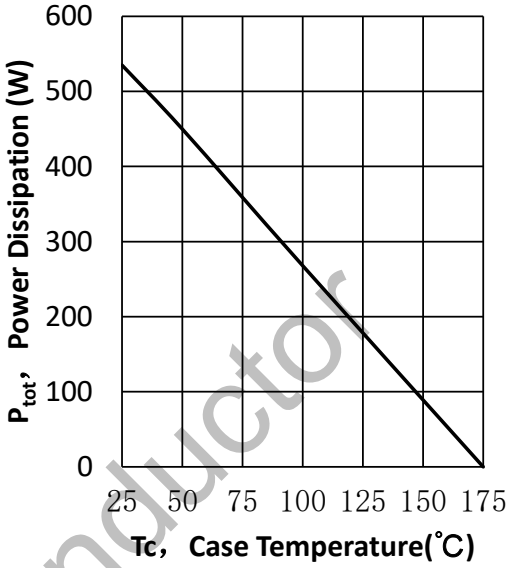


Figure 3. Typical output characteristic (V_{GE}=15V, T_{Vj}=25°C)

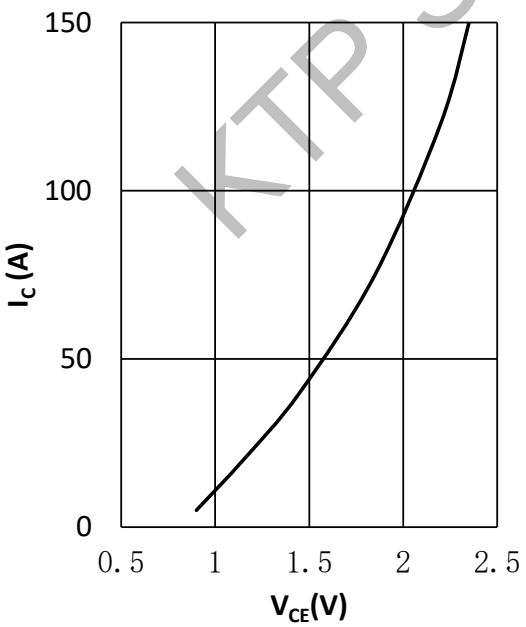


Figure 4. Typical output characteristic (V_{GE}=15V, T_{Vj}=175°C)

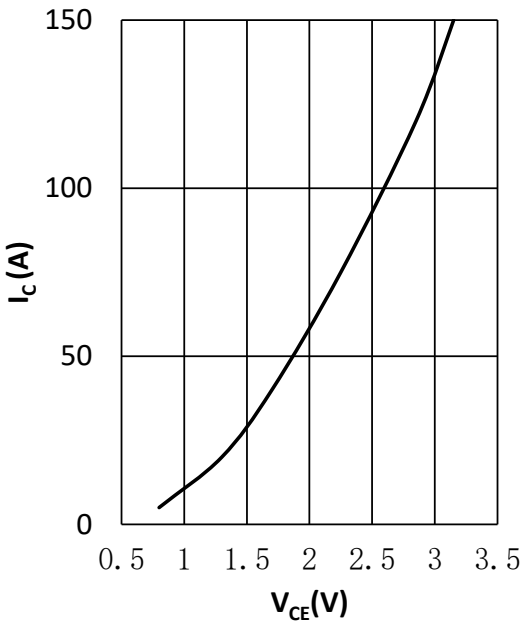


Figure 5. Typical $V_{CE(sat)}$-T_{Vj} characteristic (V_{GE}=15V)

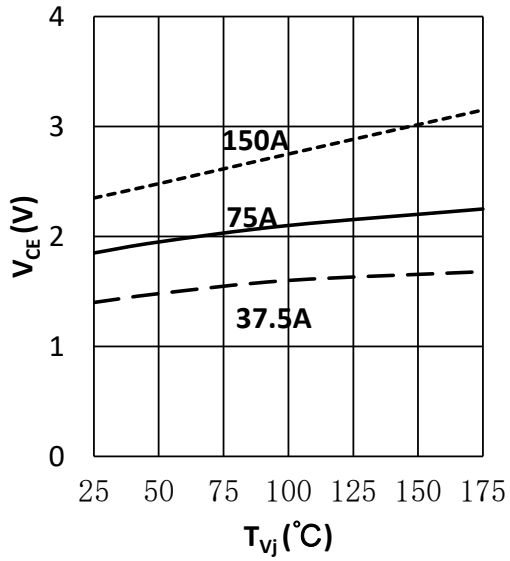


Figure 6. Typical $V_{GE(th)}$-T_{Vj} characteristic (I_C=1mA)

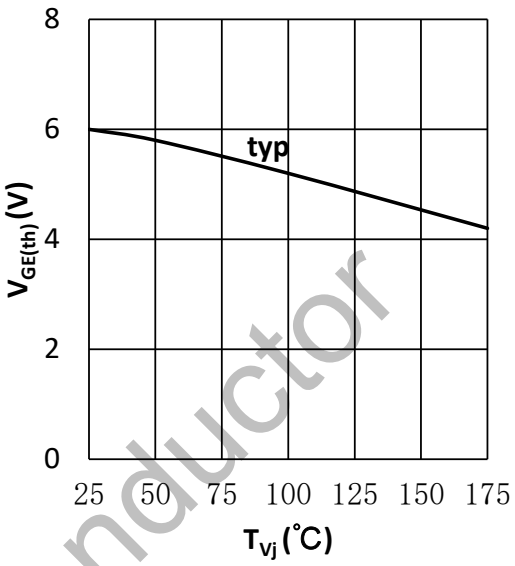


Figure 7. Typical gate charge V_{GE} = f(Q_G) (I_C=75A)

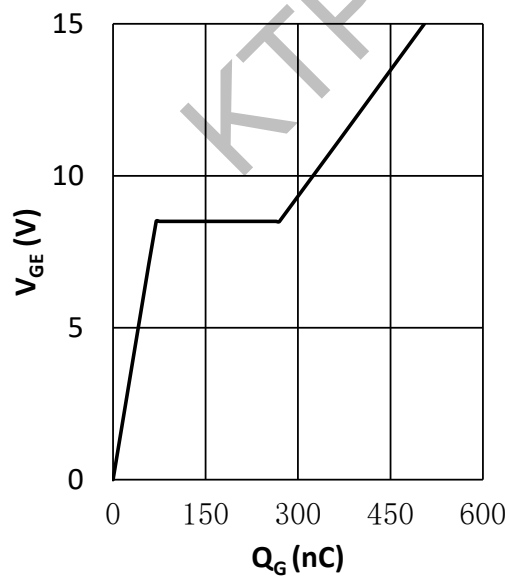


Figure 8. Typical capacitance as a function of collector-emitter voltage (V_{GE}=0V, f=100 kHz)

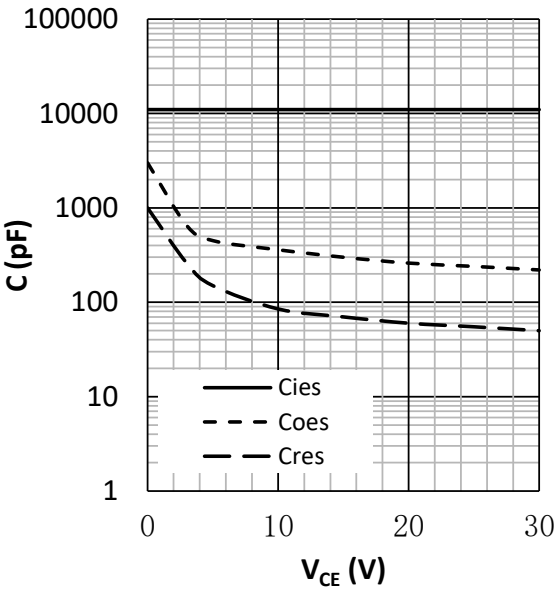


Figure 9. Typical switching energy losses as a function of junction temperature
$E=f(T_{vj})$, V_{CC}=600V, I_C=75A

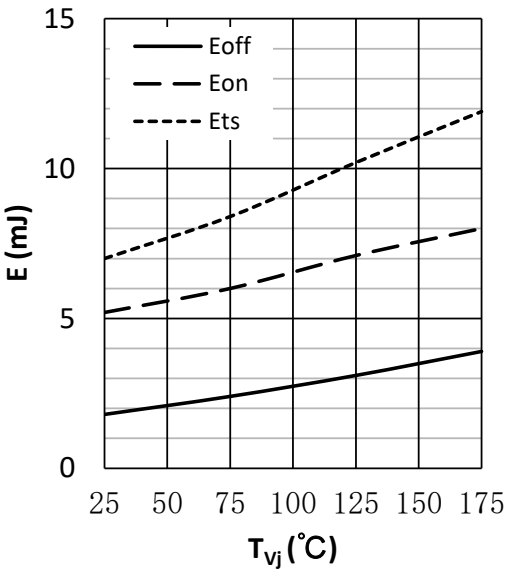


Figure 10. Typical switching energy losses as a function of collector current
$E=f(I_C)$, T_{vj}=25℃

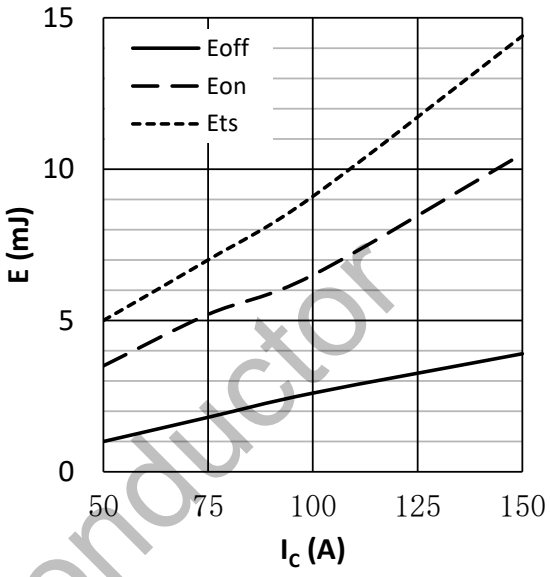


Figure 11. Typical diode forward voltage as a function of junction temperature
$V_F=f(T_{vj})$

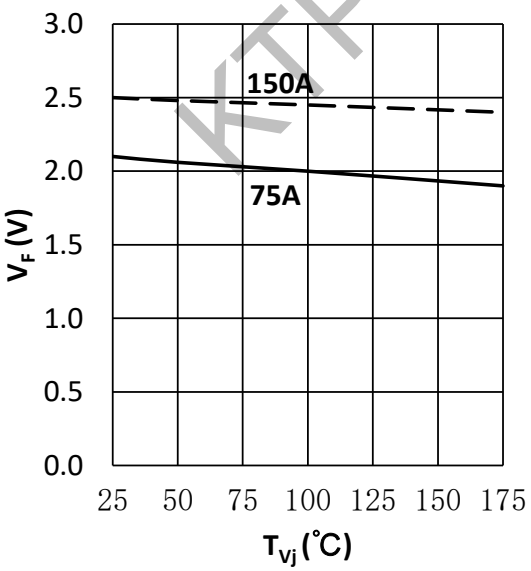
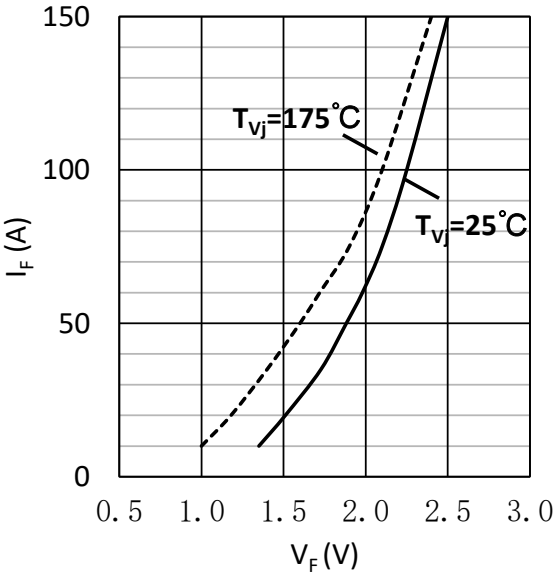
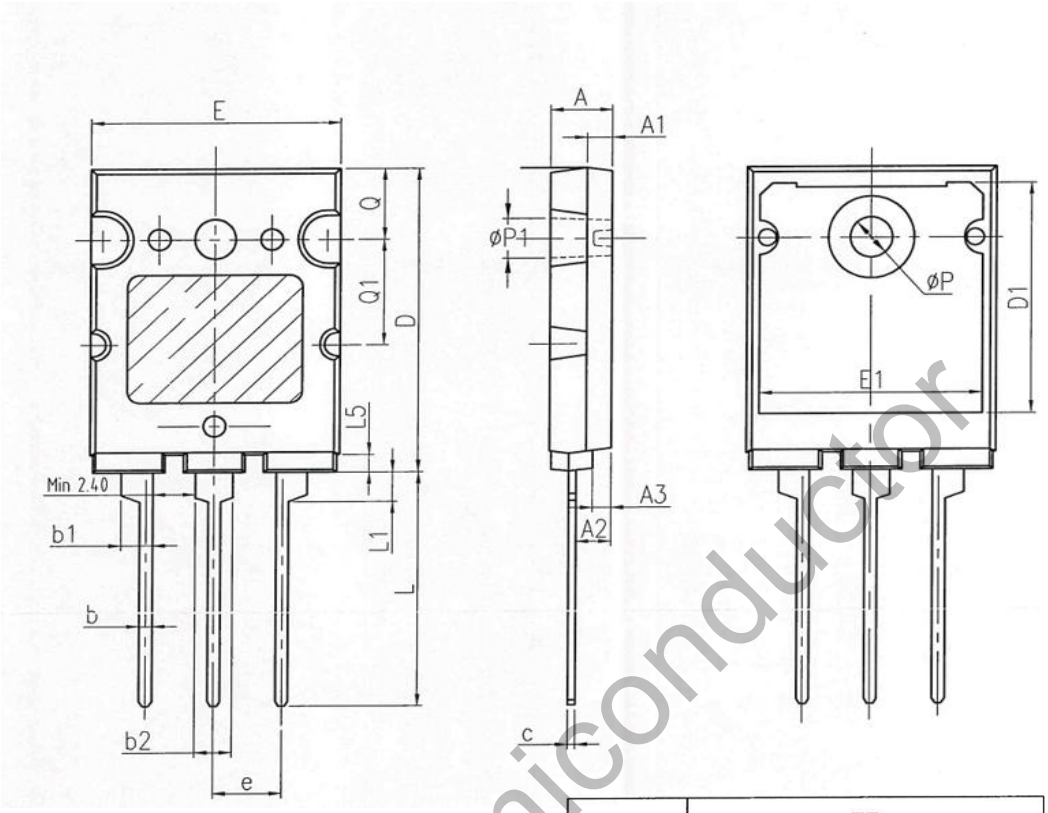


Figure 12. Forward characteristic of Diode

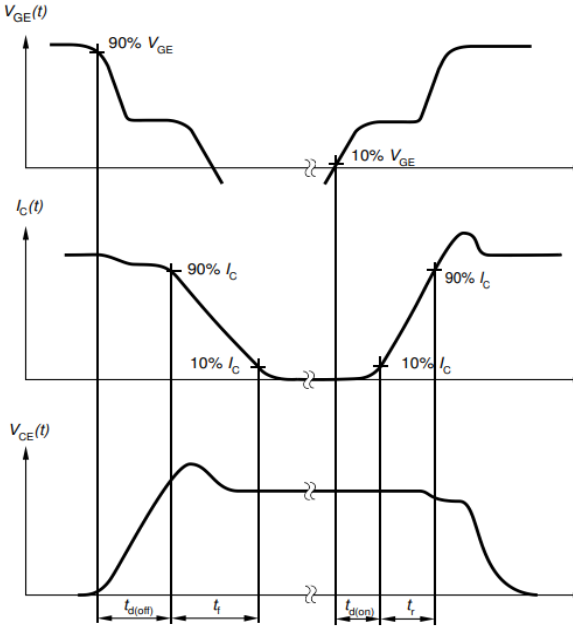


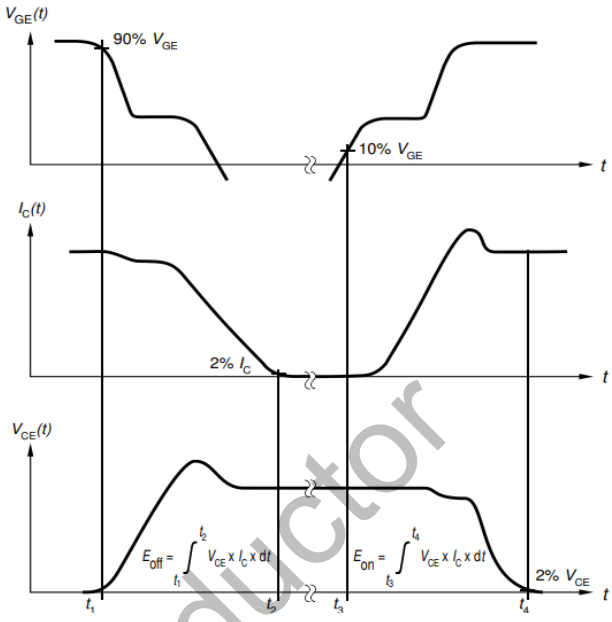
4 Package outlines

TO-264-3L



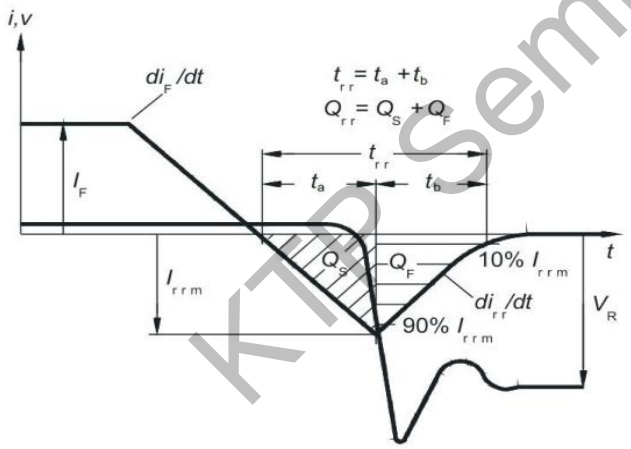
SYMBOL	mm		
	MIN	NOM	MAX
A	4.80	5.00	5.20
A1		2.00 REF	
A2	2.50	2.80	3.10
A3		1.50 REF	
b	0.90	1.00	1.25
b1	2.30	2.50	2.75
b2	2.80	3.00	3.20
c	0.50	0.60	0.85
D	25.70	26.00	26.30
D1	19.00	-	-
E	19.50	20.00	20.50
E1	16.00	-	-
e		5.45 TYP	
L	19.50	20.00	20.50
L1	2.20	2.50	2.70
L5		1.35 REF	
ΦP	3.00	3.20	3.40
ΦP1	3.20	3.40	3.60
Q	5.80	6.00	6.20
Q1	8.80	9.00	9.20





A.Definition of switching times

B.Definition of switching losse



C.Definition of diode switching characteris