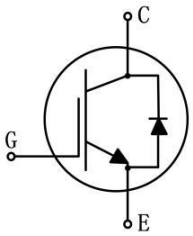
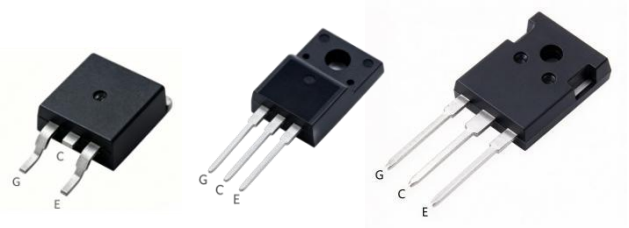
Trench Field-stop IGBT Discrete

Parameter	Value	Unit
V_{CE}	650	V
I_C	30	A
$V_{CE(sat)}$	1.6	V



Features

- Maximum Junction Temperature 175℃
- Short circuit withstand time 10us
- Low gate charge Qg



TO-263 TO-220F TO-247-3L

Applications

- General purpose inverters.
- Motor Drive

Key Performance and Package Parameters

Part No.	V_{CE}	I_C	T_{vjmax}	Package	Packing form
HT30T65TFX100	650V	30A	175℃	TO-220F	Tube
HT30T65LX100	650V	30A	175℃	TO-247-3L	Tube
HT30T65SX100	650V	30A	175℃	TO-263	Reel

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-emitter voltage	V_{CES}	650	V
Gate-emitter voltage	V_{GES}	±30	V
Continuous collector current (T_C=25℃)	I_C	60	A
Continuous collector current (T_C=100℃)		30	A
Pulsed Collector Current	I_{CM}	120	A
Diode continuous forward current (T_C=25℃)	I_F	60	A
Diode continuous forward current (T_C=100℃)		30	A
Maximum Power Dissipation (T_C=25℃)	P_D	234.38	W
Maximum Power Dissipation (T_C=100℃)		117.19	W
Operating Junction Temperature Range	T_J	-55 to+175	℃
Storage Temperature Range	T_{STG}	-55 to+175	℃
Maximum Temperature for Soldering	T_L	260	℃
Short Circuit Withstand Time V_{GE}=15V, V_{CC}≤360V,T_{vj}=150℃	T_{sc}	10	μs

Thermal Characteristics(TO-247)

Parameter	Symbol	Value	Units
Thermal Resistance, Junction to Case for IGBT	$R_{\theta JC}$	0.64	°C/W
Thermal Resistance, Junction to Case for Diode	$R_{\theta JC}$	1.36	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	40	°C/W

Electrical Characteristics of IGBT

Parameter	Symbol	Test Conditions		Min.	Typ.	Max.	Units
Collector-Emitter Breakdown Voltage	$V_{(BR)CES}$	V_{GE}=0V, I_{CE}=0.25mA		650			V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	V_{GE}=15V, I_C=30A	T_{vj}=25℃		1.6	2.1	V
			T_{vj}=150℃		1.94		V
Gate Threshold Voltage	$V_{GE(th)}$	I_C=0.25mA,V_{CE}=V_{GE},T_{vj}=25℃		5	5.7	6.5	V
Collector-Emitter Leakage Current	I_{CES}	V_{GE}=0V, V_{CE}=650V				500	nA
Gate-Emitter Leakage Current	I_{GES}	V_{GE}=20V, V_{CE}=0V				500	nA
Transconductance	g_{fs}	I_C=30A, V_{CE}=20V, T_{vj}=150℃			11.01		S
Input Capacitance	C_{ies}	V_{GE}=0V, V_{CE}=25V, f=1MHz			1562		pF
Output Capacitance	C_{oes}				81		pF
Reverse Transfer Capacitance	C_{res}				17		pF
Total Gate Charge	Q_g	V_{CC}=520V, I_C=30A, V_{GE}=0 to 15V			83.7		nC
Gate to Emitter Charge	Q_{ge}				25.3		nC
Gate to Collector Charge	Q_{gc}				34.2		nC
Turn-on Delay Time	$t_{d(on)}$	V_{CE}=400V,I_C=30A, V_{GE}=15V,R_g=10Ω, Inductive Load T_C=25℃			37.5		ns
Rise Time	t_r				63.3		ns
Turn-off Delay Time	$t_{d(off)}$				94.4		ns
Fall Time	t_f				32.9		ns
Turn-on Switching Loss	E_{on}				1.10		mJ
Turn-off Switching Loss	E_{off}				0.27		mJ
Total Switching Loss	E_{ts}				1.38		mJ
Turn-on Delay Time	$t_{d(on)}$	V_{CE}=400V,I_C=30A, V_{GE}=15V,R_g=10Ω, Inductive Load T_C=150℃			38.0		ns
Rise Time	t_r				63.4		ns
Turn-off Delay Time	$t_{d(off)}$				104.9		ns
Fall Time	t_f				37.7		ns
Turn-on Switching Loss	E_{on}				1.39		mJ
Turn-off Switching Loss	Eoff				0.34		mJ
Total Switching Loss	E_{ts}				1.73		mJ

Diode Characteristics

Parameter	Symbol	Test condition		Min.	Typ.	Max.	Unit
Diode Forward Voltage	V_F	I_F=30A	T_{vj}=25℃		1.95	2.4	V
			T_{vj}=150℃		1.75		V
Reverse Recovery Time	t_{rr}	V_R=400V, I_F=30A, dif/dt=200A/μs	T_{vj}=25℃		206.7		ns
			T_{vj}=150℃		312.6		ns
Reverse Recovery Charge	Q_{rr}		T_{vj}=25℃		1270		nC
			T_{vj}=150℃		3080		nC
Peak Reverse Recovery Current	I_{rrm}		T_{vj}=25℃		13.5		A
			T_{vj}=150℃		20.8		A

Typical Characteristics

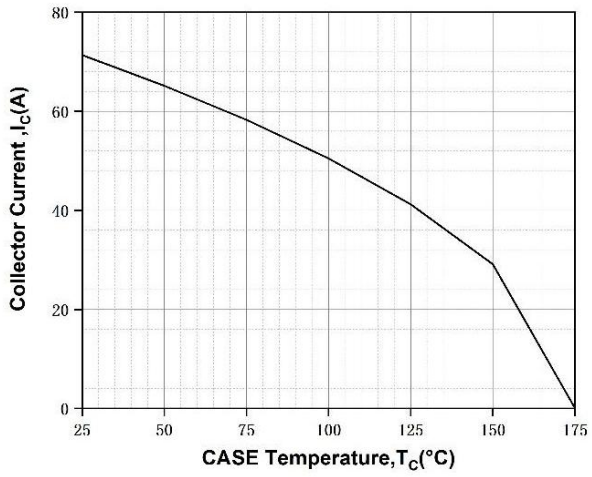


Fig 1. Collector current as a function of case temperature

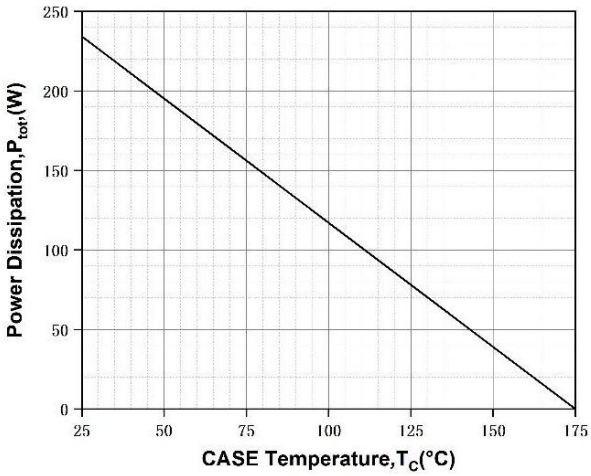


Fig 2. Power dissipation as a function of case temperature

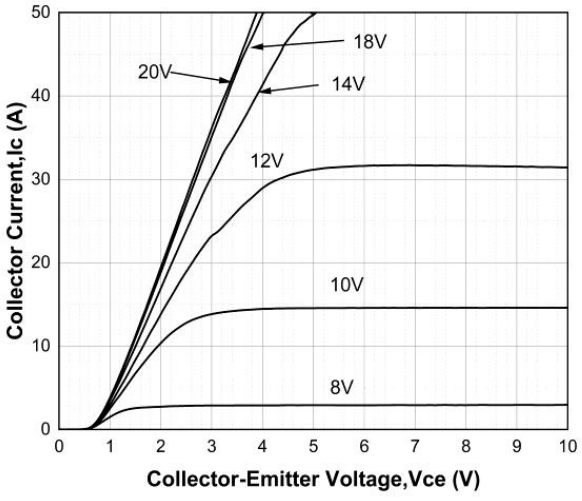


Fig 3. Typical output characteristic（T_j=25℃）

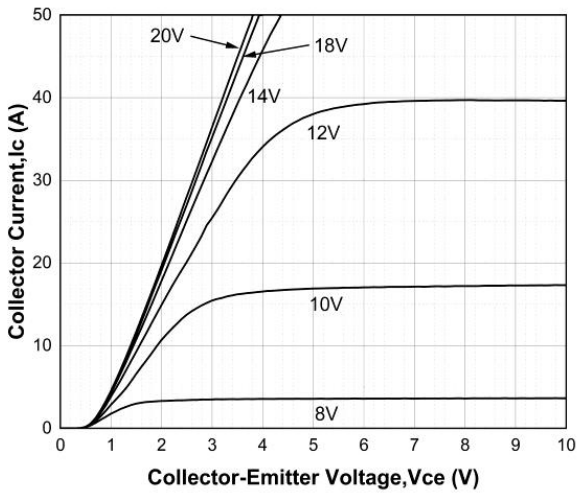


Fig 4. Typical output characteristic (T_j=150℃)

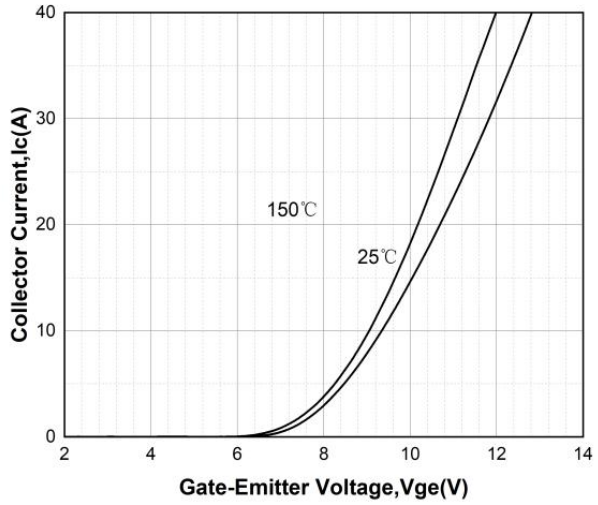


Fig 5. Typical transfer characteristics (V_{CE}=10V)

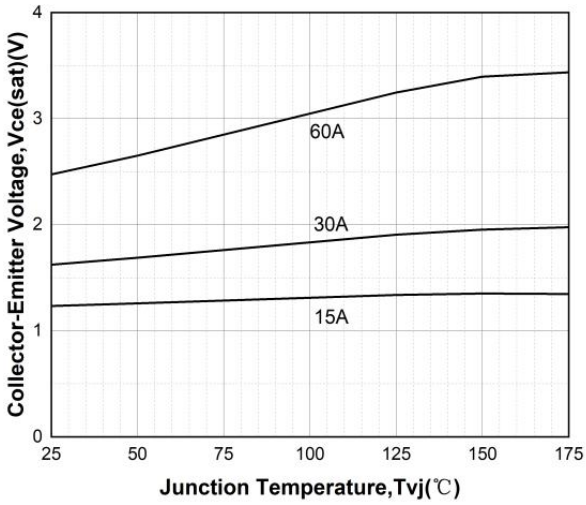


Fig 6. Typical collector-emitter saturation voltage as a function of junction temperature

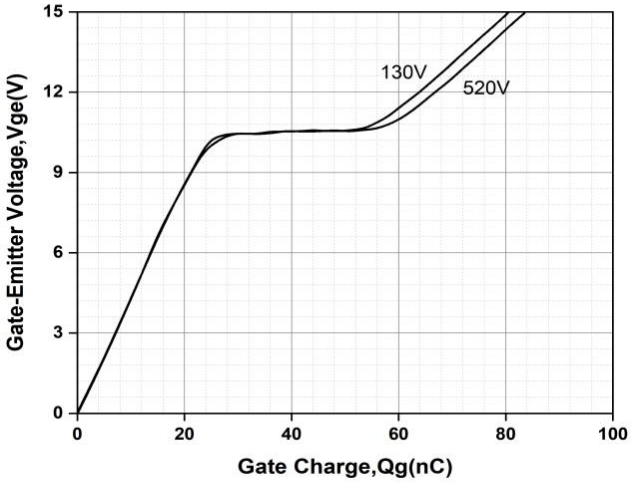


Fig 7. Typical gate charge

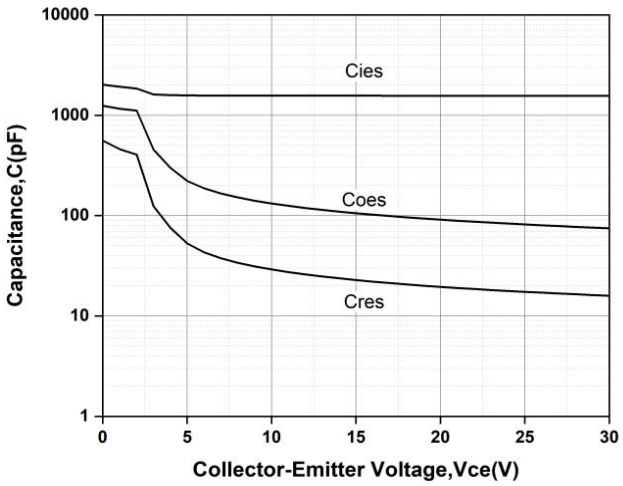


Fig 8. Typical capacitance as a function of collector-emitter voltage（f=1MHz）

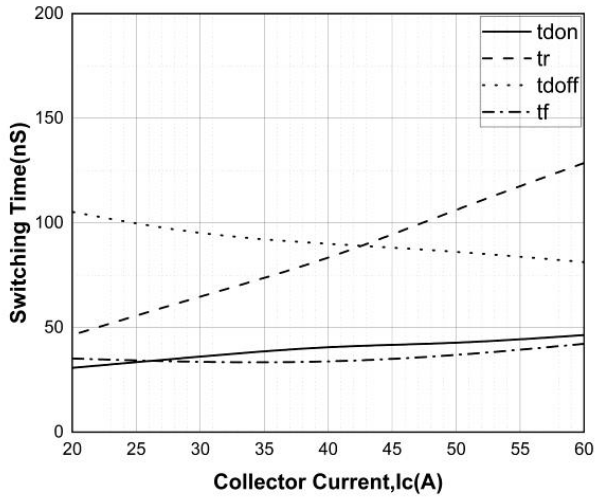


Fig 9.Typical switching times as a function of collector current
（T_j=25℃,V_{CC}=400V, R_g=10Ω）

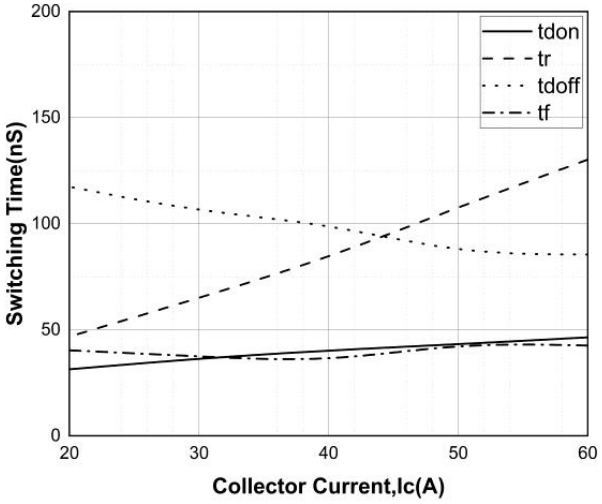


Fig 10. Typical switching times as a Function of collector current
（T_j=150℃, V_{CC}=400V, R_g=10Ω）

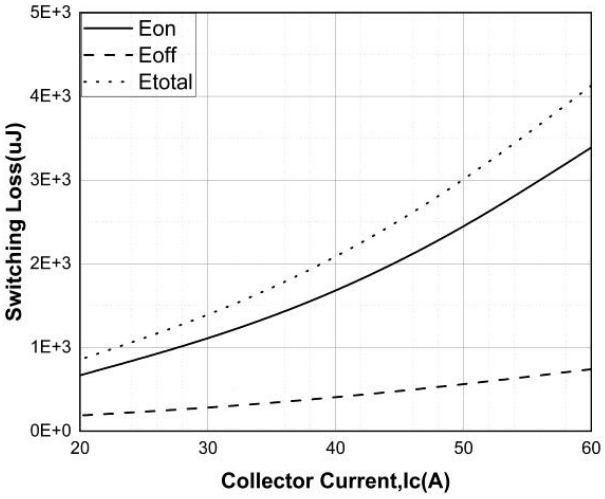


Fig 11. Typical switching energy losses as a function of collector current
(T_j=25℃, V_{CE}=400V, R_G=10Ω)

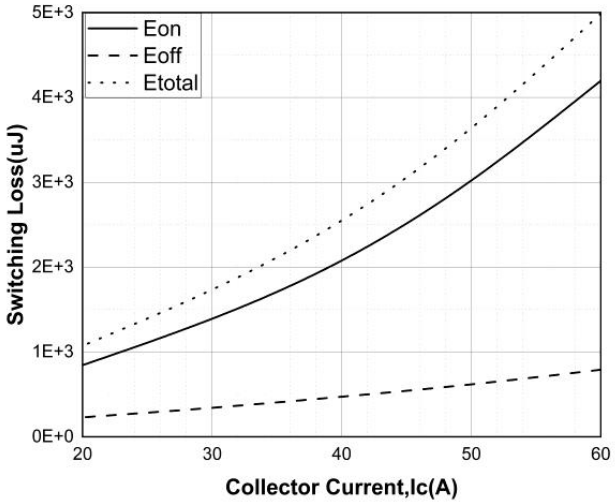


Fig 12. Typical switching energy losses as a function of collector current
(T_j=150℃, V_{CE}=400V, R_G=10Ω)

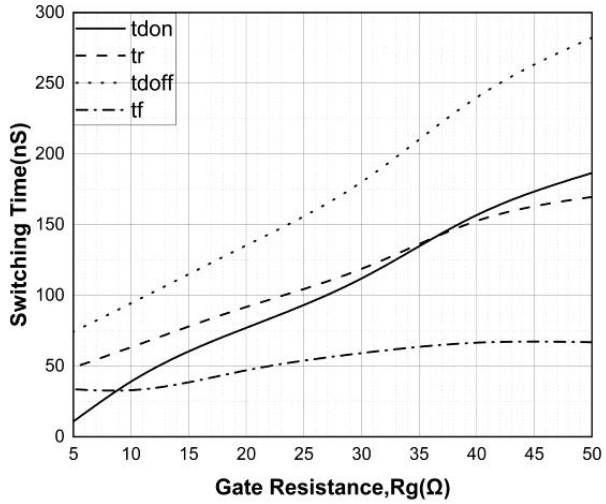


Fig 13. Typical switching times as a function of gate resistor
（T_j=25℃, V_{CC}=400V, I_C=30A）

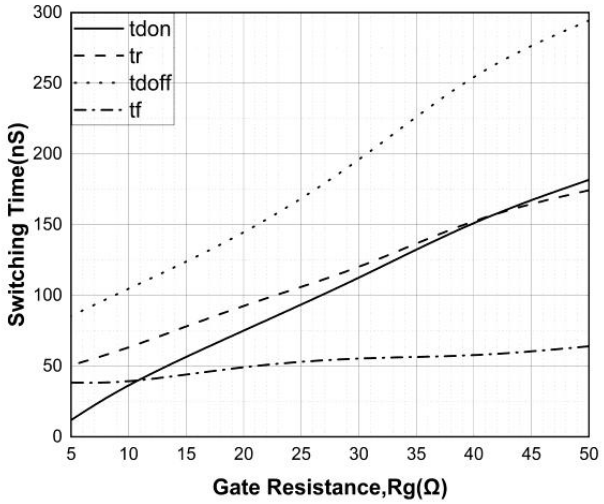


Fig 14. Typical switching times as a function of gate resistor
（T_j=150℃, V_{CC}=400V, I_C=30A）

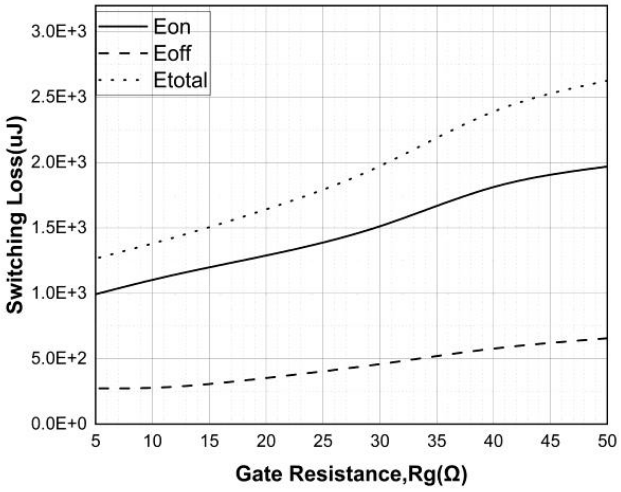


Fig 15. Typical switching energy losses as a function of gate resistor
（T_j=25℃, V_{CC}=400V, I_C=30A）

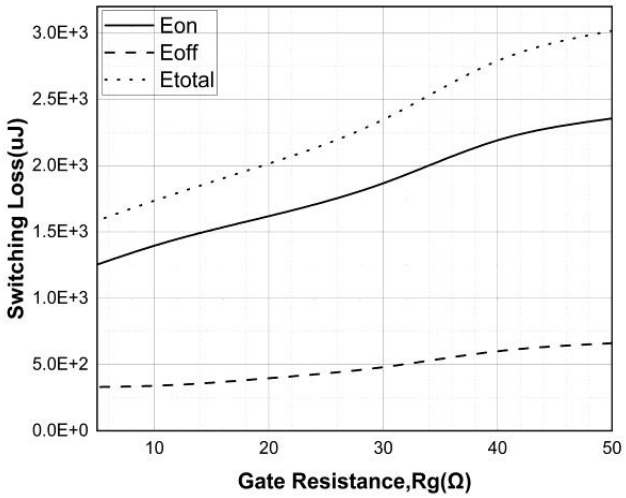


Fig 16. Typical switching energy losses as a function of gate resistor
（T_j=150℃, V_{CC}=400V, I_C=30A）

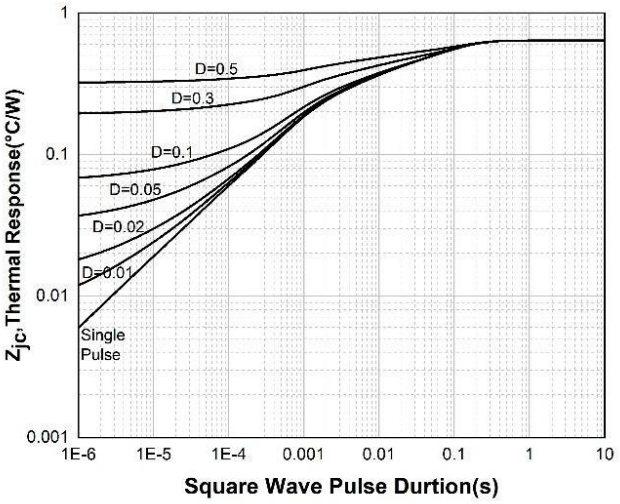


Fig 17. IGBT transient thermal impedance(D=tp/T)

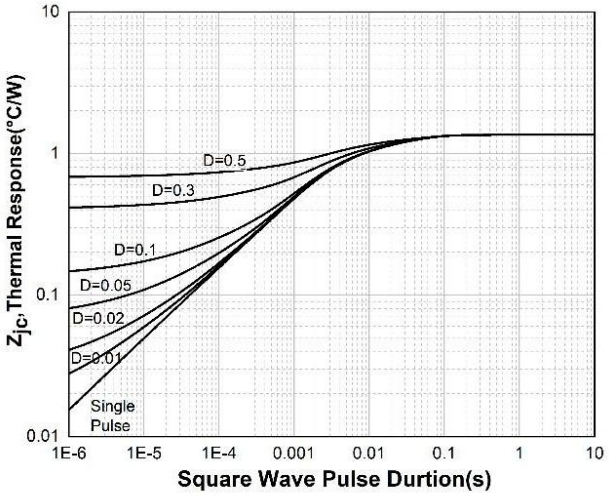


Fig 18. Diode transient thermal impedance as a function of pulse width(D=tp/T)

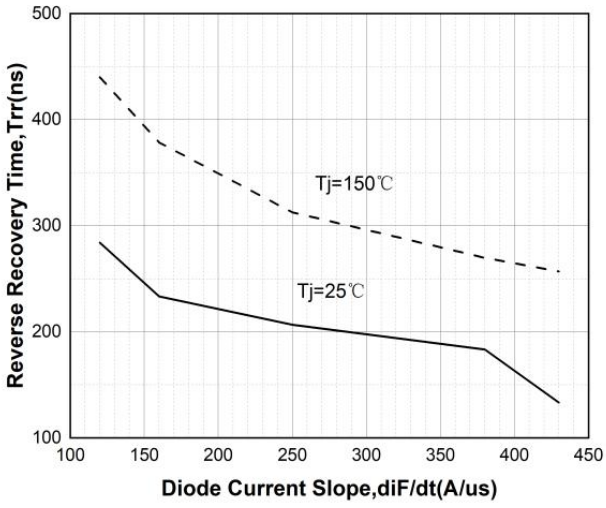


Fig 19. Typical reverse recovery time as a function of diode current slope
（V_{CC}=400V, I_F=30A）

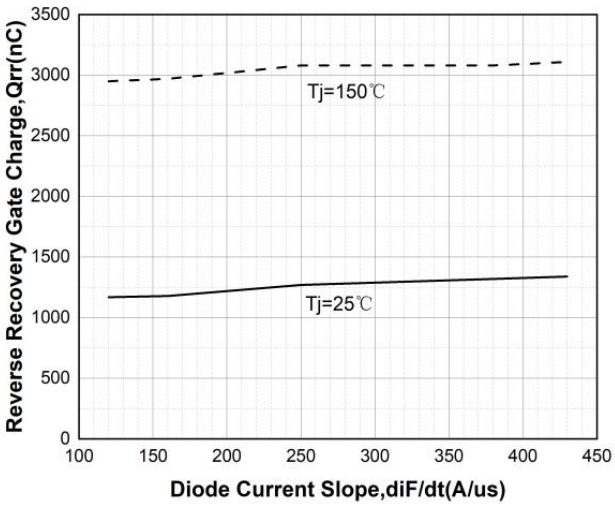


Fig 20. Typical reverse recovery charge as a function of diode current slope
（V_{CC}=400V, I_F=30A）

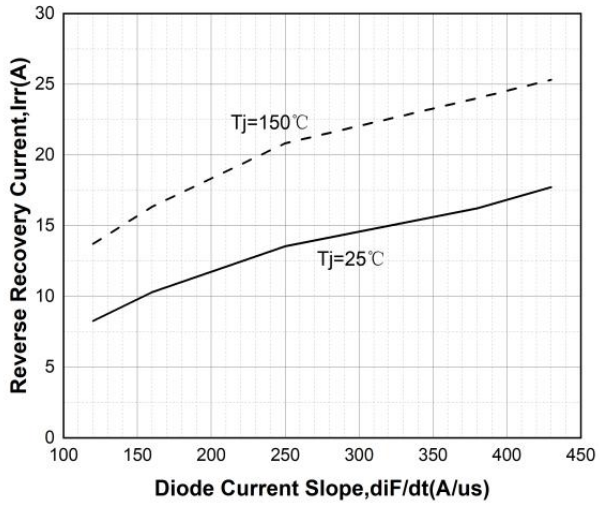


Fig 21. Typical reverse recovery current as a function of diode current slope
（V_{CC}=400V, I_F=30A）

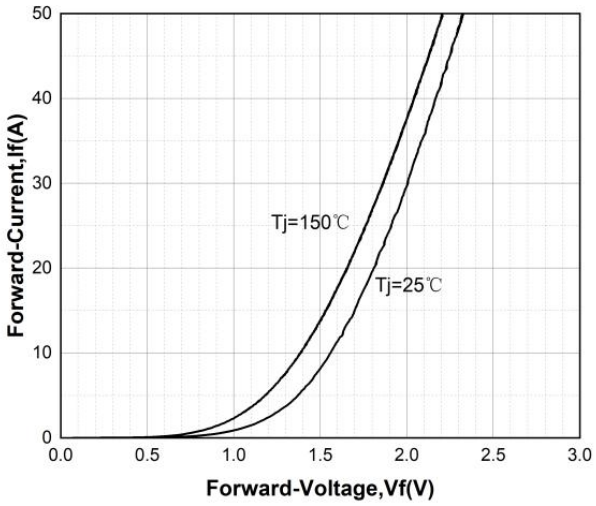


Fig 22. Typical diode forward current as a function of forward voltage

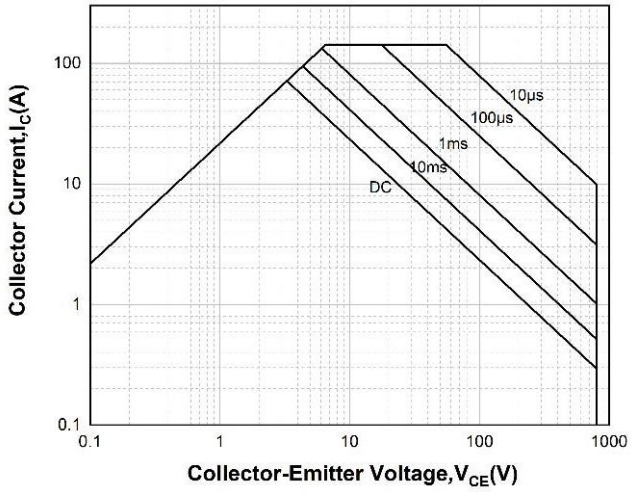


Fig 23. Safe operating area

Test Conditions

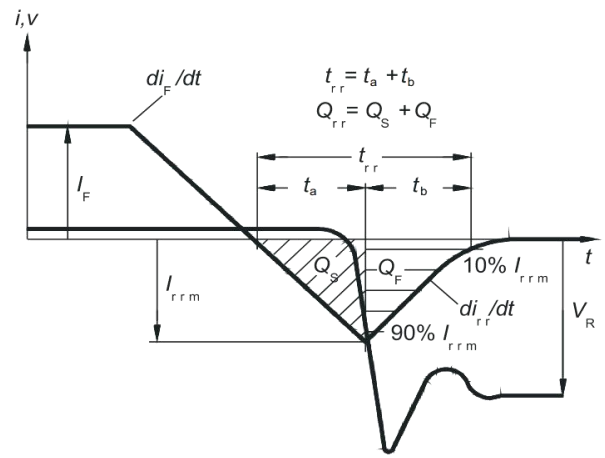


Fig1. Gate Charge Test Circuit

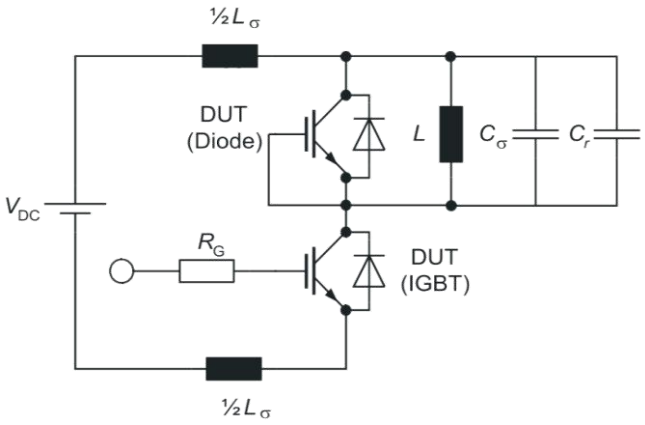


Fig 2. Switch Time Test Circuit

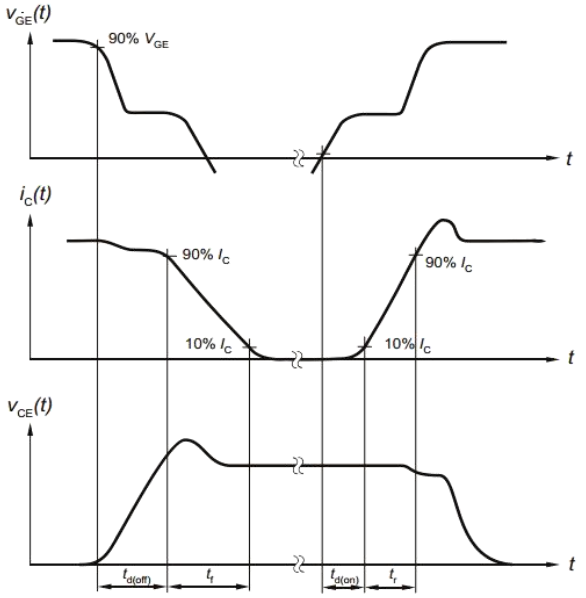


Fig 3. Definition of Switching Times

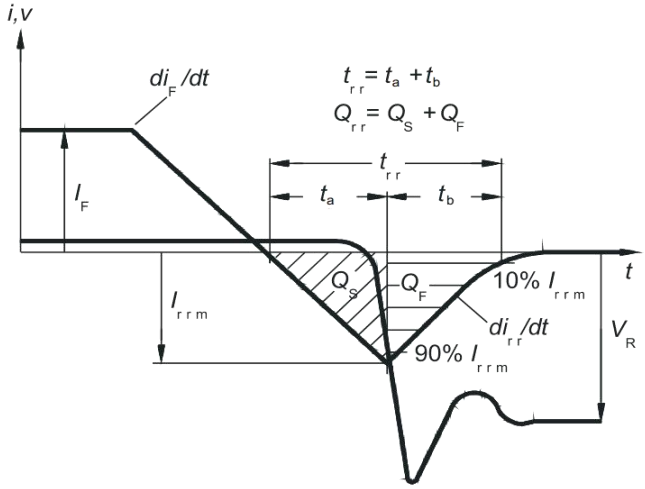
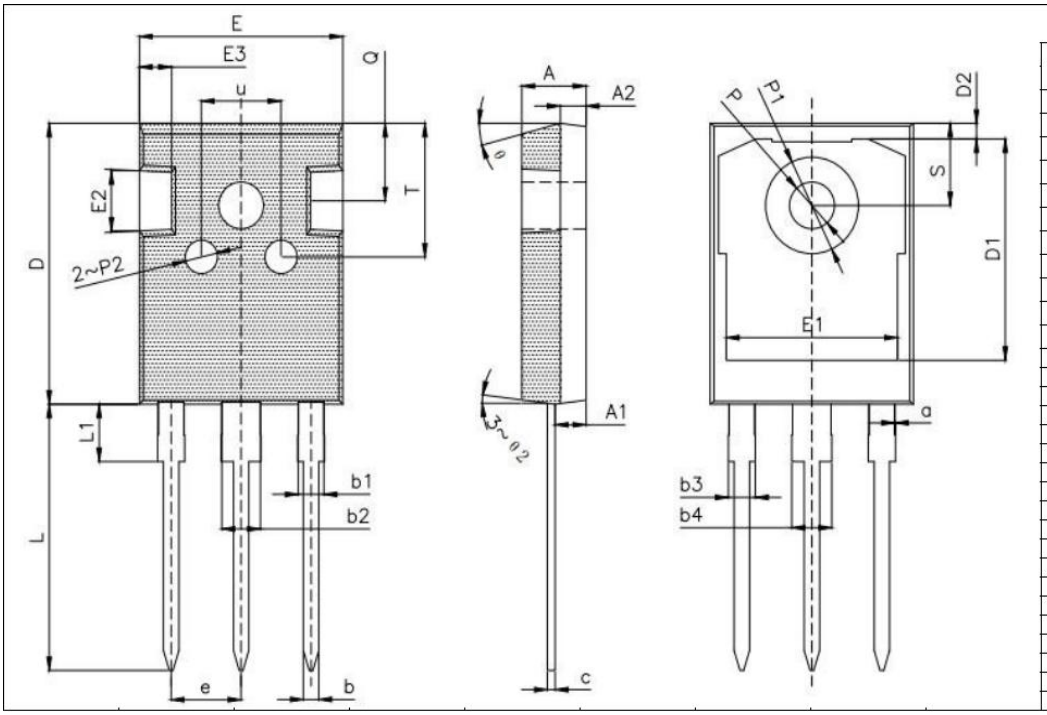


Fig 4. Definition of Diode Switching Characteristics

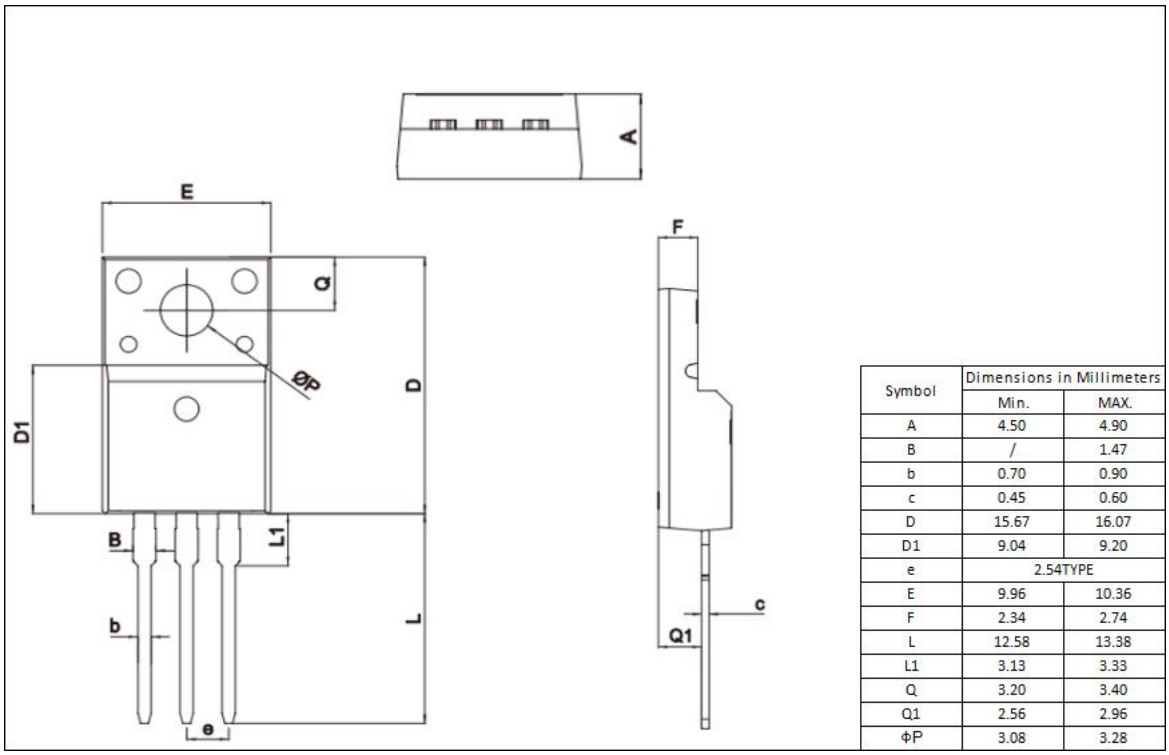
Package Outlines (Unit：mm)

TO-247



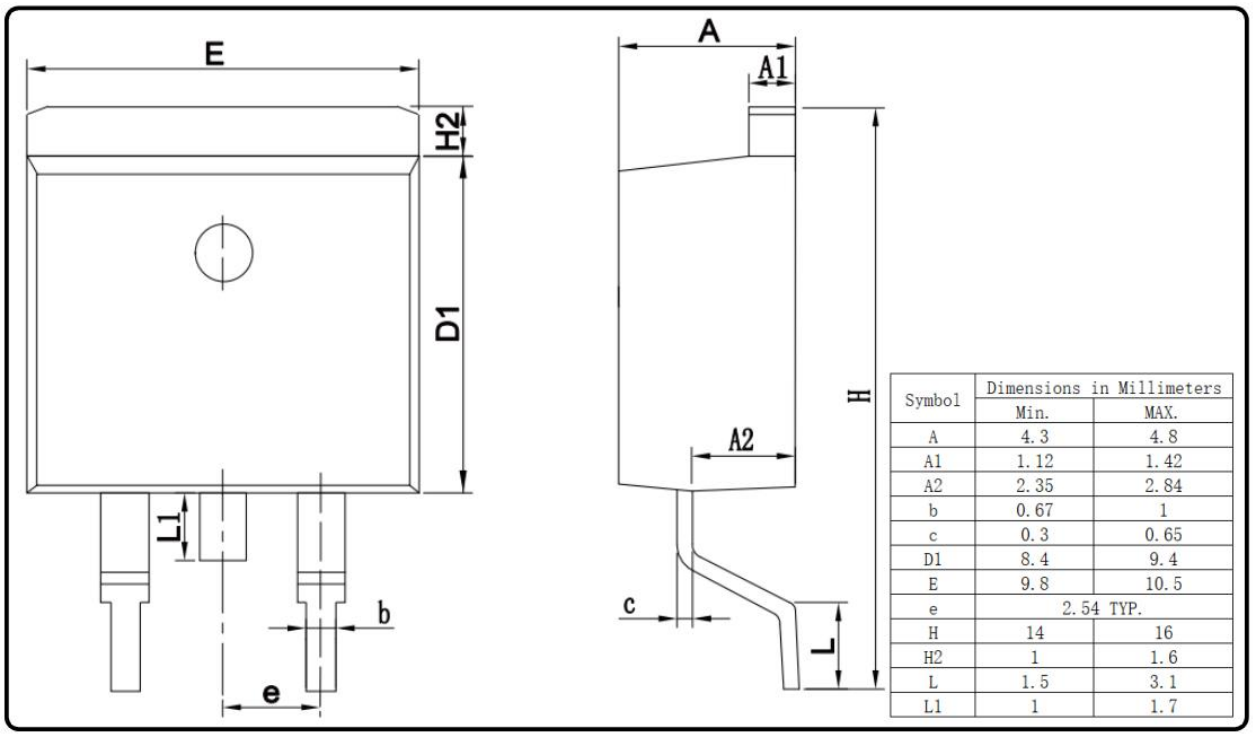
Symbol	Dimensions in Millimeters	
	Min.	MAX.
A	4.80	5.21
A1	2.21	2.61
A2	1.80	2.20
a	0.00	0.15
b	1.07	1.40
b1	1.80	2.50
b2	2.70	3.50
b3	1.80	2.40
b4	2.90	3.30
c	0.55	0.75
D	20.80	21.20
D1	16.05	17.65
D2	0.70	1.70
E	15.60	16.13
E1	12.80	14.15
E2	4.40	5.50
E3	2.00	3.00
e	5.24	5.64
L	19.42	20.42
L1	3.83	4.47
P	3.40	3.80
P1	6.89	7.49
P2	2.20	2.80
Q	5.30	6.30
S	5.95	6.35
T	9.50	10.50
U	5.70	6.70
θ	11°	19°
θ1	4°	10°
θ2	4°	10°

TO-220F



Symbol	Dimensions in Millimeters	
	Min.	MAX.
A	4.50	4.90
B	/	1.47
b	0.70	0.90
c	0.45	0.60
D	15.67	16.07
D1	9.04	9.20
e	2.54TYPE	
E	9.96	10.36
F	2.34	2.74
L	12.58	13.38
L1	3.13	3.33
Q	3.20	3.40
Q1	2.56	2.96
ΦP	3.08	3.28

TO-263



Symbol	Dimensions in Millimeters	
	Min.	MAX.
A	4.3	4.8
A1	1.12	1.42
A2	2.35	2.84
b	0.67	1
c	0.3	0.65
D1	8.4	9.4
E	9.8	10.5
e	2.54 TYP.	
H	14	16
H2	1	1.6
L	1.5	3.1
L1	1	1.7

***Important Usage Information and Disclaimer**

The specifications of Zhuhai Hypersemi Co., Ltd. products are not guarantees of product characteristics. They reflect typical performance expected in standard applications, which may vary with specific uses. Users must conduct prior testing for their applications and make necessary adjustments.

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