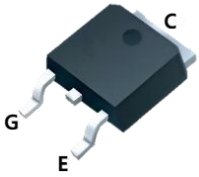
Trench Field-stop IGBT Discrete

Parameter	Value	Unit
V_{CE}	650	V
I_C	20	A
$V_{CE(sat)}$	1.8	V



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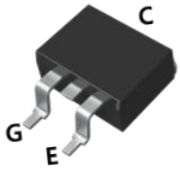

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Features

- Trench and field-stop technology
- Low switching losses
- Positive temperature coefficient
- Low Gate-Charge
- RoHS compliant

Applications

- UPS
- Motor drives
- Boost
- PFC

Product specification classification

Part Number	Package	Pack
HG10T65FX100	TO-252	Tube
HG10T65SX100	TO-263	Tube

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-emitter voltage	V_{CES}	650	V
Gate-emitter voltage	V_{GES}	±20	V
Continuous collector current(T_C=25℃)	I_C	20	A
Continuous collector current(T_C=100℃)		10	A
Pulsed collector current, tp limited by T_{vjmax}	I_{CM}	40	A
Diode continuous forward current(T_C=100℃)	I_F	10	A
Diode maximum current, tp limited by T_{vjmax}	I_{FM}	40	A
Short Circuit with Stand Time V_{GE}=15V,V_{CC}≤400V,Allowed Number of Short Circuits＜1000,Times Between Short Circuits≥1.0s,T_J≤175℃	t_{sc}	10	μs
Power dissipation(T_C=25℃)	P_{tot}	100	W
Power dissipation(T_C=100℃)		50	W
Operating junction temperature range	T_{vj}	-40 to+175	℃
Storage temperature range	T_{stg}	-55 to+150	℃

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal resistance,junction to case for IGBT	$R_{th(j-C)}$	1.5	℃/W
Thermal resistance,junction to case for Diode	$R_{th(j-C)}$	2	℃/W
Thermal resistance,junction to ambient	$R_{th(j-a)}$	62	℃/W

Electrical Characteristics of IGBT (Tvj=25℃ unless otherwise specified)

Static characteristics

Parameter	Symbol	Test condition	Value			Unit
			Min.	Typ.	Max.	
Collector-emitter breakdown voltage	B_{VCES}	V_{GE}=0V,I_C=250μA	650	-	-	V
Collector-emitter leakage current	I_{CES}	V_{CE}=650V,V_{GE}=0V	-	-	50	μA
Gate leakage current,forward	I_{GES}	V_{GE}=±20V,V_{CE}=0V	-	-	±100	nA
Gate-emitter threshold voltage	$V_{GE(th)}$	V_{GE}=V_{CE},I_C=250μA	5.5	5.8	6.2	V
Collector-emitter saturation voltage	$V_{CE(sat)}$	V_{GE}=15V,I_C=10A,T_{vj}=25℃	-	1.8	-	V
		V_{GE}=15V,I_C=10A,T_{vj}=150℃	-	2.1	-	V

Dynamic Characteristics

Parameter	Symbol	Test condition	Value			Unit
			Min.	Typ.	Max.	
Input capacitance	C_{ies}	V_{CE}=30V V_{GE}=0V f=1MHz	-	667	-	pF
Output capacitance	C_{oes}		-	35	-	pF
Reverse transfer capacitance	C_{res}		-	9	-	pF
Total gate charge	Q_g	V_{CC}=520V,V_{GE}=15V,I_C=10A	-	27	-	nC

Switching Characteristics

Parameter	Symbol	Test condition	Value			Unit
			Min.	Typ.	Max.	
Turn-on delay time	$t_{d(on)}$	V_{CC}=400V V_{GE}=15V I_C=10A R_G=10Ω Inductive load	-	11	-	ns
Rise time	t_r		-	9	-	ns
Turn-off delay time	$t_{d(off)}$		-	69	-	ns
Fall time	t_f		-	73	-	ns
Turn-on energy	E_{on}		-	0.18	-	mJ
Turn-off energy	E_{off}		-	0.17	-	mJ
Total switching energy	E_{ts}		-	0.35	-	mJ
Turn-on delay time	$t_{d(on)}$	V_{CC}=400V V_{GE}=15V I_C=10A R_G=10Ω Inductive load T_{vj}=150℃	-	9	-	ns
Rise time	t_r		-	11	-	ns
Turn-off delay time	$t_{d(off)}$		-	85	-	ns
Fall time	t_f		-	111	-	ns
Turn-on energy	E_{on}		-	0.21	-	mJ
Turn-off energy	E_{off}		-	0.25	-	mJ
Total switching energy	E_{ts}		-	0.46	-	mJ

Diode Characteristics

Parameter	Symbol	Test condition	Value			Unit
			Min.	Typ.	Max.	
Diode forward voltage	V_F	I_F=10A,T_{vj}=25℃	-	1.4	-	V
		I_F=10A,T_{vj}=150℃	-	1.2	-	V
Diode reverse recovery time	t_{rr}	V_R=400V I_F=10A diF/dt=-750A/μs	-	55	-	ns
Diode peak reverse recovery current	I_{rrm}		-	11	-	A
Diode reverse recovery charge	Q_{rr}		-	409	-	nC
Diode reverse recovery time	t_{rr}	V_R=400V I_F=10A diF/dt=-750A/μs,T_{vj}=150℃	-	117	-	ns
Diode peak reverse recovery current	I_{rrm}		-	11	-	A
Diode reverse recovery charge	Q_{rr}		-	727	-	nC

Typical Characteristics

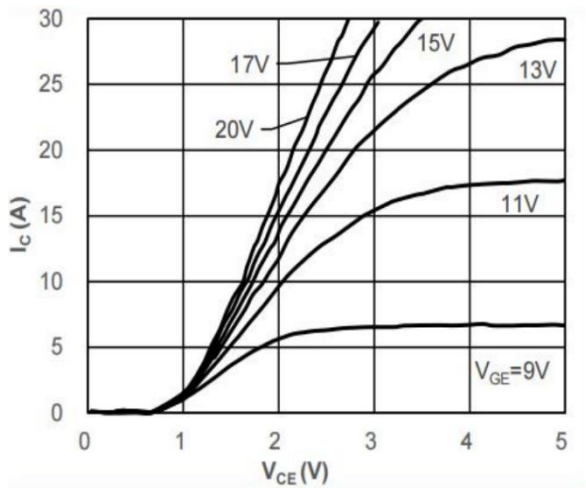

Fig 1.Typical output characteristic (T_{vj}=25℃)

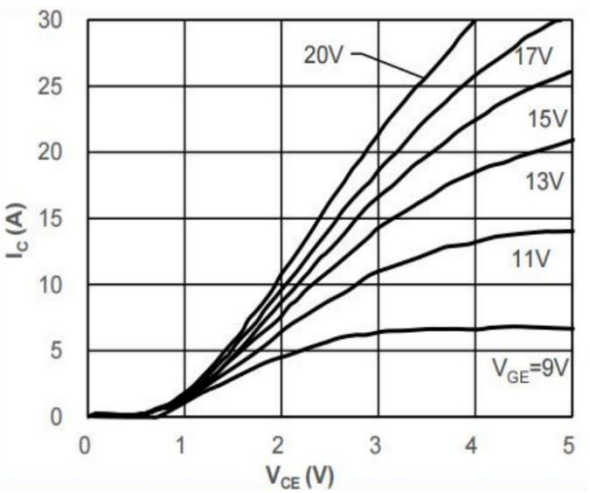

Fig 2.Typical output characteristic(T_{vj}=175℃)

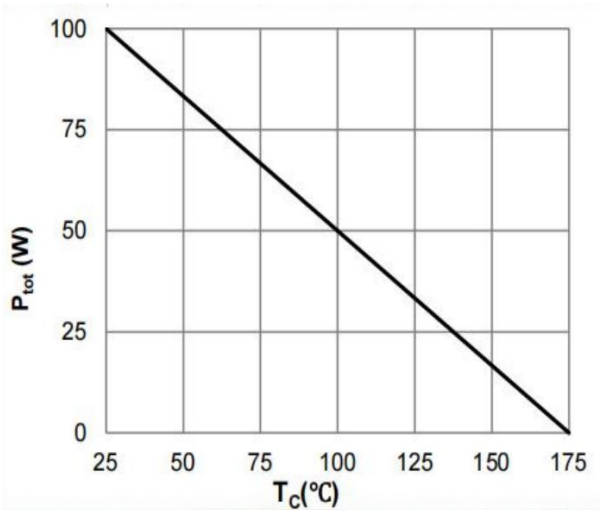

Fig 3.Power dissipation as a function of T_C

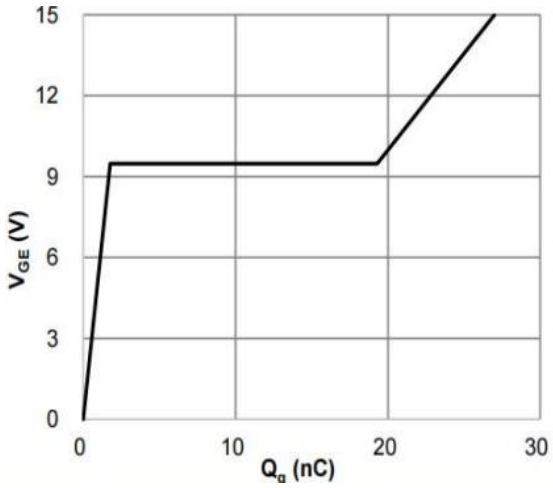

Fig 4.Typical Gate charge

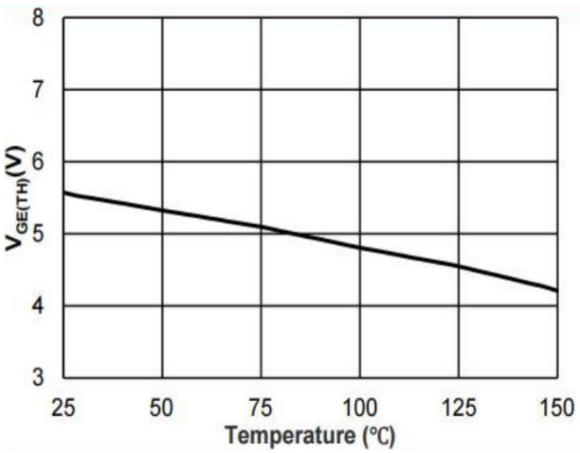

Fig 5.Typical $V_{GE(th)}$ as a function of T_{vj} (I_C=1mA)

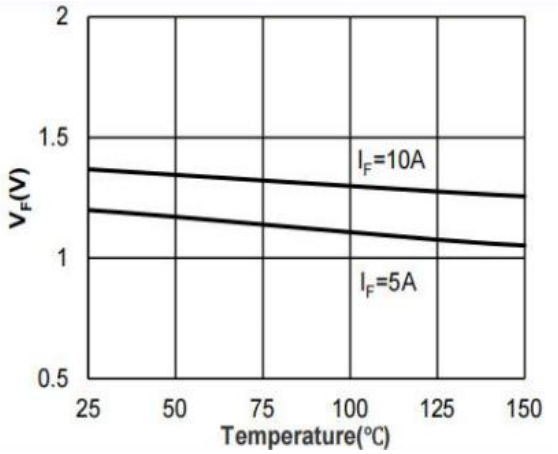

Fig 6.Typical V_F as a function of T_{vj}

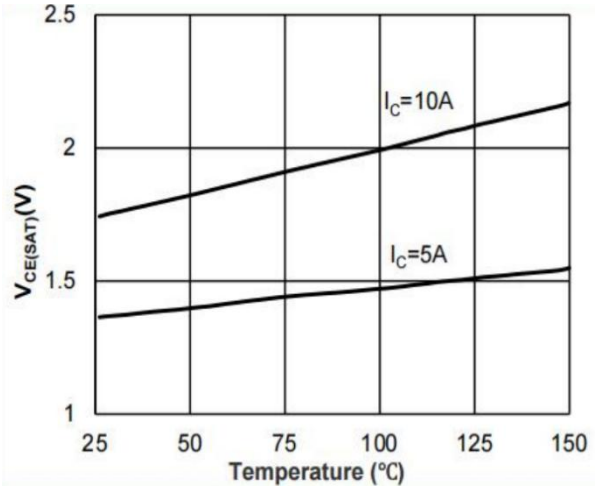

Fig 7.Typical V_{CEsat} as a function of T_{vj}

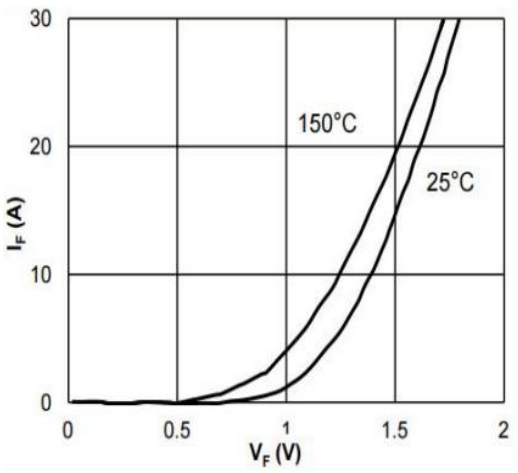

Fig 8.Typical I_F as a function of V_F

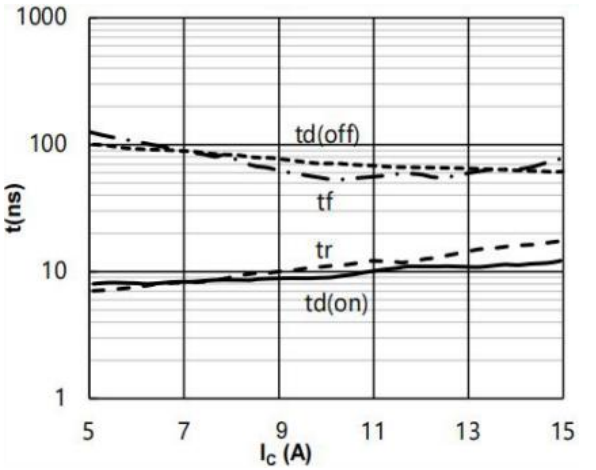

Fig 9.Typical switching time as a function of I_C

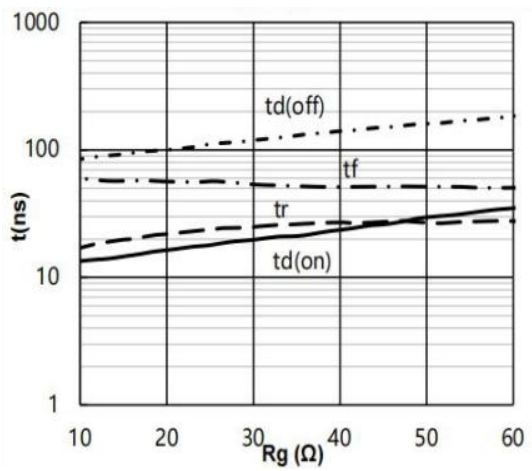

Fig 10.Typical switching time as a function of R_g

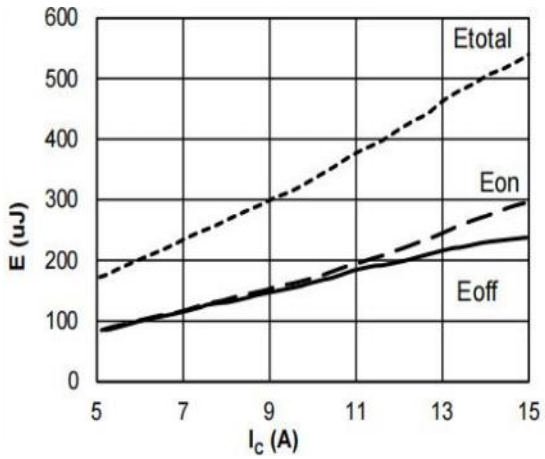

Fig 11.Typical switching energy losses as a function of I_C

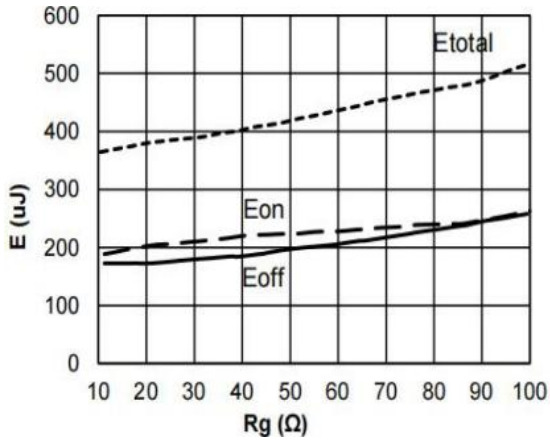

Fig 12.Typical switching energy losses as a function of R_g

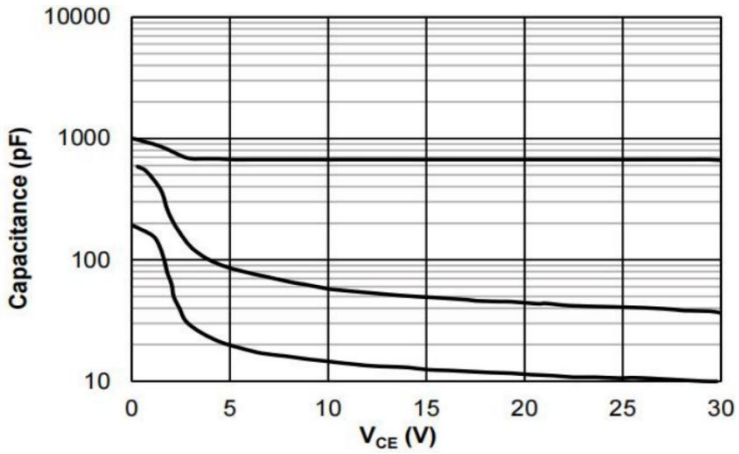

Fig 13.Typical capacitance as a function of V_{CE}(f=1Mhz,V_{GE}=0V)

Package Outlines (Unit：mm)

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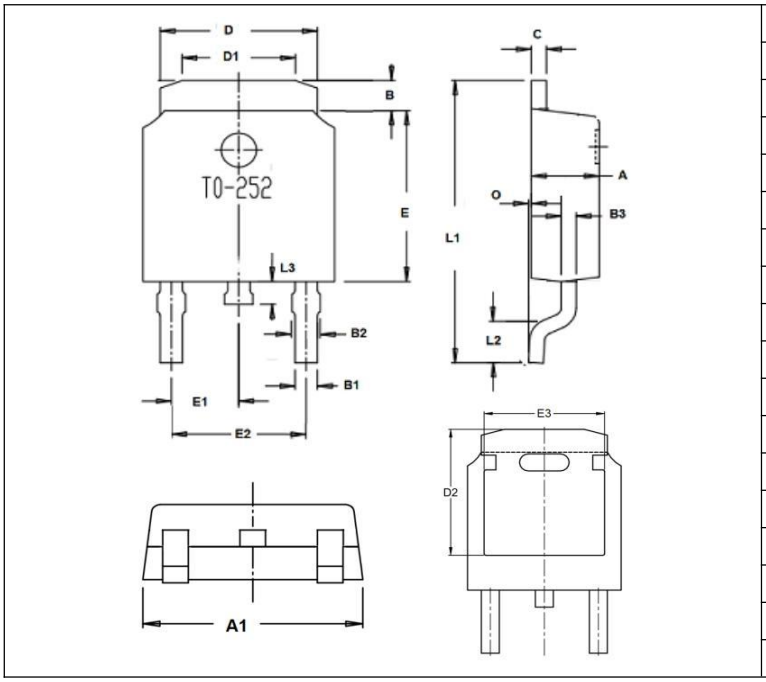

Dim.	Min.	Max.
A	2.1	2.5
A1	6.3	6.9
B	0.96	1.42
B1	0.74	0.86
B2	0.74	0.94
C	Typ 0.5	
D	5.33	5.53
D1	3.65	4.05
D2	5	5.4
E	6	6.2
E1	Typ 2.29	
E2	Typ 4.58	
E3	4.6	5
O	-	0.15
L1	9.9	10.5
L2	Typ1.65	
L3	0.6	1

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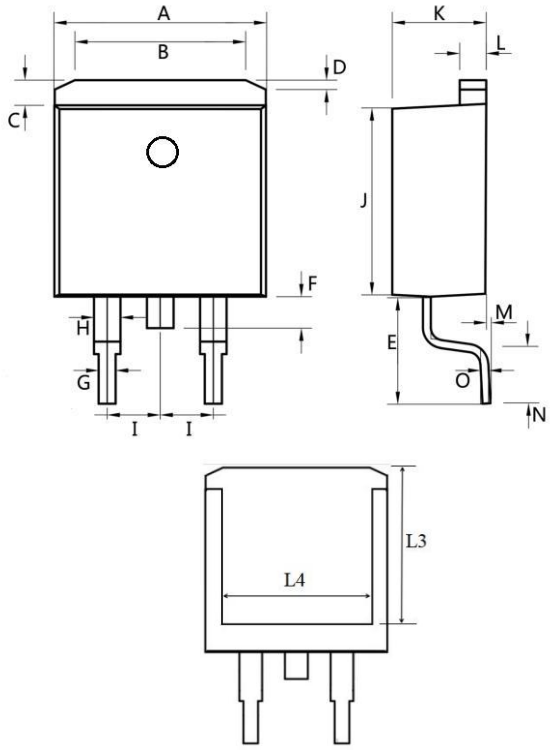

Dim.	Min.	Max.
A	9.8	10.2
B	6.1	6.7
C	1.1	1.4
D	0.5	1
E	4.6	5
F	1.4	1.6
G	0.7	0.9
H	1.17	1.37
I	Typ2.54	
J	9	9.2
K	4.3	4.7
L	1.25	1.35
L3	7.9	8.1
L4	7.5	7.7
M	0.02	0.23
N	2.2	2.8
O	0.45	0.55

All Dimensions in millimeter

***Important Usage Information and Disclaimer**

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