CMD5B65D/CMU5B65D

650V,5A N-Channel power IGBT

General Description

The 5B65D is produced by using advanced field stop trench IGBT technology, which provides excellent quality and high-switching performance.

Product Summary

VCES	IC
650V	5A

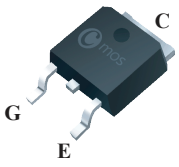
Applications

- inverters
- Motor Drives
- PFC

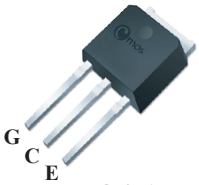
Features

- Low gate charge
- High efficient turn-on di/dt controllability
- Very fast and soft recovery freewheeling diode
- RoHS Compliant

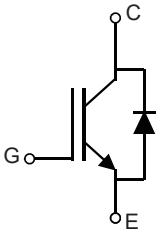
TO-252/251 Pin Configuration



TO-252
(CMD5B65D)



TO-251
(CMU5B65D)



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{CES}	Collector-Emitter Voltage	650	V
V_{GES}	Gate-Emitter Voltage	±20	V
I_C@T_C=25℃	Collector Current	10	A
I_C@T_C=100℃		5	A
I_{CM}	Pulsed Collector Current *	15	A
I_F@T_C=100℃	Diode Continuous Forward Current	3	A
I_{FM}	Diode Maximum Forward Current *	9	A
P_D@T_C=25℃	Maximum Power Dissipation	65	W
P_D@T_C=100℃	Maximum Junction Temperature	25	W
T_j,T_{stg}	Operating and Storage Temperature Range	-55 to 150	℃

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

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
R_{thJA}	Thermal Resistance, Junction-Ambient	---	110	℃/W
R_{thJC}	Thermal Resistance, IGBT Junction-Case	---	1.92	℃/W
R_{thJC}	Thermal Resistance, Diode Junction-Case	---	5	℃/W

Electrical Characteristics (T_J=25℃ , unless otherwise noted)

Symbol	Characteristic	Test Condition	Min.	Typ.	Max.	Unit
Static						
BV_{CES}	Collector-Emitter Breakdown Voltage	V_{CE}=0V , I_C=250μA	650	---	---	V
I_{CES}	Collector Cut-off Current	V_{GE}=0V , V_{CE}=650V, T_j = 25℃	---	---	1	μA
I_{GES}	Gate Leakage Current	V_{CE} =0V , V_{GE}=±20V	---	---	±100	nA
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	V_{CE} = V_{GE} , I_C=500μA	4.5	---	6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	V_{GE}=15V, I_C=5A, T_j = 25℃	---	1.80	2.0	V
		V_{GE}=15V, I_C=5A, T_j = 125℃	---	2.05	---	V
gfs	Forward Transconductance	V_{CE}=20V , I_C=5A	---	3	---	S
Dynamic						
Q_g	Total Gate Charge	V_{CE}=400V, V_{GE}=15V, I_C= 5A (Note 1)	---	12.5	---	nC
Q_{ge}	Gate-Emitter Charge		---	2.8	---	
Q_{gc}	Gate-Collector Charge		---	6.2	---	
R_g	Gate Resistance	V_{GE}=0V, V_{CC}=0V, F= 1MHz	---	3.2	---	Ω
$I_{C(sc)}$	Short circuit collector current	V_{CC}=400V, V_{GE}=15V, T_{SC} ≤ 10μS , T_J ≤ 25℃ (Note 2)	---	30	---	A
$t_{d(on)}$	Turn-On Delay Time	V_{CE}=400V, I_C=5A, V_{GE}=15V, R_{Gon} =10Ω , R_{Goff}=10Ω T_{Vj} = 25℃	---	20	---	ns
t_r	Rise Time		---	23	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	84	---	ns
t_f	Fall Time		---	56	---	ns
E_{on}	Turn-On Switching Loss		---	195	---	mJ
E_{off}	Turn-Off Switching Loss		---	84	---	mJ
E_{ts}	Total Switching Loss		---	279	---	mJ
C_{ies}	Input Capacitance	V_{CE}=25V , V_{GE}=0V , f=1MHz	---	260	---	pF
C_{oes}	Output Capacitance		---	40	---	
C_{res}	Reverse Transfer Capacitance		---	6	---	

Note :

1.Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%.

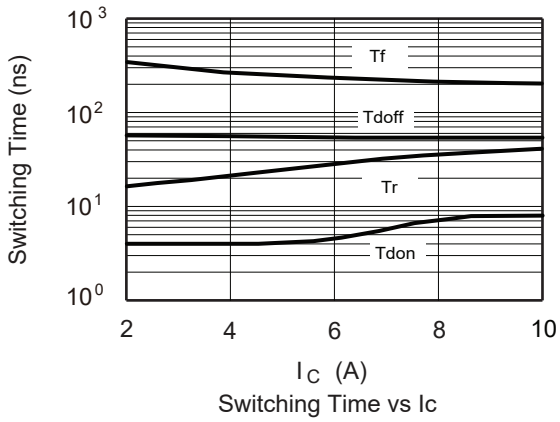
2.Allowed number of short circuits:<1000，time between short circuits: >1s.

Electrical Characteristic Of Diode

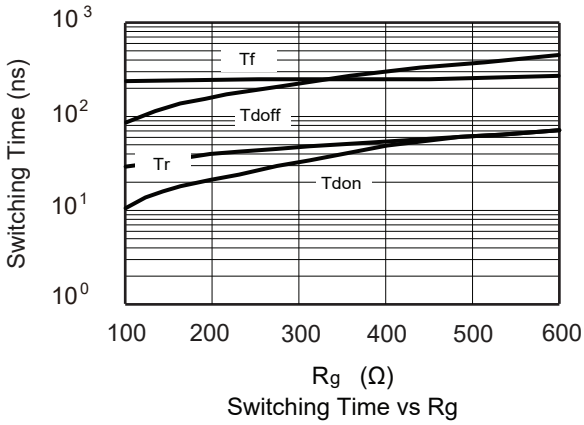
Symbol	Characteristic	Test Condition		Mim.	Typ.	Max.	Unit
V_F	Diode Forward Voltage	I_F = 10A	Tc=25℃	---	1.56	---	V
			Tc=150℃	---	1.35	---	
t_{rr}	Diode Reverse Recovery Time	I_F =5A di/dt =200A/μs V_{CC}=400V	Tc=25℃	---	195	---	ns
			Tc=150℃	---	273	---	
I_{rm}	Diode Peak Reverse Recovery Current		Tc=25℃	---	2.78	---	A
			Tc=150℃	---	3.3	---	
Q_{rr}	Diode Reverse Recovery Charge		Tc=25℃	---	0.24	---	μC
			Tc=150℃	---	0.38	---	

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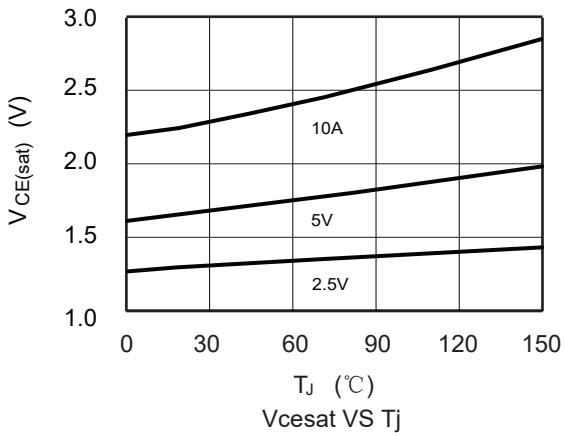
Typical electrical and thermal characteris



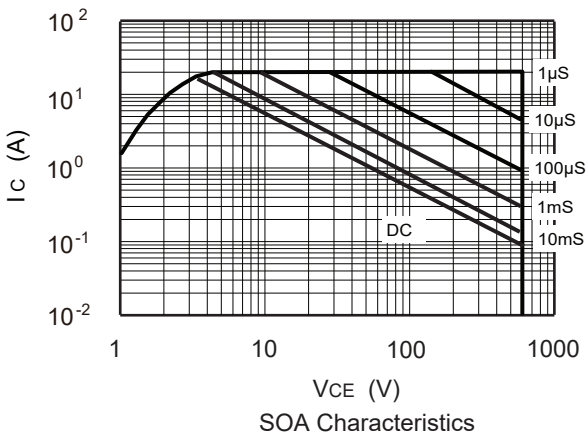
Switching Time vs Ic



Switching Time vs Rg



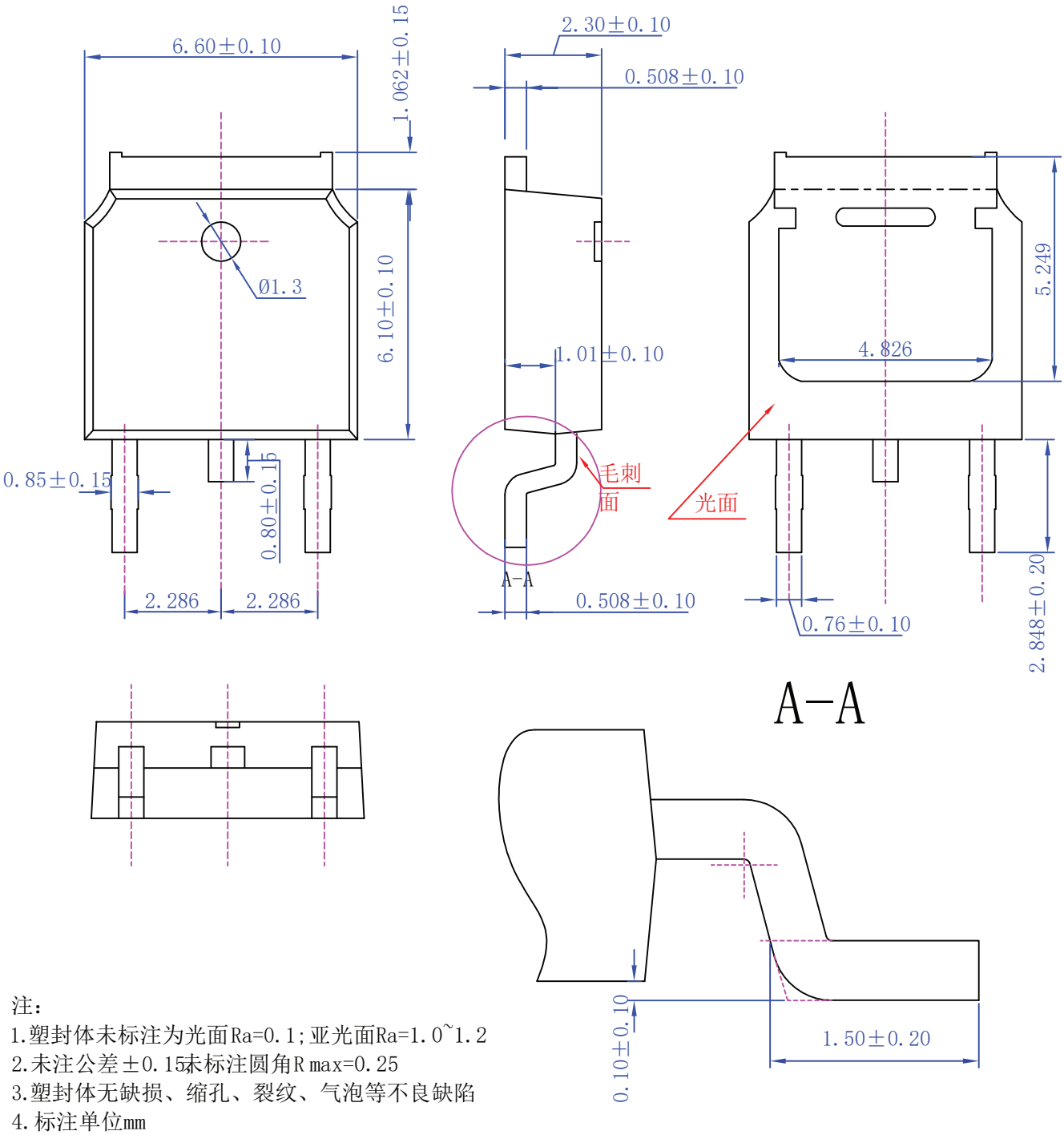
Vcesat VS Tj



SOA Characteristics

Package Dimension

TO-252 Unit :mm



注：

1.塑封体未标注为光面Ra=0.1;亚光面Ra=1.0~1.2
2.未注公差±0.15未标注圆角R max=0.25
3.塑封体无缺损、缩孔、裂纹、气泡等不良缺陷
4.标注单位mm
5.顶针孔不允许凸出塑封体表面

Package Dimension

TO-251A Unit :mm

