CMF10B65D

650V,10A Field Stop Trench IGBT

General Description

Cmos's Insulated Gate Bipolar Transistors (IGBTs) provides low conduction and switching losses. The device is designed for Motor applications where ruggedness is a required feature.

Product Summary

VCES	IC
650V	10A

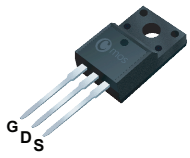
Applications

- Motor drives
- Uninterruptible Power Supply

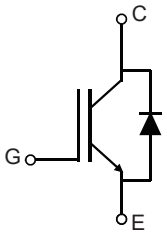
Features

- High speed switching
- High input impedance
- RoHS Compliant

TO-220F Pin Configuration



TO-220F
(CMF10B65D)



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	20	A
I_C@T_C=100℃		10	A
I_{CM}	Pulsed Collector Current *	30	A
I_F@T_C=100℃	Diode Continuous Forward Current	5	A
I_{FM}	Diode Maximum Forward Current	15	A
P_D@T_C=25℃	Maximum Power Dissipation	30	W
P_D@T_C=100℃	Maximum Junction Temperature	12	W
T_{Vj}	Operating Junction temperature range	-55 to 150	℃
T_{stg}	Storage temperature range	-55 to 150	℃

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

Thermal Data

Symbol	Parameter	Typ.	Max.	Units
R_{thJA}	Thermal Resistance, Junction-Ambient	---	62	℃/W
R_{thJC}	Thermal Resistance, IGBT Junction-Case	---	4.2	℃/W
R_{thJC}	Thermal Resistance, Diode Junction-Case	---	7.0	℃/W

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

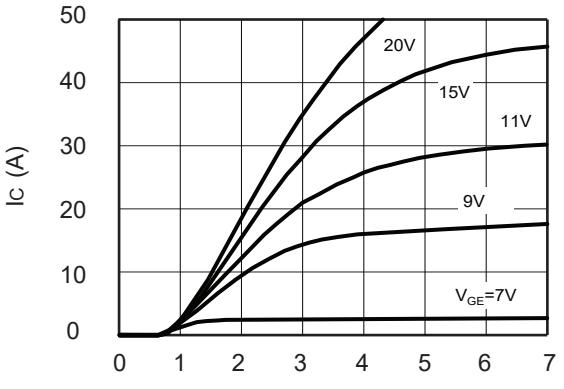
Symbol	Characteristic	Test Condition	Min.	Typ.	Max.	Unit
Static						
BV_{CES}	Collector-Emitter Breakdown Voltage	V_{CE}=0V , I_C=2mA	650	---	---	V
I_{CES}	Collector Cut-off Current	V_{GE}=0V , V_{CE}=650V, T_{vj} = 25℃	---	---	10	μA
I_{GES}	Gate Leakage Current	V_{CE} =0V , V_{GE}=±20V	---	---	±100	nA
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	V_{CE} = 5V , I_C=250μA	3.5	5.2	6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	V_{GE}=15V, I_C=10A, T_{vj} = 25℃	---	1.7	2.0	V
		V_{GE}=15V, I_C=10A, T_{vj} = 150℃	---	2.0	---	V
Dynamic						
Q_g	Total Gate Charge	V_{CC}=520V, V_{GE}=15V, I_C= 10A	---	24	---	nC
Q_{ge}	Gate-Emitter Charge		---	5.5	---	
Q_{gc}	Gate-Collector Charge		---	12	---	
$t_{d(on)}$	Turn-On Delay Time	V_{CC}=400V, I_C=10A, V_{GE}=15V, R_G=30Ω Inductive Load , T_{vj} = 25℃	---	12	---	ns
t_r	Rise Time		---	16	---	
$t_{d(off)}$	Turn-Off Delay Time		---	91	---	
t_f	Fall Time		---	14	---	
E_{on}	Turn-On Switching Loss		---	0.18	---	mJ
E_{off}	Turn-Off Switching Loss		---	0.13	---	
E_{total}	Total Switching Energy		---	0.31	---	
$t_{d(on)}$	Turn-On Delay Time	V_{CC}=400V, I_C=10A, V_{GE}=15V, R_G=30Ω Inductive Load , T_{vj} = 150℃	---	11	---	ns
t_r	Rise Time		---	17	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	108	---	ns
t_f	Fall Time		---	23	---	ns
E_{on}	Turn-On Switching Loss		---	0.2	---	mJ
E_{off}	Turn-Off Switching Loss		---	0.21	---	mJ
E_{total}	Total Switching Energy		---	0.41	---	mJ
C_{ies}	Input Capacitance	V_{CE}=25V , V_{GE}=0V , f=1MHz	---	1400	---	pF
C_{oes}	Output Capacitance		---	45	---	
C_{res}	Reverse Transfer Capacitance		---	25	---	

Electrical Characteristic Of Diode

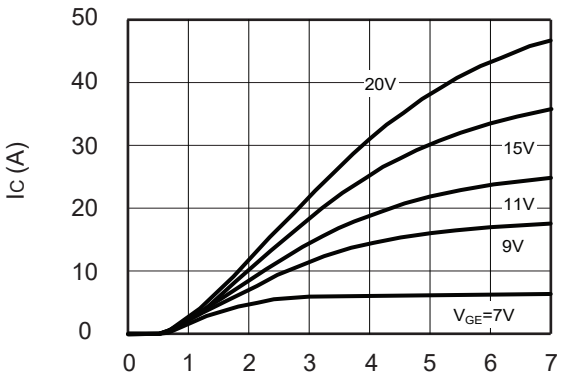
Symbol	Characteristic	Test Condition		Mim.	Typ.	Max.	Unit
V_F	Diode Forward Voltage	I_F = 5A	Tc=25℃	---	1.5	1.95	V
			Tc=150℃	---	1.6	---	
t_{rr}	Diode Reverse Recovery Time	I_F =10A di/dt =200A/μs	Tc=25℃	---	263	---	ns
			Tc=150℃	---	262	---	
I_{rm}	Diode Peak Reverse Recovery Current		Tc=25℃	---	3.8	---	A
			Tc=150℃	---	4.5	---	
Q_{rr}	Diode Reverse Recovery Charge		Tc=25℃	---	0.4	---	μC
			Tc=150℃	---	0.6	---	

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Cmos assumes no liability for customers' product design or applications.
Cmos reserver the right to improve product design ,functions and reliability wihtout notice.Please refer to the latest version of specification.

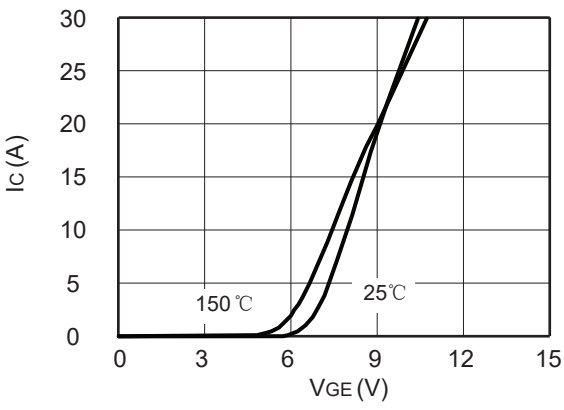
Typical electrical and thermal characteris



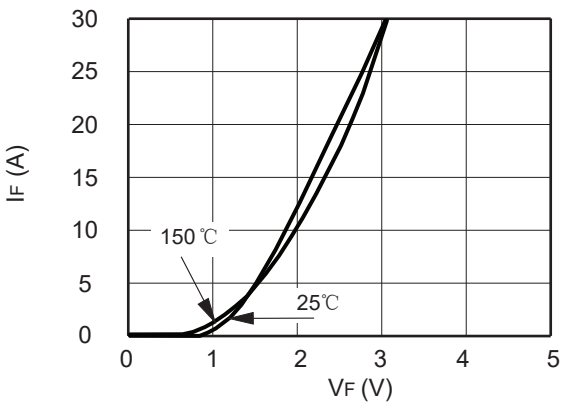
Output Characteristic (Tj=25℃)



Output Characteristic (Tj=150℃)

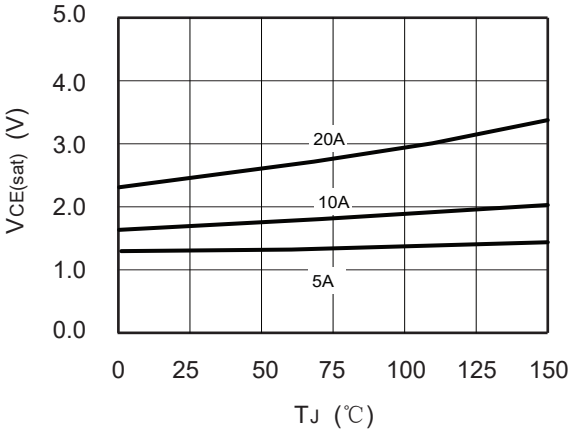


Transfer Characteristic

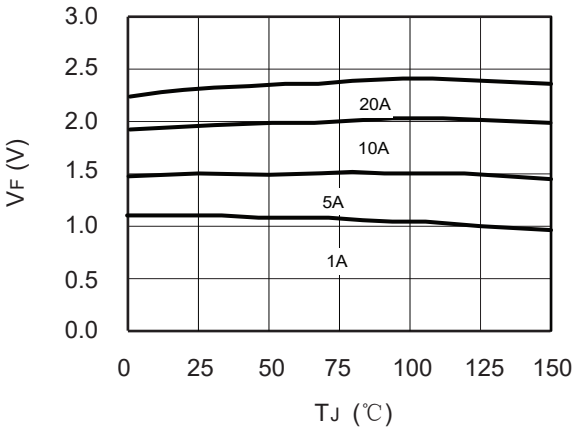


Diode Characteristic

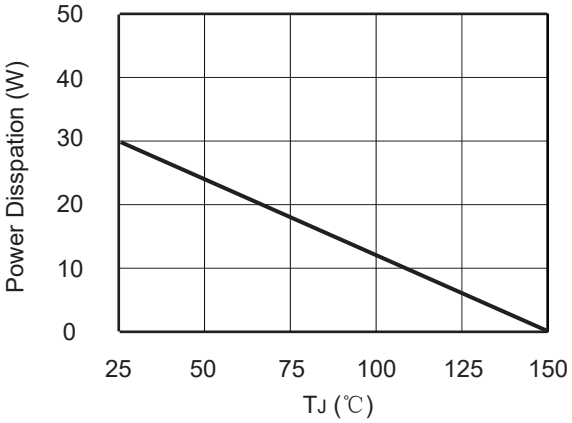
Typical electrical and thermal characteris



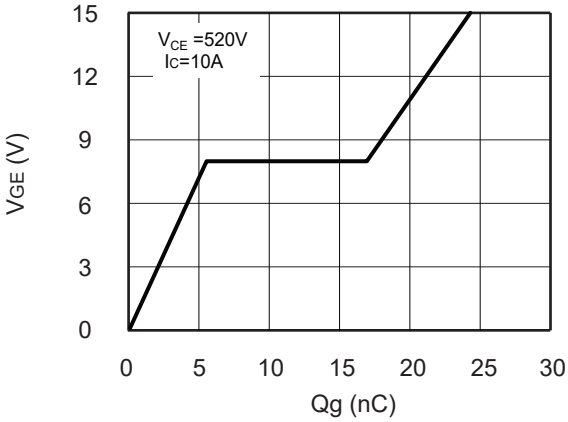
Collector-Emitter Saturation Voltage vs. Junction Temperature



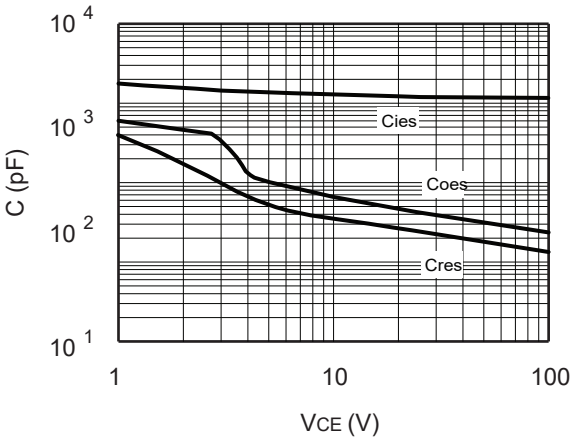
Diode Forward voltage vs. Junction Temperature



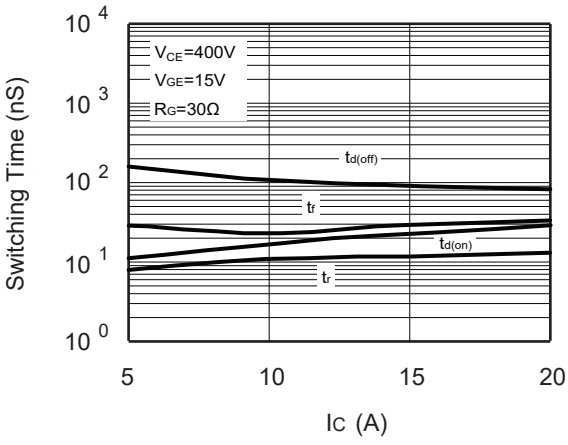
Power Disspation as a Function of Case



Gate-Charge Characteristics



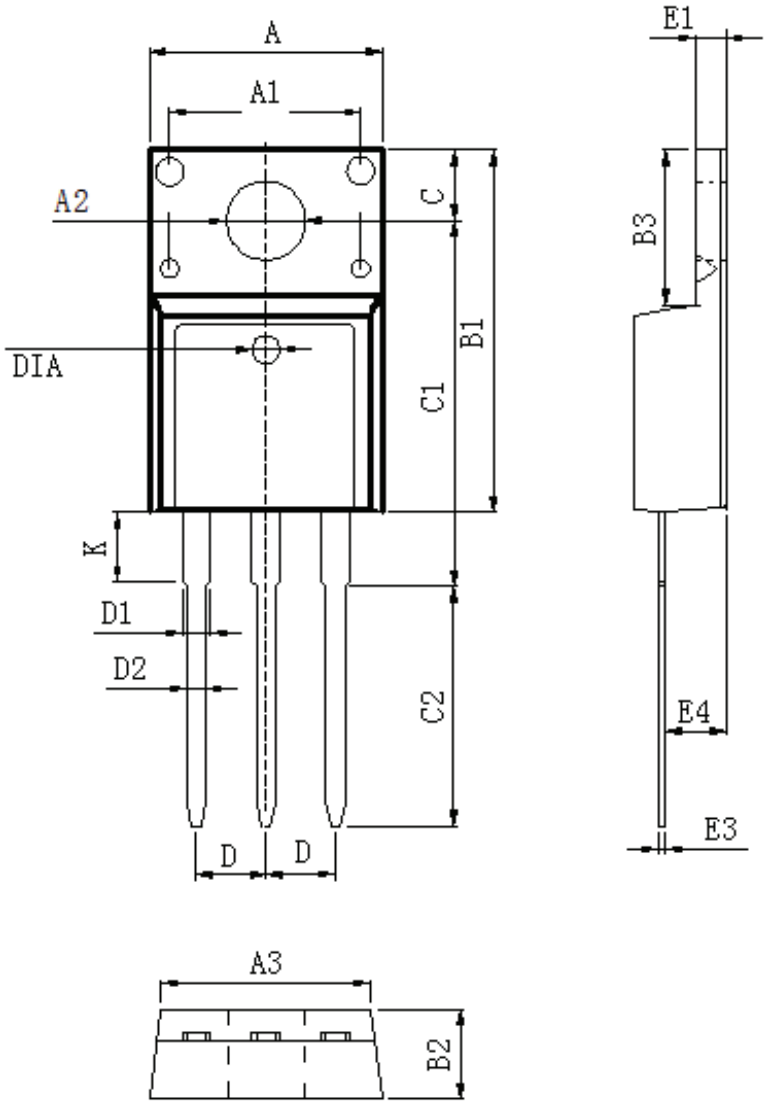
Capacitance Characteristic



Switching Time vs. Collector Current

Package Dimension

TO-220F Unit :mm



DIM	MILLIMETERS
A	10.16±0.3
A1	7.00±0.1
A2	3.3±0.2
A3	9.5±0.2
B1	15.87±0.3
B2	4.7±0.2
B3	6.68±0.4
C	3.3±0.2
C1	12.57±0.3
C2	10.02±0.5
D	2.54±0.05
D1	1.28±0.2
D2	0.8±0.1
K	3.1±0.3
E1	2.54±0.1
E3	0.5±0.1
E4	2.76±0.2
DIA	⊙1.5(deep 0.2)