

CMF15B65D

650V, 15A 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.

Features

- High speed switching
- High input impedance
- RoHS Compliant

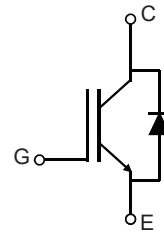
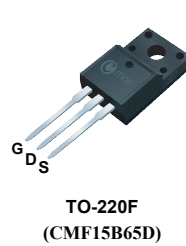
Product Summary

V _{CES}	I _C
650V	15A

Applications

- Motor drives
- Uninterruptible Power Supply

TO-220F Pin Configuration



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°C	Collector Current	30	A
I _C @T _C =100°C		15	A
I _{CM}	Pulsed Collector Current *	45	A
I _F @T _C =100°C	Diode Continuous Forward Current	8	A
I _{FM}	Diode Maximum Forward Current	20	A
t _{sc}	Short circuit withstanding time V _{GE} =15V, V _{CC} ≤400V, T _J ≤150°C	8	μS
P _D @T _C =25°C	Maximum Power Dissipation	30	W
P _D @T _C =100°C	Maximum Junction Temperature	15	W
T _{vj}	Operating Junction temperature range	-55 to 150	°C
T _{stg}	Storage temperature range	-55 to 150	°C

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

Thermal Data

Symbol	Parameter	Typ.	Max.	Units
R_{thJA}	Thermal Resistance, Junction-Ambient	---	62.5	$^{\circ}\text{C/W}$
R_{thJC}	Thermal Resistance, IGBT Junction-Case	---	4.2	$^{\circ}\text{C/W}$
R_{thJC}	Thermal Resistance, Diode Junction-Case	---	4.5	$^{\circ}\text{C/W}$

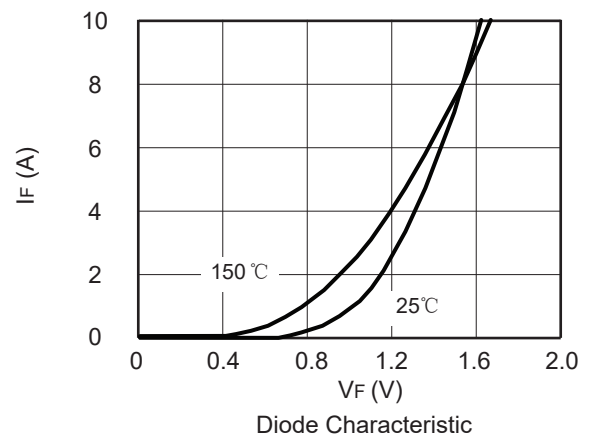
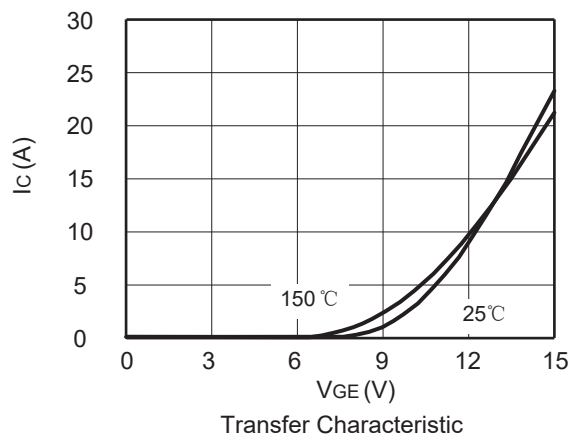
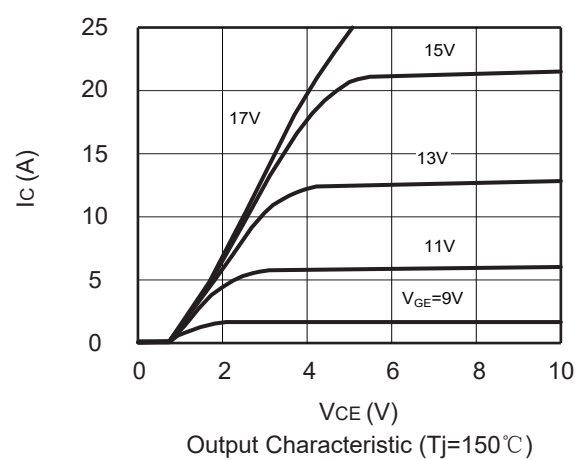
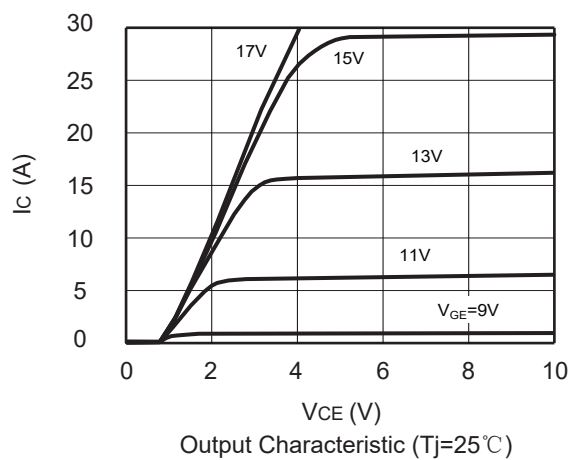
Electrical Characteristics ($T_J=25^{\circ}\text{C}$, unless otherwise noted)

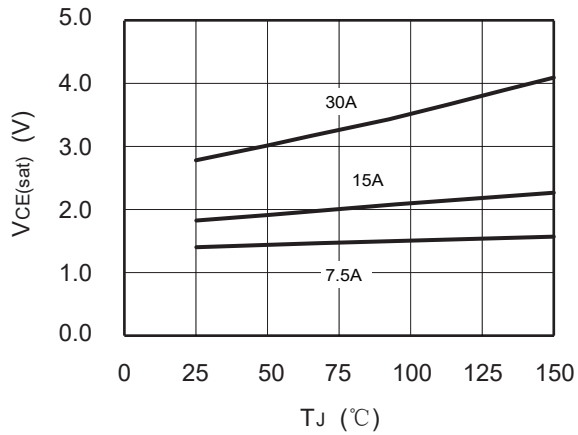
Symbol	Characteristic	Test Condition	Min.	Typ.	Max.	Unit
Static						
BV _{CES}	Collector-Emitter Breakdown Voltage	V _{CE} =0V , I _C =250μA	650	---	---	V
I _{CES}	Collector Cut-off Current	V _{GE} =0V , V _{CE} =650V, T _{Vj} = 25℃	---	---	10	μA
I _{GES}	Gate Leakage Current	V _{CE} =0V , V _{GE} =±20V	---	---	±100	nA
V _{GE(th)}	Gate-Emitter Threshold Voltage	V _{CE} = V _{GE} , I _C =250μA	4.5	5.3	6.5	V
V _{CE(sat)}	Collector-Emitter Saturation Voltage	V _{GE} =15V, I _C =15A, T _{Vj} = 25℃	---	1.7	2.0	V
		V _{GE} =15V, I _C =15A, T _{Vj} = 150℃	---	2.0	---	V
Dynamic						
Q _g	Total Gate Charge	V _{CC} =400V, V _{GE} =15V, I _C = 15A	---	27.7	---	nC
Q _{ge}	Gate-Emitter Charge		---	8.6	---	
Q _{gc}	Gate-Collector Charge		---	11.5	---	
t _{d(on)}	Turn-On Delay Time	V _{CC} =400V, I _C =15A, V _{GE} =15V, R _G =10Ω Inductive Load , T _{Vj} = 25℃	---	26	---	ns
t _r	Rise Time		---	25	---	
t _{d(off)}	Turn-Off Delay Time		---	84	---	
t _f	Fall Time		---	128	---	
E _{on}	Turn-On Switching Loss		---	0.36	---	mJ
E _{off}	Turn-Off Switching Loss		---	0.45	---	
E _{total}	Total Switching Energy		---	0.81	---	
C _{ies}	Input Capacitance	V _{CE} =25V , V _{GE} =0V , f=1MHz	---	1200	---	pF
C _{oes}	Output Capacitance		---	60	---	
C _{res}	Reverse Transfer Capacitance		---	22	---	

Electrical Characteristic Of Diode

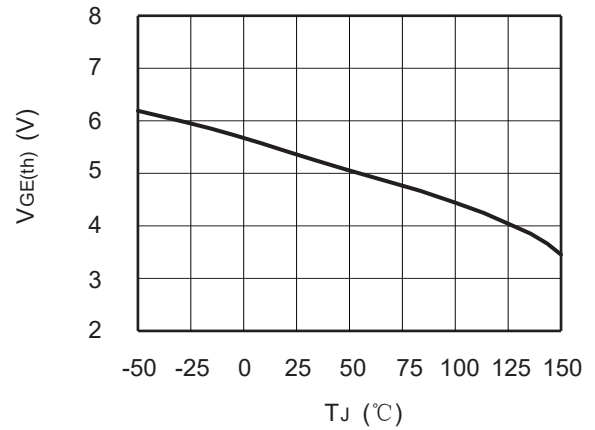
Symbol	Characteristic	Test Condition		Mim.	Typ.	Max.	Unit
V_F	Diode Forward Voltage	$I_F = 10A$	$T_C=25^{\circ}C$	---	1.7	---	V
			$T_C=150^{\circ}C$	---	1.5	---	
t_{rr}	Diode Reverse Recovery Time	$I_F=15A$ $di/dt=200A/\mu s$	$T_C=25^{\circ}C$	---	112	---	ns
I_{rm}	Diode Peak Reverse Recovery Current		$T_C=25^{\circ}C$	---	6.4	---	A
Q_{rr}	Diode Reverse Recovery Charge		$T_C=25^{\circ}C$	---	0.63	---	μC

This product has been designed and qualified for the consumer market.
Cmos assumes no liability for customers' product design or applications.
Cmos reserves the right to improve product design, functions and reliability without notice. Please refer to the latest version of specification.

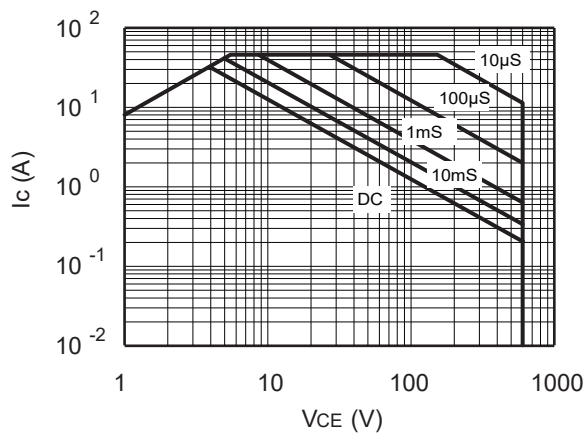
Typical electrical and thermal characteris


Typical electrical and thermal characteris


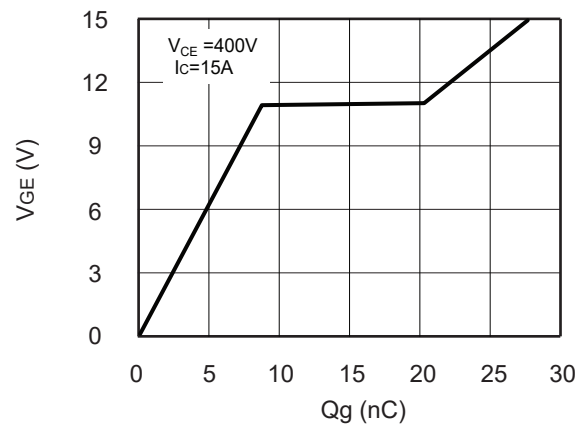
Collector-Emitter Saturation Voltage vs. Junction Temperature



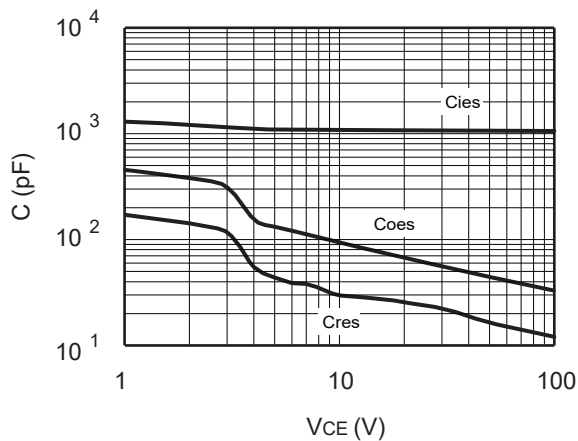
Junction temperature Vs. $V_{GE(th)}$



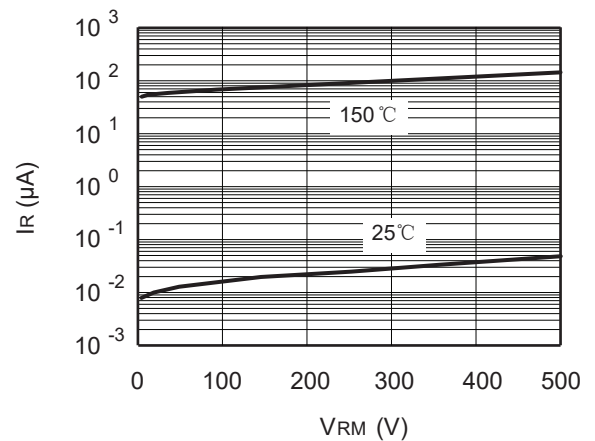
Forward bias safe operating area



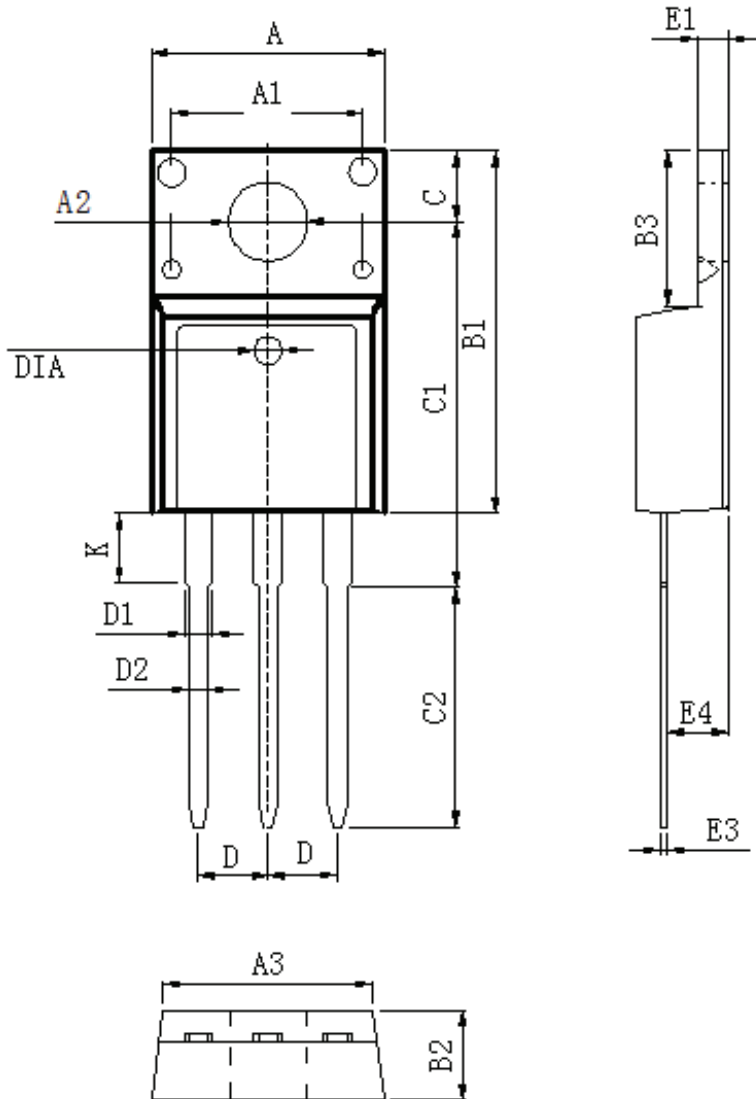
Gate-Charge Characteristics



Capacitance Characteristic



Diode junction temperature Vs. Leakage 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	$\odot 1.5$ (deep 0.2)