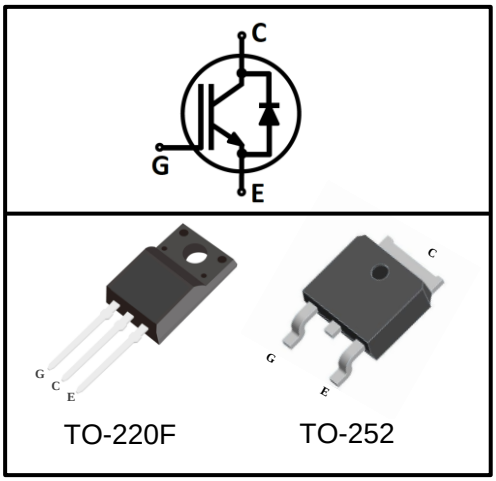
Features

- Easy parallel switching capability due to positive temperature coefficient in V_{CEsat}
- Low V_{CEsat}, fast switching
- High ruggedness, good thermal stability
- Very tight parameter distribution

Applications

- Motor Drives



Type	Marking	Package Code
MPBA10N65EF	MP10N65EF	TO-220F-3
MPBD10N65EF	MP10N65EF	TO-252

Maximum Rated Values [1]

Parameter	Symbol	Value		Unit
		TO-220F	TO-252	
Collector-emitter voltage	V_{CE}	650		V
DC collector current[2]				A
T_C=25℃	I_C	15		
T_C=100℃		10		
Pulsed collector current[3]	I_{Cpuls}	20		
Diode forward current[2]				
T_C=25℃	I_F	20		
T_C=100℃		10		
Diode pulsed current[3]	I_{Fpuls}	24		
Short circuit withstanding time V_{GE} = 15V, V_{CC} ≤ 400V, T_J ≤150℃	t_{SC}	5		us
Gate-emitter voltage	V_{GE}	±20		V
Transient Gate-emitter voltage（t_p≤10us)		±30		
Power dissipation				W
T_C=25℃	P_{tot}	32	68	
T_C=100℃		16	34	
Operating junction temperature	T_j	-55~175		℃
Storage temperature	T_{stg}	-55~150		

1:Reference standard: JESD-022 2: limited by Tjmax 3: Tp limited by Tjmax ;

Thermal Characteristics

Parameter	Symbol	Max		Unit
		TO-220F	TO-252	
IGBT thermal resistance, junction-case	R_{thJC}	4.6	2.2	K/W
Diode thermal resistance, junction-case	R_{thJCD}	5.6	2.9	
Thermal Resistance, junction-ambient	R_{thJA}	65	62.5	

Electrical Characteristics（at Tj=25℃, unless otherwise specified）
Static Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-emitter breakdown voltage	$V_{(BR)CES}$	V_{GE}=0V, I_C=0.25mA	650	-	-	V
Collector-emitter saturation voltage	$V_{CE(sat)}$	V_{GE}=15V, I_C=10A T_j=25℃	-	1.40	1.80	
		T_j=125℃	-	1.65	-	
		T_j=150℃	-	1.75	-	
Diode forward voltage	V_F	V_{GE}=0V，I_F=10A T_j=25℃	-	1.65	1.95	
		T_j=125℃	-	1.30	-	
		T_j=150℃	-	1.20	-	
G-E threshold voltage	$V_{GE(th)}$	I_C=150uA,V_{CE}=V_{GE}	4.5	5.5	6.5	
C-E leakage current	I_{CES}	V_{CE}=650V, V_{GE}=0V T_j=25℃	-	-	0.01	mA
		T_j=150℃	-	-	1.0	
G-E leakage current	I_{GES}	V_{CE}=0V, V_{GE}=20V	-	-	250	nA
Transconductance	g_{FS}	V_{CE}=20V, I_C=10A	-	5	-	S

Dynamic Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Input capacitance	C_{iss}	V_{CE}=25V, V_{GE}=0V, f=1MHz	-	1000	-	pF
Output capacitance	C_{oss}		-	45	-	
Reverse transfer capacitance	C_{rss}		-	16	-	
Gate charge	Q_G	V_{CC}=300V, I_C=10A, V_{GE}=15V	-	58	-	nC

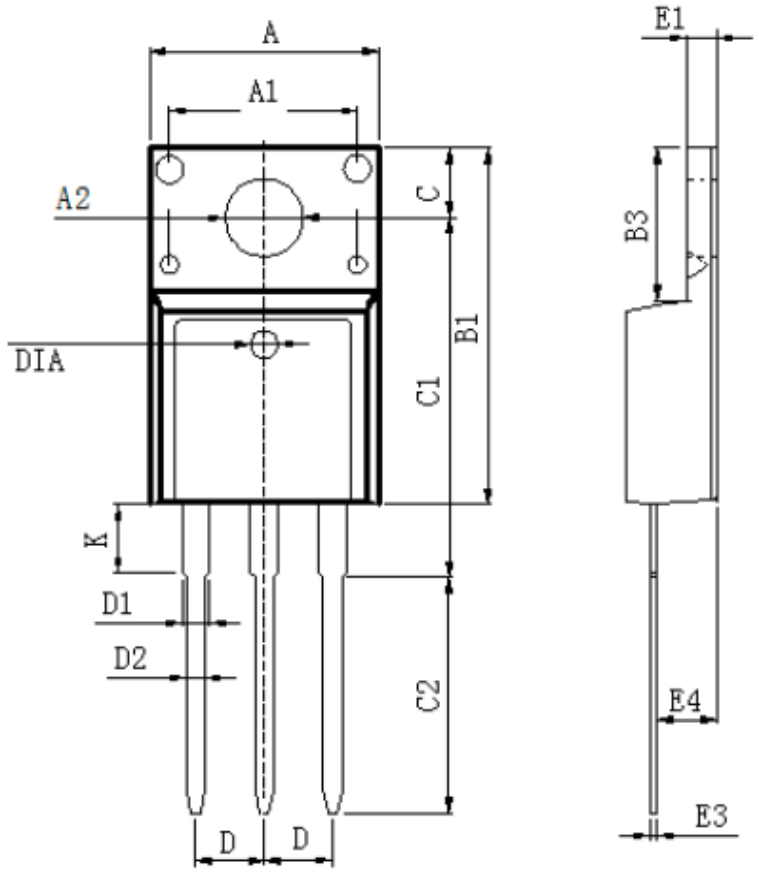
IGBT Switching Characteristics

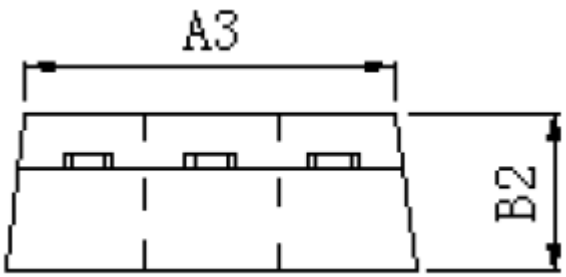
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Turn-on delay time	$t_{d(on)}$	T_j=25℃, V_{CC}=400V, I_C=10A, V_{GE}=0/15V, R_G=10Ω, Inductive load	-	47	-	ns
Rise time	t_r		-	28	-	
Turn-off delay time	$t_{d(off)}$		-	103	-	
Fall time	t_f		-	80	-	
Turn-on energy	E_{on}		-	0.17	-	mJ
Turn-off energy	E_{off}		-	0.20	-	
Total switching energy	E_{ts}		-	0.37	-	

Diode Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Diode reverse recovery time	t_{rr}	T_j=25℃, V_R=400V, I_F=10A, di_F/dt=350A/μs	-	66	-	ns
Diode reverse recovery charge	Q_{rr}		-	0.23	-	μC
Diode peak reverse recovery current	I_{rrm}		-	5.55	-	A

TO-220F-3L

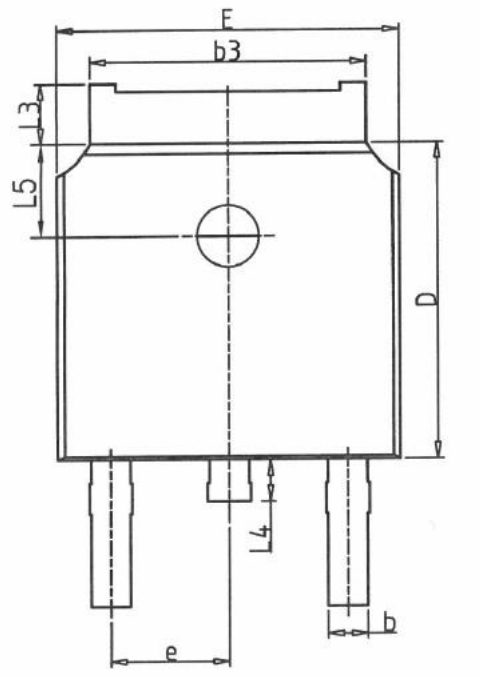




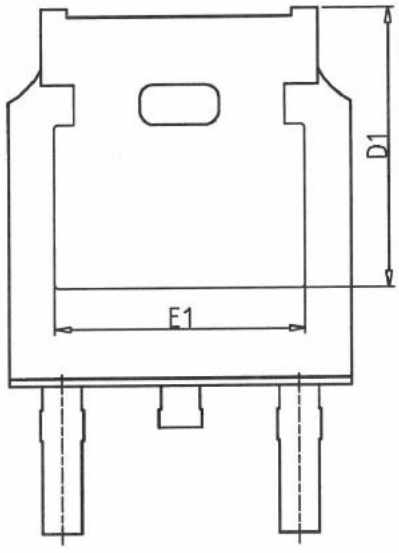
DIM	MILLIMETERS
A	10.16±0.3
A1	7.00±0.1
A2	3.3±0.2
A3	9.5±0.2
B1	15.87±0.3
B2	4.7±0.2
B3	6.68±0.4
C	3.3±0.2
C1	12.57±0.3
C2	10.02±0.5
D	2.54±0.05
D1	1.28±0.2
D2	0.8±0.1
K	3.1±0.3
E1	2.54±0.1
E3	0.5±0.1
E4	2.76±0.2
DIA	⊙1.5(deep 0.2)

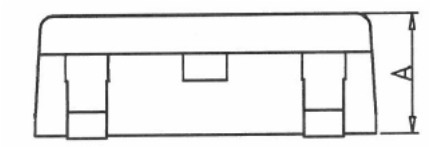
Unit :mm

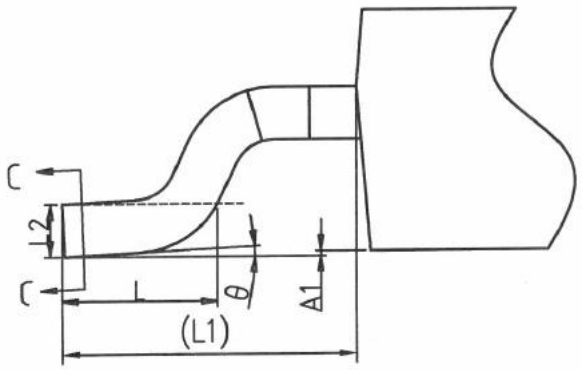
TO-252



SYMBOL	mm		
	Min	Nom	Max
A	2.20	2.30	2.38
A1	0.00	-	0.20
A2	0.97	1.07	1.17
b	0.68	0.78	0.90
b3	5.20	5.33	5.46
c	0.43	0.53	0.61
D	5.98	6.10	6.22
D1	5.30REF		
E	6.40	6.60	6.73
E1	4.63	-	-
e	2.286BSC		
H	9.40	10.10	10.50
L	1.38	1.50	1.75
L1	2.90REF		
L2	0.51BSC		
L3	0.88	-	1.28
L4	0.50	-	1.00
L5	1.65	1.80	1.95
θ	0°	-	8°







Revision History:

Revision	Date	Subjects (major changes since last revision)
1.0	2021-12-14	Initial version

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