

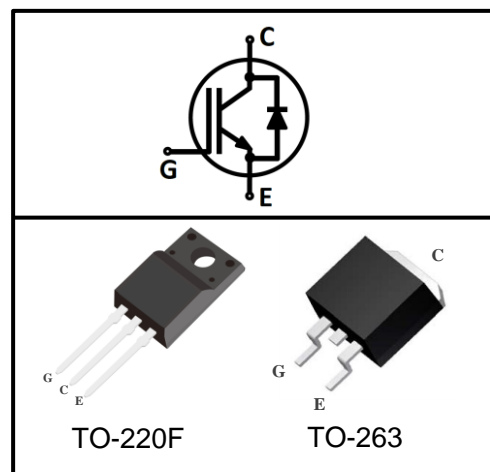
Features

- 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

Type	Marking	Package Code
MPBA15N65EF	MP15N65EF	TO-220F-3
MPBC15N65EF	MP15N65EF	TO-263

Applications

- Motor Drives



Maximum Rated Values ¹

Parameter	Symbol	Value		Unit
		TO-220F	TO-263	
Collector-emitter voltage	V _{CE}	650		V
DC collector current ²				A
T _C =25°C	I _C	30		
T _C =100°C		15		
Pulsed collector current ³	I _{Cpuls}	45		
Diode forward current ²				
T _C =25°C	I _F	30		
T _C =100°C		15		
Diode pulsed current ³	I _{Fpuls}	45		
Short circuit withstanding time V _{GE} = 15V, V _{CC} ≤ 400V, T _J ≤150°C	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°C	P _{tot}	51.7	107	
T _C =100°C		25.9	53.5	
Operating junction temperature	T _j	-55~175		°C
Storage temperature	T _{sta}	-55~150		

1:Reference standard: JESD-022 2: limited by T_{jmax} 3: T_p limited by T_{jmax} ;

Thermal Characteristics

Parameter	Symbol	Max		Unit
		TO-220F	TO-263	
IGBT thermal resistance, junction-case	R_{thJC}	2.9	1.4	K/W
Diode thermal resistance, junction-case	R_{thJCD}	4.6	2.8	
Thermal Resistance, junction-ambient	R_{thJA}	65	65	

Electrical Characteristics (at $T_j=25^{\circ}\text{C}$, 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	$V_{CE(sat)}$	$V_{GE}=15V$, $I_C=15A$ $T_j=25^{\circ}\text{C}$	-	1.30	1.80	
		$T_j=125^{\circ}\text{C}$	-	1.55	-	
		$T_j=150^{\circ}\text{C}$	-	1.65	-	
Diode forward voltage	V_F	$V_{GE}=0V$, $I_F=15A$ $T_j=25^{\circ}\text{C}$	-	1.50	1.80	
		$T_j=125^{\circ}\text{C}$	-	1.40	-	
		$T_j=150^{\circ}\text{C}$	-	1.30	-	
G-E threshold voltage	$V_{GE(th)}$	$I_C=250\mu A$, $V_{CE}=V_{GE}$	4.5	5.8	6.5	
C-E leakage current	I_{CES}	$V_{CE}=650V$, $V_{GE}=0V$ $T_j=25^{\circ}\text{C}$	-	-	0.01	mA
		$T_j=150^{\circ}\text{C}$	-	-	1.0	
G-E leakage current	I_{GES}	$V_{CE}=0V$, $V_{GE}=20V$	-	-	250	nA

Dynamic Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Input capacitance	C_{iss}	$V_{CE}=25V$, $V_{GE}=0V$, $f=1MHz$	-	2091	-	pF
Output capacitance	C_{oss}		-	69	-	
Reverse transfer capacitance	C_{rss}		-	32	-	
Gate charge	Q_G	$V_{CC}=300V$, $I_C=15A$, $V_{GE}=15V$	-	113	-	nC

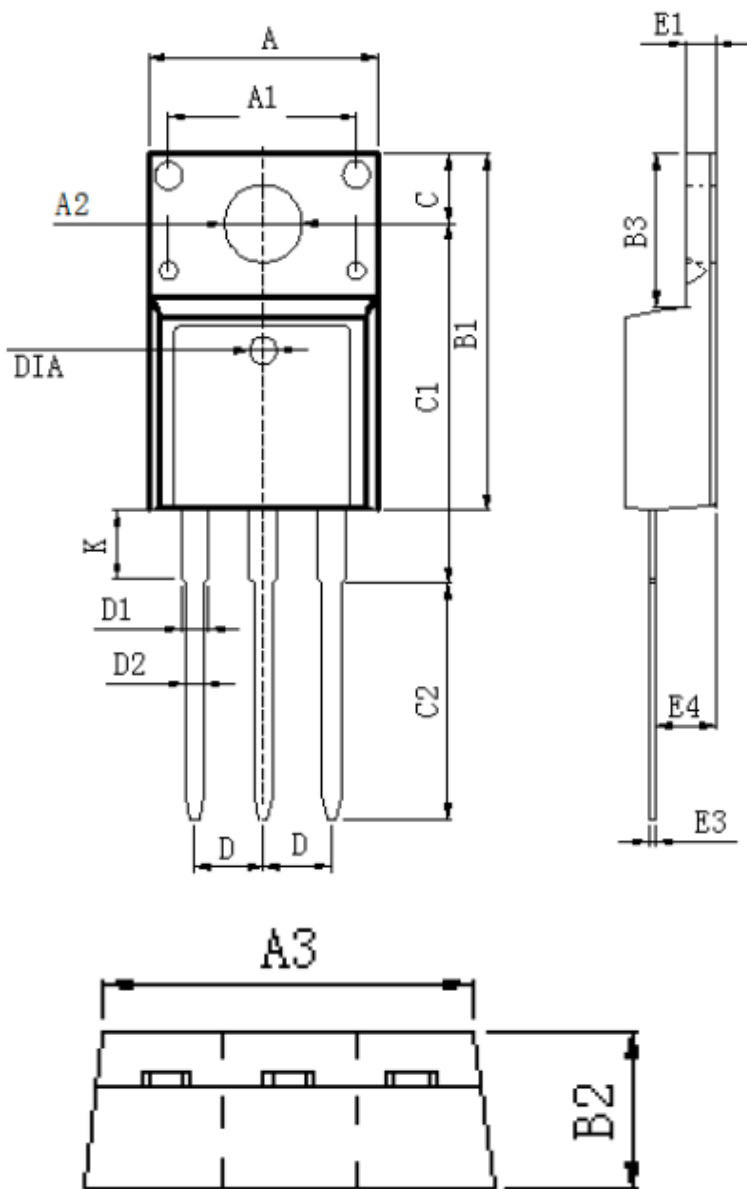
IGBT Switching Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Turn-on delay time	$t_{d(on)}$	$T_j=25^\circ C$, $V_{CC}=400V$, $I_C=15A$, $V_{GE}=0/15V$, $R_G=10\Omega$, Inductive load	-	68	-	ns
Rise time	t_r		-	30	-	
Turn-off delay time	$t_{d(off)}$		-	174	-	
Fall time	t_f		-	58	-	
Turn-on energy	E_{on}		-	0.26	-	mJ
Turn-off energy	E_{off}		-	0.31	-	
Total switching energy	E_{ts}		-	0.57	-	

Diode Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Diode reverse recovery time	t_{rr}	$T_j=25^\circ C$, $V_R=400V$, $I_F=15A$, $di_F/dt=570A/\mu s$	-	78	-	ns
Diode reverse recovery charge	Q_{rr}		-	0.458	-	μC
Diode peak reverse recovery current	I_{rrm}		-	10.1	-	A

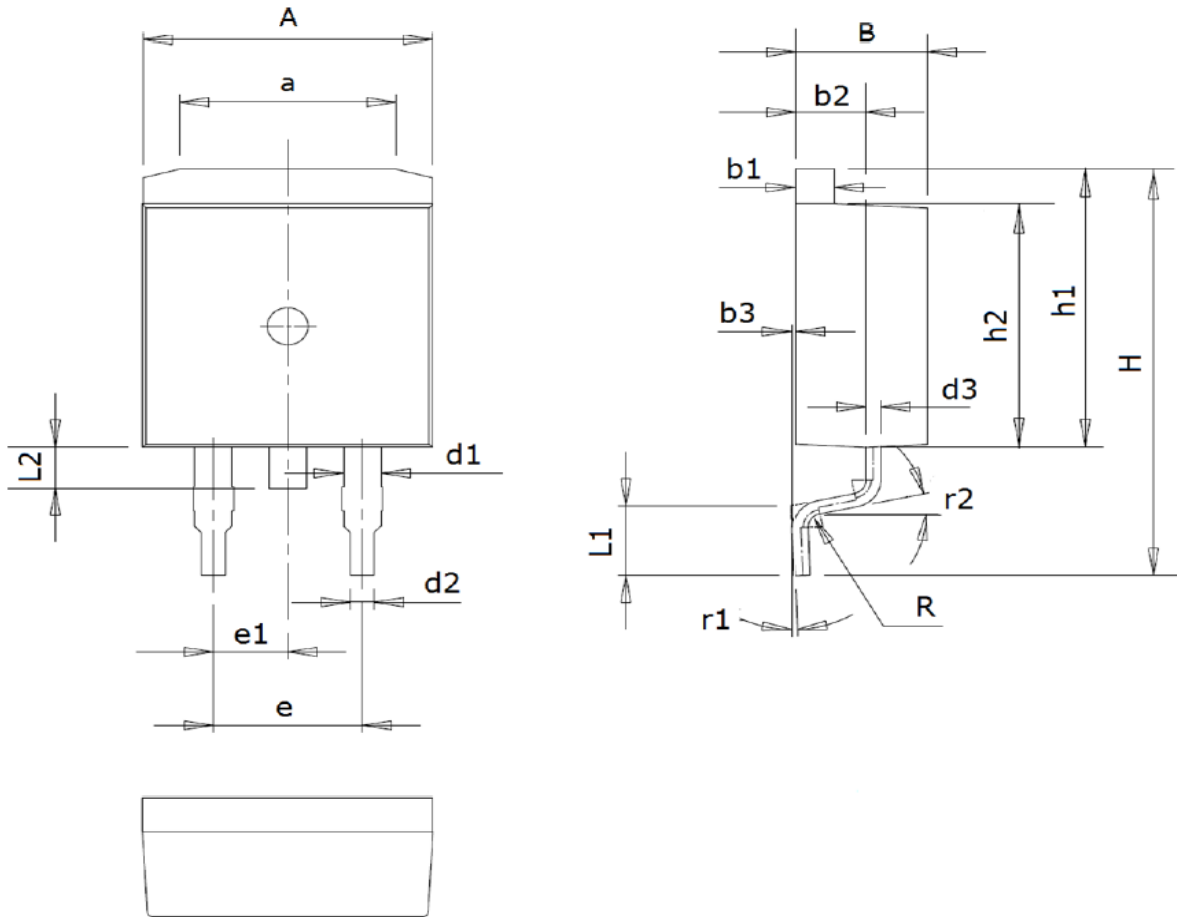
TO-220F-3L



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	$\odot 1.5$ (deep 0.2)

Unit :mm

TO-263



Symbol	Dimensions (mm)	Symbol	Dimensions (mm)	Symbol	Dimensions (mm)
A	9.86~10.26	d2	0.7~0.96	L1	2.0~2.6
a	7.0~7.8	d3	0.3~0.53	L2	1.3~1.8
B	4.37~4.77	e	5.08	R	0.5
b1	1.22~1.42	e1	2.54	r1	0-9°
b2	2.2~2.6	H	14.7~15.5	r2	12°
b3	0~0.25	h1	10.3~10.7		
d1	1.17~1.47	h2	9.1~9.4		



Revision History:

Revision	Date	Subjects (major changes since last revision)
1.0	2022-01	Initial version



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