CMPG65R380/CMBG65R380/CMIG65R380/CMFG65R380

650V, 260mΩ typ., 11A N-Channel Silicon Carbide Power MOSFET

General Description

This silicon carbide Power MOSFET device has been developed using Cmos's advanced Sic MOSFET technology.The device features a very low $R_{DS(on)}$ over the entire temperature range combined with low capacitances and very high switching operations,which improve application performance in frequency, energy efficiency, system size and weight reduction.

Product Summary

BVDSS	$R_{DS(on)}$ max.	ID
650V	320mΩ	11A

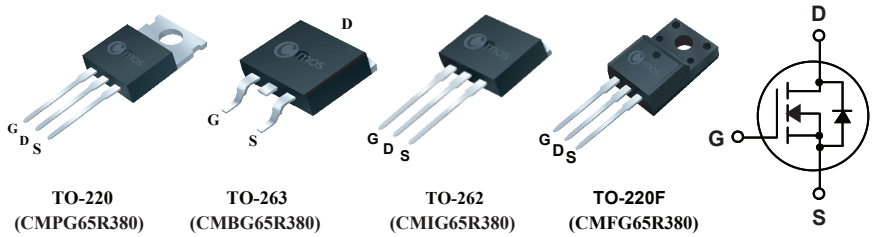
Applications

- Low power system, SMPS
- Adapter, LED power, TV display

Features

- Easy to Parallel and Simple to Drive
- Wide Bandgap SiC MOSFET Technology
- Low On-Resistance with High Blocking Voltage
- RoHS Compliant

TO-220/263/262/220F Pin Configuration



TO-220 (CMPG65R380) | TO-263 (CMBG65R380) | TO-262 (CMIG65R380) | TO-220F (CMFG65R380)

Absolute Maximum Ratings

Symbol	Parameter	220/263/262	220F	Units
V_{DS}	Drain-Source Voltage	650		V
V_{GS}	Absolute maximum values	-10/+22		V
V_{GSop}	Recommended operational values	0/+18		V
I_D@T_C=25℃	Continuous Drain Current	11	11*	A
I_D@T_C=100℃	Continuous Drain Current	9	9*	A
I_{DM}	Pulsed Drain Current	22	22*	A
EAS	Single Pulse Avalanche Energy (Note 1)	45		mJ
P_D@T_C=25℃	Total Power Dissipation	90	45	W
T_{STG}	Storage Temperature Range	-55 to 175		℃
T_J	Operating Junction Temperature Range	-55 to 175		℃

* Drain current limited by maximum junction temperature.

Thermal Data

Symbol	Parameter	220/263/262	220F	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient Max.	40	40	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-case Max.	1.67	3.33	℃/W

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=500μA	650	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=18V , I_D=5A	---	260	320	mΩ
		V_{GS}=18V , I_D=5A , T_J=175℃	---	280	---	
		V_{GS}=15V , I_D=5A	---	380	500	
		V_{GS}=15V , I_D=5A , T_J=175℃	---	330	---	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =1.8mA (tested after V_{GS}=22V,1ms pulse)	2.0	3.4	5.0	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=650V , V_{GS} =0V	---	1	10	μA
		V_{DS}=650V , V_{GS} =0V , T_J=175℃	---	20	---	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=+22V , V_{DS} =0V	---	---	+250	nA
		V_{GS}= -10V , V_{DS} =0V	---	---	-250	
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	3.5	---	Ω
$Q_{g(tot)}$	Total Gate Charge	V_{DS} =500V , I_D=5A V_{GS}= 0V to 15V	---	21.3	---	nC
Q_{gs}	Gate-Source Charge		---	6.7	---	
Q_{gd}	Gate-Drain Charge		---	11.5	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DS} =500V I_D =5A V_{GS}=0V / 15V R_G =10Ω	---	24	---	ns
T_r	Rise Time		---	42	---	
$T_{d(off)}$	Turn-Off Delay Time		---	26.8	---	
T_f	Fall Time		---	76	---	
C_{iss}	Input Capacitance	V_{DS}=100V , V_{GS}=0V , f=1MHz	---	280	---	pF
C_{oss}	Output Capacitance		---	55	---	
C_{rss}	Reverse Transfer Capacitance		---	11	---	

Diode Characteristics

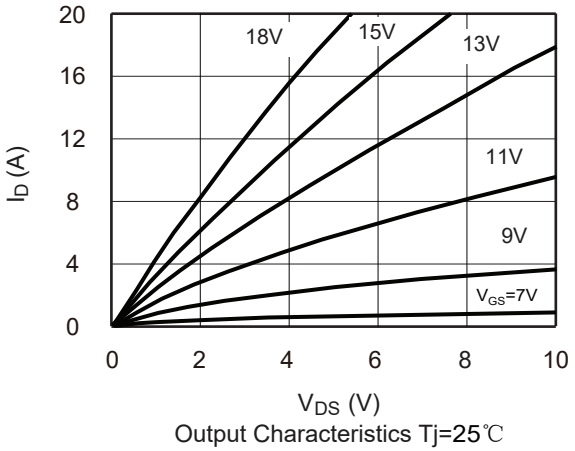
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	11	A
I_{SM}	Pulsed Source Current		---	---	22	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_{SD}=3A ,T_J=25℃	---	4.2	---	V
t_{rr}	Reverse Recovery Time	di/dt=530A/μs , V_{GS} =0V V_{DD} =500V , I_{SD} =5A , T_J =25℃	---	17.8	---	ns
Q_{rr}	Reverse Recovery Charge		---	33.7	---	nC
I_{rrm}	Peak Reverse Recovery Current		---	3.5	---	A

Note :

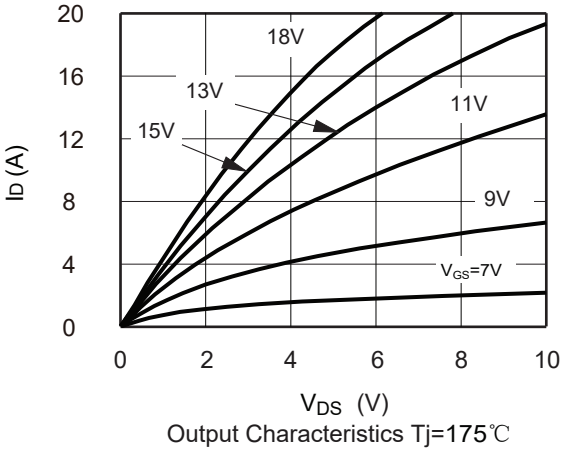
1.The EAS data shows Max. rating . The test condition is V_{DD}=100V , V_{GS}=10V , L=10mH , I_{AS}=3A.

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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.

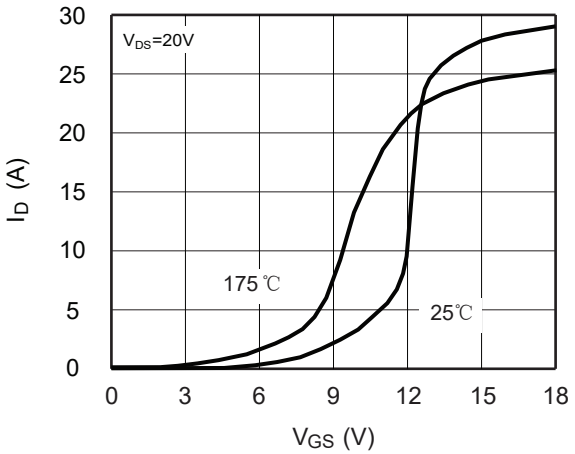
Typical Characteristics



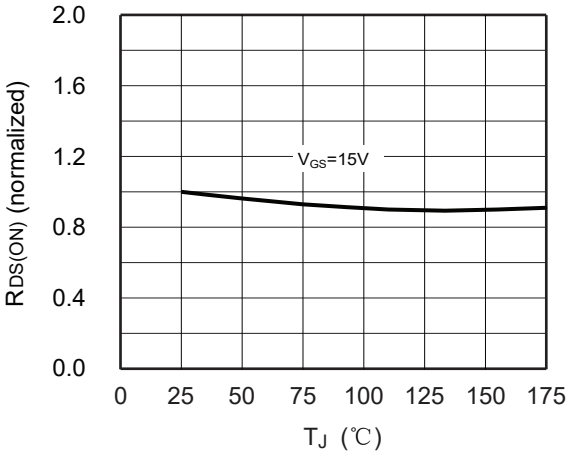
Output Characteristics Tj=25℃



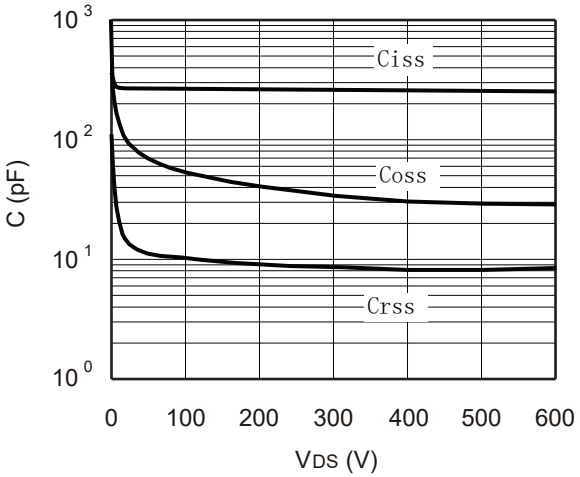
Output Characteristics Tj=175℃



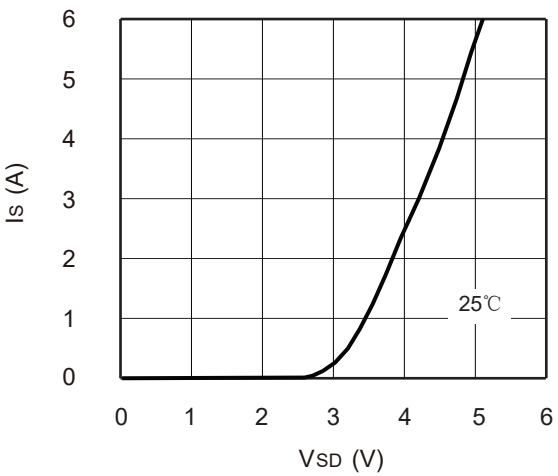
Transfer Characteristics



On-Resistance vs. temperature

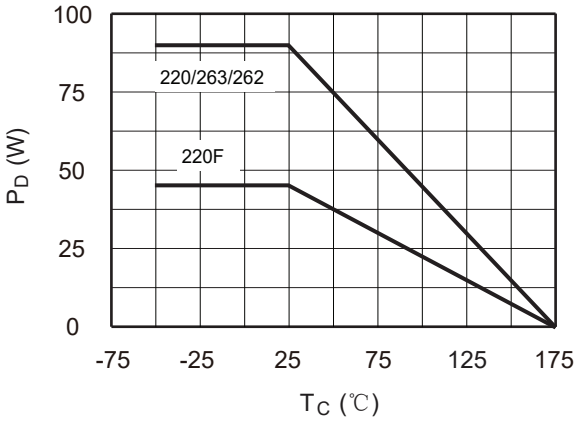


Capacitance Characteristics

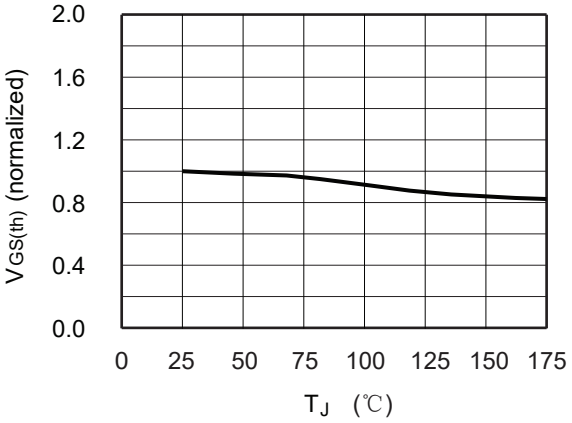


Body-Diode Characteristics

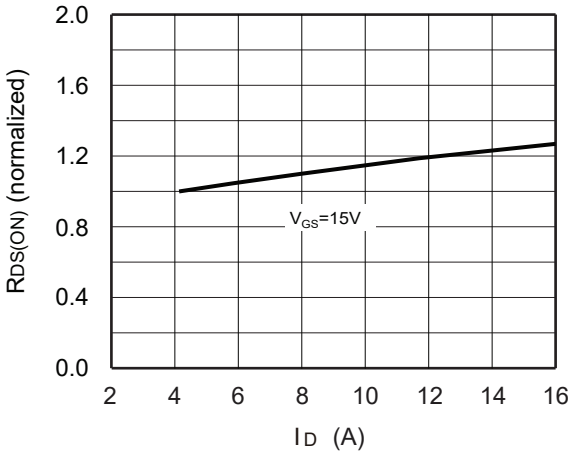
Typical Characteristics



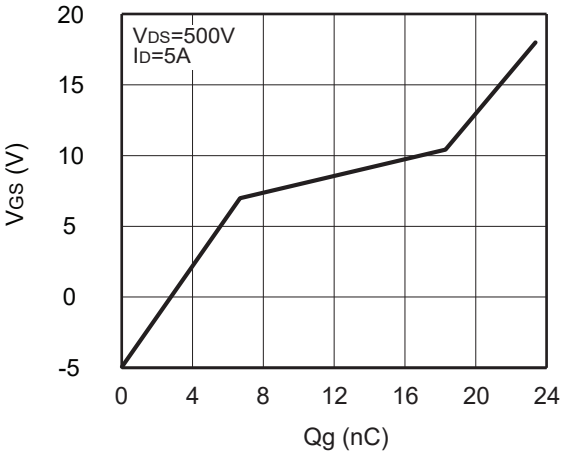
Maximum total power dissipation



Threshold Voltage vs. Junction Temperatur



On-Resistance vs. Drain Current

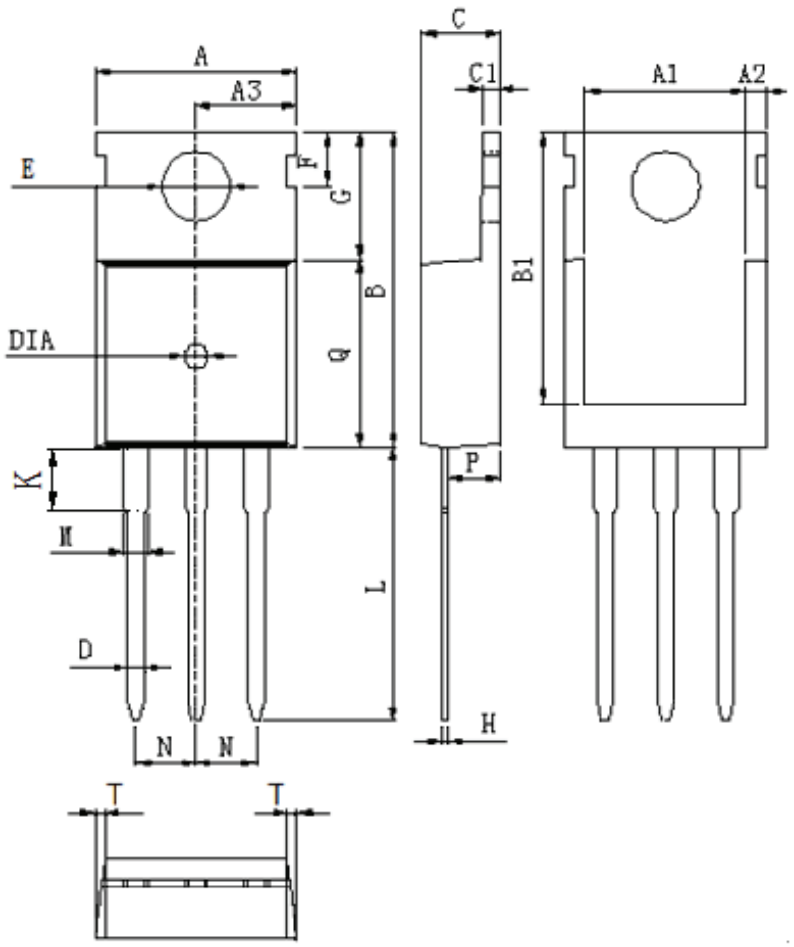


Gate charge vs gate-source voltage

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Package Dimension

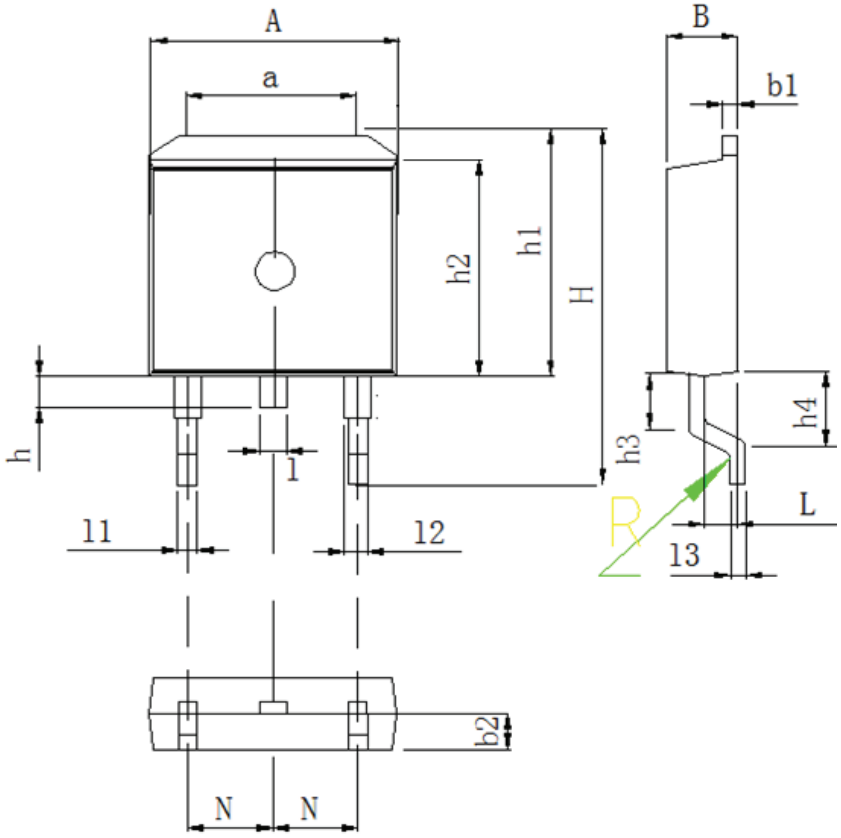
TO-220 Unit :mm



DIM	MILLIMETERS
A	10.0±0.3
A1	8.64±0.2
A2	1.15±0.1
A3	5.0±0.2
B	15.8±0.4
B1	13.2±0.3
C	4.56±0.1
C1	1.3±0.2
D	0.8±0.2
E	3.6±0.2
F	2.95±0.3
G	6.5±0.3
H	0.5±0.1
K	3.1±0.2
L	13.2±0.4
M	1.25±0.1
N	2.54±0.1
P	2.4±0.3
Q	9.0±0.3
T	W:0.35
DIA	⊙1.5(deep 0.2)

Package Dimension

TO-263 Unit :mm

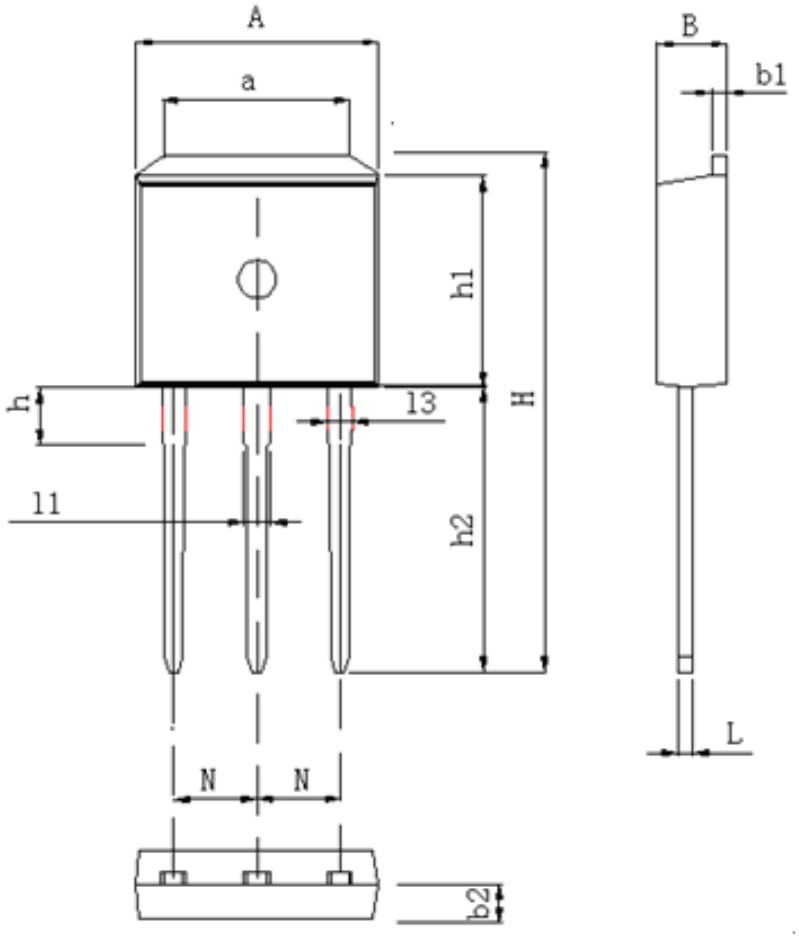


DIM	MILLIMETERS
A	9.8±0.2
a	7.4±0.4
B	4.5±0.2
b1	1.3±0.05
b2	2.4±0.2
H	15.5±0.3
h	1.54±0.2
h1	10.5±0.2
h2	9.2±0.1
h3	1.54±0.2
h4	2.7±0.2
L	2.4±0.2
l	1.3±0.1
l1	0.8±0.1
l2	1.3±0.1
l3	0.5±0.1
N	2.54±0.1
R	0.5R±0.05

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Package Dimension

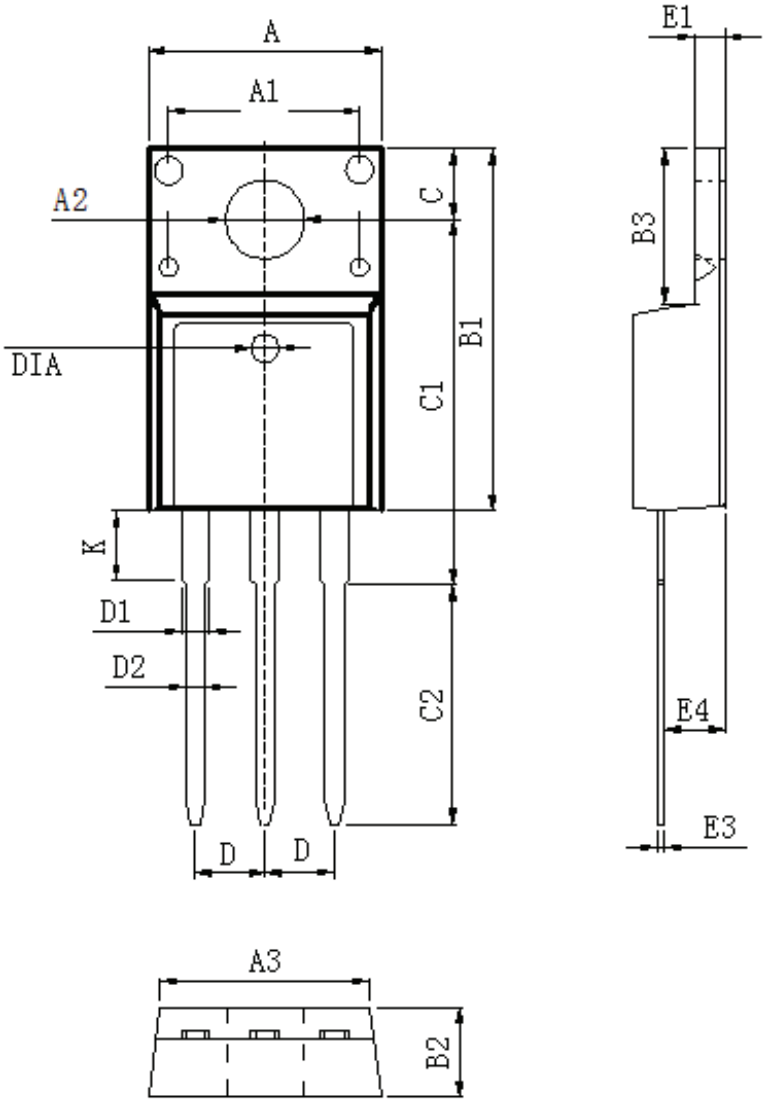
TO-262 Unit :mm



DIM	MILLIMETERS
A	9.98±0.2
a	7.4±0.4
B	4.5±0.2
b1	1.3±0.05
b2	2.4±0.2
H	23.9±0.3
h	3.1±0.2
h1	9.16±0.2
h2	13.2±0.2
L	0.5±0.1
l1	1.3±0.1
l2	0.8±0.1
N	2.45±0.1

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)