



Technical Data
 Data Sheet N2289, REV.B



S3D10065A/S3D10065F/S3D10065E/S3D10065G/S3D10065I/S3D10065D1 10A 650V SiC POWER SCHOTTKY RECTIFIERS

Description


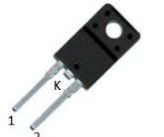
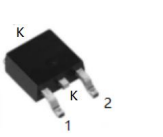
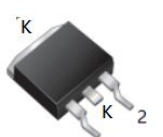



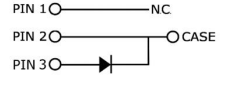
S3D10065A/S3D10065F/S3D10065E/S3D10065G/S3D10065I/S3D10065D1 are all single SiC Schottky rectifiers packaged in TO-220AC(TO-220-2)/ITO-220AC(TO-220-2F)/DPAK(TO-252-2)/D2PAK(TO-263-2)/TO-220-Isolation/TO-247AD(TO-247-3) case. The devices are high voltage Schottky rectifiers that have very low total conduction losses and very stable switching characteristics over temperature extremes. The S3D10065A/S3D10065F/S3D10065E/S3D10065G/S3D10065I/S3D10065D1 are ideal for energy sensitive, high frequency applications in challenging environments.

Features

- 175°C T_J operation
- Ultra-low switching loss
- Switching speeds independent of operating temperature
- Low total conduction losses
- High forward surge current capability
- High package isolation voltage
- Terminals finish: 100% Pure Tin
- Pb – Free Device
- All SMC parts are traceable to the wafer lot
- Additional electrical and life testing can be performed upon request

Applications

- Alternative energy inverters
- Power Factor Correction (PFC)
- Free-Wheeling diodes
- Switching supply output rectification
- Reverse polarity protection

S3D10065A 	S3D10065F 	S3D10065E 	S3D10065G 	S3D10065I 	S3D10065D1 
TO-220AC (TO-220-2)	ITO-220AC (TO-220-F2)	DPAK (TO-252-2)	D ² PAK (TO-263-2)	TO-220- Isolation	TO-247AD TO-247-3
					



Maximum Ratings:

Characteristics	Symbol	Condition	Max.	Units
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	V_{RRM} V_{RWM} V_{DC}	-	650	V
Average Rectified Forward Current	$I_{F(AV)1}$	$T_c=25^{\circ}C$	31	A
	$I_{F(AV)2}$	$T_c=135^{\circ}C$	14	A
	$I_{F(AV)3}$	$T_c=150^{\circ}C$	10	A
Repetitive Peak Forward Surge Current	I_{FRM1}	10ms, Half Sine pulse, $T_J=25^{\circ}C$	55	A
	I_{FRM2}	10ms, Half Sine pulse, $T_J=110^{\circ}C$	40	A
Peak One Cycle Non-Repetitive Surge Current	I_{FSM1}	10ms, Half Sine pulse, $T_J=25^{\circ}C$	115	A
	I_{FSM2}	10ms, Half Sine pulse, $T_J=110^{\circ}C$	80	A
Non-Repetitive Peak Forward Surge Current	$I_{F,Max}$	10 μ s. Pulse, $T_J=25^{\circ}C$	995	A
	$I_{F,Max}$	10 μ s. Pulse, $T_J=110^{\circ}C$	685	A
Power Dissipation	P_{tot1}	$T_J=25^{\circ}C$	103	W
	P_{tot1}	$T_J=110^{\circ}C$	45	W
TO-220 Mounting Torque		M3 Screw	1	Nm
		6-32 Screw	8.8	bf-in



Electrical Characteristics:

Characteristics	Symbol	Condition	Typ.	Max.	Units
Forward Voltage Drop*	V _{F1}	@ 10A, Pulse, T _J = 25 °C	1.45	1.7	V
	V _{F2}	@ 10A, Pulse, T _J = 175 °C	1.65	2.0	V
Reverse Current*	I _{R1}	@V _R = rated V _R T _J = 25 °C	0.7	40	uA
	I _{R2}	@V _R = rated V _R T _J = 175 °C	7	160	uA
Junction Capacitance	C _T	V _R =0V, T _J =25°C, f=1MHz	787	-	pF
Reverse Recovery Charge	Q _c	I _F = 10A, di/dt = 200A/μs V _R = 400 V, T _J = 25°C	49.1	-	nC
Capacitance Stored Energy	E _c	V _R = 400 V	12.03	-	μJ

* Pulse width < 300 μs, duty cycle < 2%

Thermal-Mechanical Specifications:

Characteristics	Symbol	S3D10065A	S3D10065F	S3D10065E	S3D10065G	S3D10065I	S3D10065D1	Units
Junction Temperature	T _J	-55 to +175						°C
Storage Temperature	T _{stg}	-55 to +175						°C
Typical Thermal Resistance Junction to Case	R _{qJC}	1.4	4	1.5	1.65	3.3	0.84(per leg) 0.42(both leg)	°C/W

Ordering Information

Device	Package	Shipping
S3D10065A	TO-220AC(TO-220-2)	50pcs / tube
S3D10065F	ITO-220AC(TO-220-F2)	50pcs / tube
S3D10065E	DPAK(TO-252-2)	2500pcs / reel
S3D10065G	D2PAK(TO-263-2)	800pcs / reel
S3D10065I	TO-220-Isolation	50pcs / tube
S3D10065D1	TO-247AD(TO-247-3)	25pcs / tube

For information on tape and reel specifications, including part orientation and tape sizes, please refer to our tape and reel packaging specification.



Ratings and Characteristics Curves

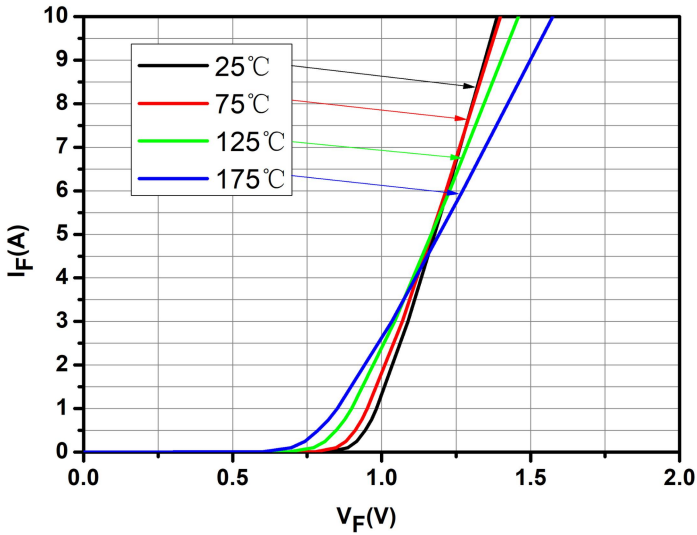


Fig.1-Typical Forward Voltage Characteristics

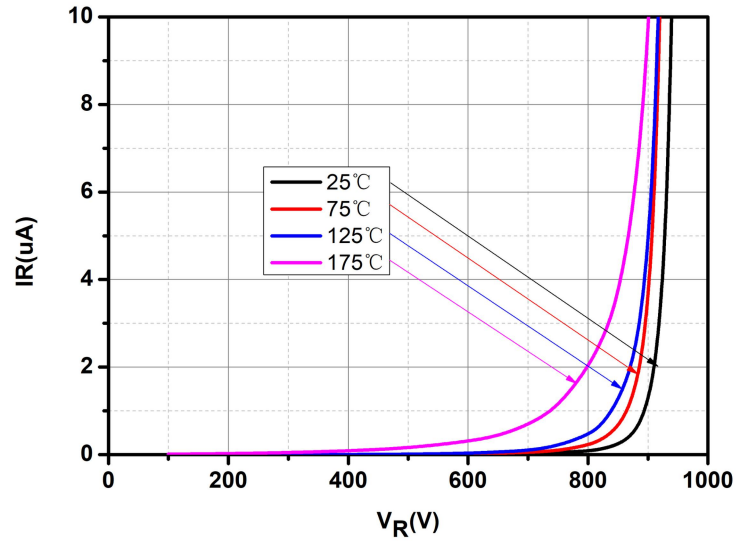


Fig.2-Typical Reverse Characteristics

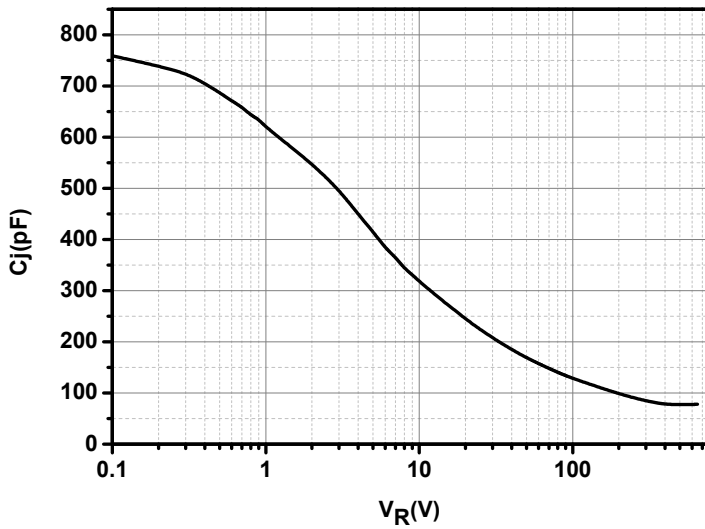


Fig.3-Capacitance vs. Reverse Voltage

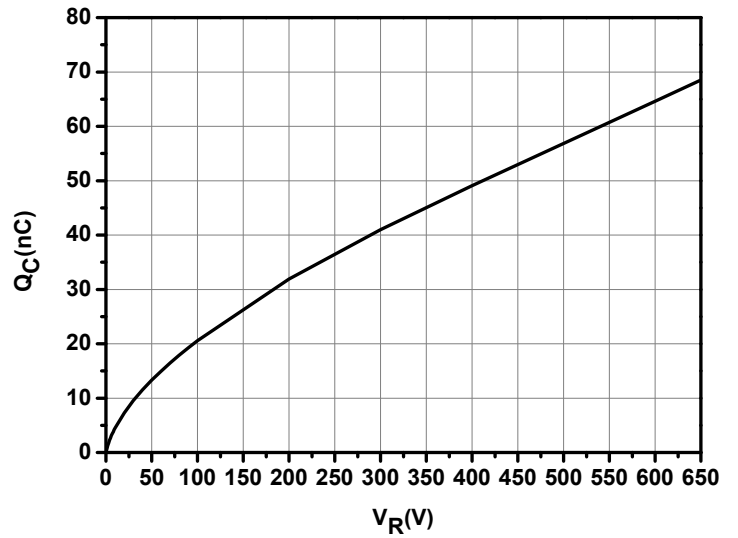


Fig.4-Total Capacitance Charge vs. Reverse Voltage

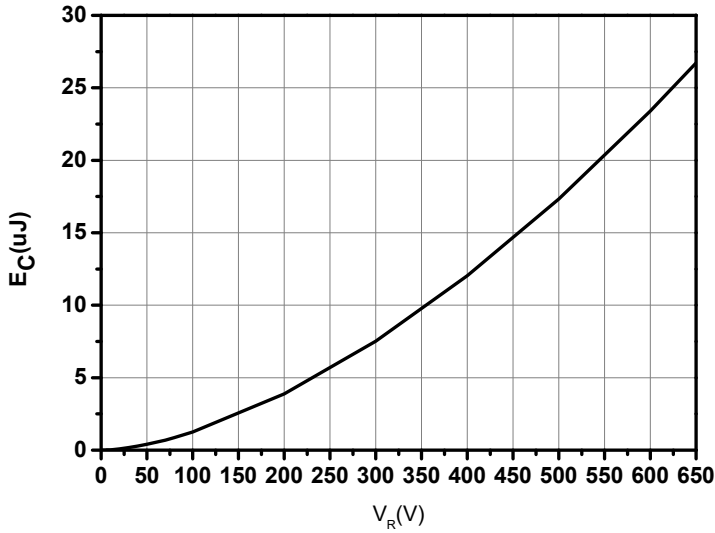


Fig.5-Capacitance Stored Energy

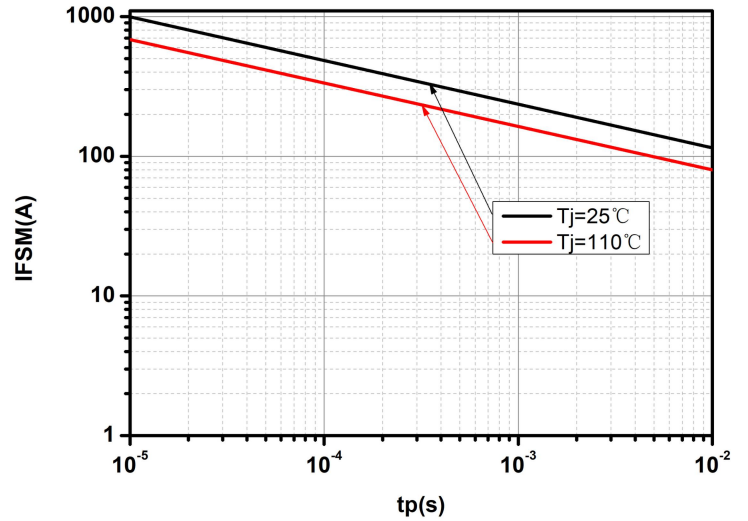


Fig.6-Non-repetitive peak forward surge current versus pulse duration (sinusoidal waveform)

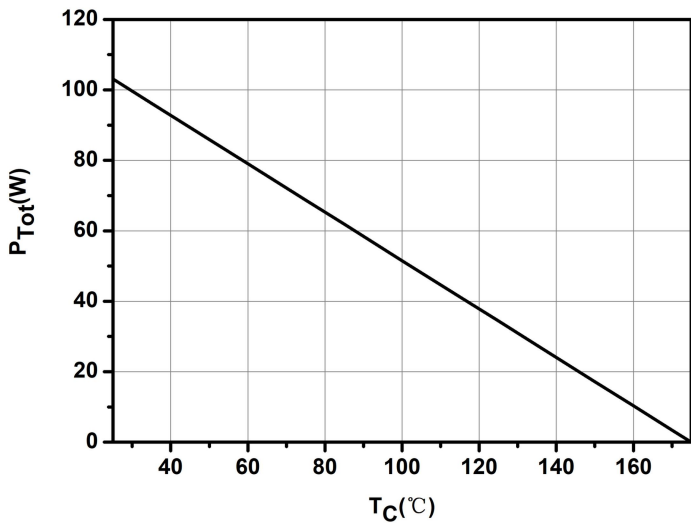


Fig.7-Power Derating

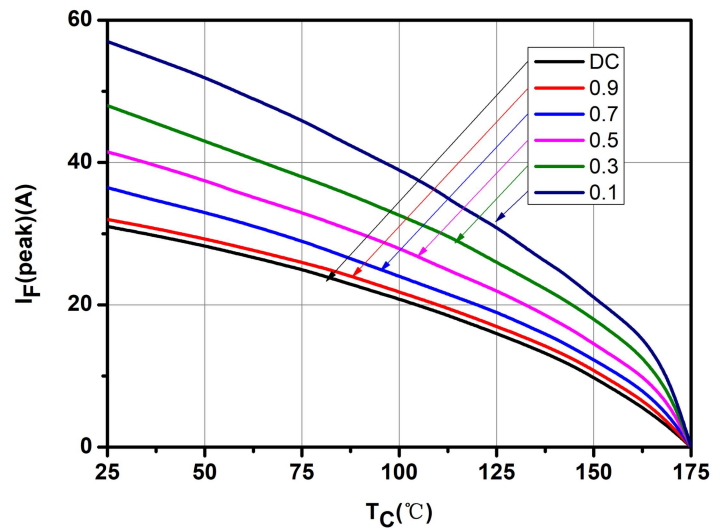


Fig.8-Current Derating

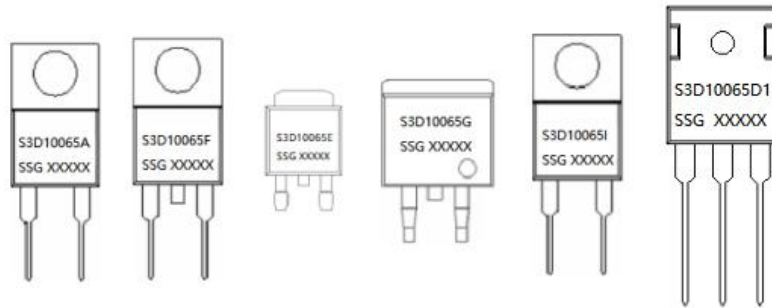
S3D10065A
 S3D10065F
 S3D10065E
 S3D10065G
 S3D10065I
 S3D10065D1



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Marking Diagram

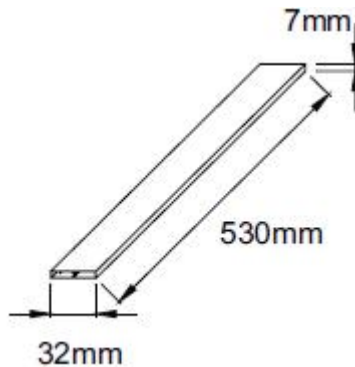


Where XXXXX is YYWWL

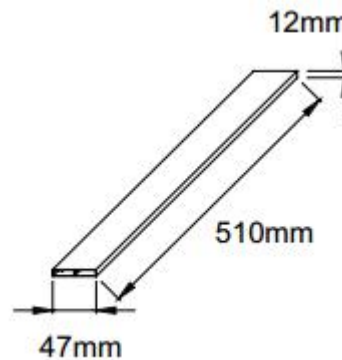
S3D = Device Type
 A/F/E/G/I/D1 = Package type
 10 = Forward Current (10A)
 065 = Reverse Voltage (650V)
 SSG = SSG
 YY = Year
 WW = Week
 L = Lot Number

Cautions: Molding resin
 Epoxy resin UL:94V-0

Tube Specification

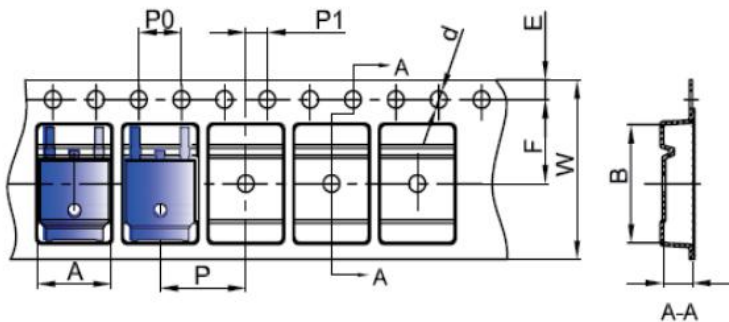


(TO-220-2/TO-220-F2/TO-220-Isolation)



(TO-247-3)

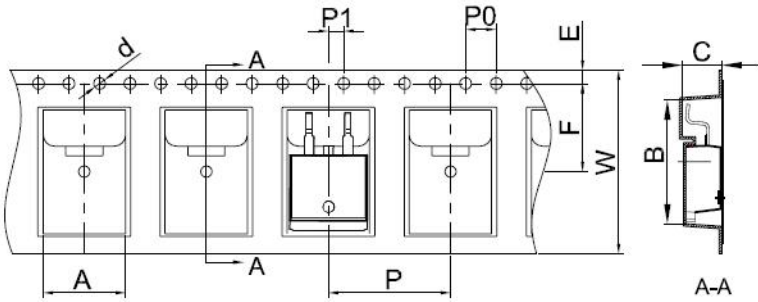
Carrier Tape & Reel Specification DPAK(TO-252-2)



SYMBOL	Millimeters	
	Min.	Max.
A	6.80	7.00
B	10.40	10.60
C	2.60	2.80
d	Φ1.45	Φ1.65
E	1.65	1.85
F	7.40	7.60
P0	3.90	4.10
P	7.90	8.10
P1	1.90	2.10
W	15.90	16.30

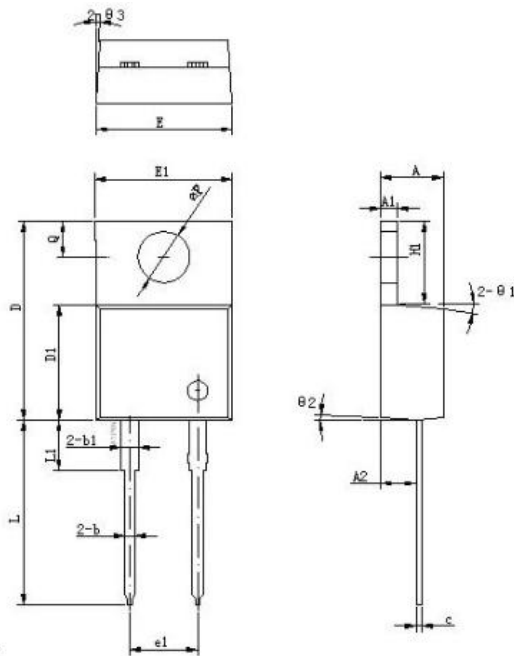
- China - Germany - Korea - Singapore - United States •
- <http://www.smc-diodes.com> - sales@smc-diodes.com •

Carrier Tape & Reel Specification D2PAK(TO-263-2)



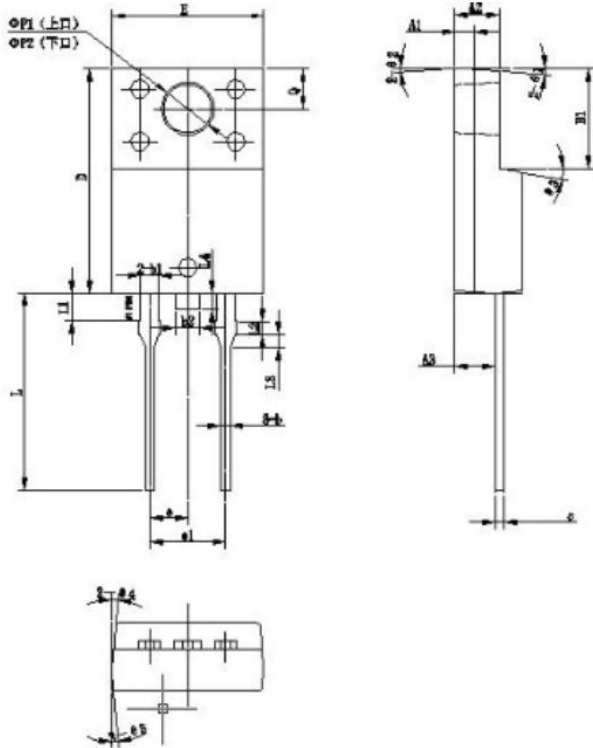
SYMBOL	Millimeters	
	Min.	Max.
A	10.70	10.90
B	16.03	16.23
C	5.11	5.31
d	1.45	1.65
E	1.65	1.85
F	11.40	11.60
P0	3.90	4.10
P	15.90	16.10
P1	1.90	2.10
W	23.90	24.30

Mechanical Dimensions TO-220AC(TO-220-2)



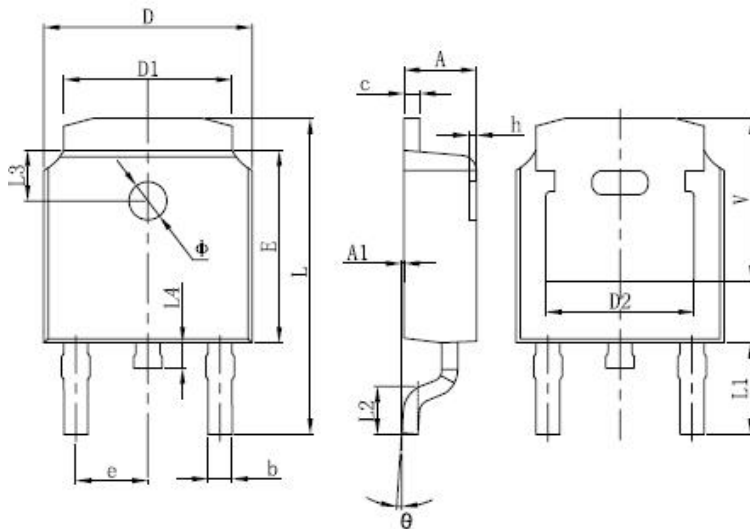
Symbol	Dimensions in millimeters		
	Min.	Typical	Max.
A	4.55	4.70	4.85
A1	1.17	1.27	1.37
A2	2.59	2.69	2.89
b	0.71	0.81	0.96
b1		1.27	
c	0.36	0.38	0.61
D	14.64	14.94	15.24
D1	8.55	8.70	8.90
E	10.01	10.16	10.31
E1	9.98	10.18	10.38
e1		5.08	
H1	6.04	6.24	6.44
L	13.00	13.86	14.08
L1		3.80	
ΦP	3.74	3.84	4.04
Q	2.54	2.74	2.94
Θ1		5°	
Θ2		4°	
Θ3		4°	

Mechanical Dimensions ITO-220AC(TO-220-2F)



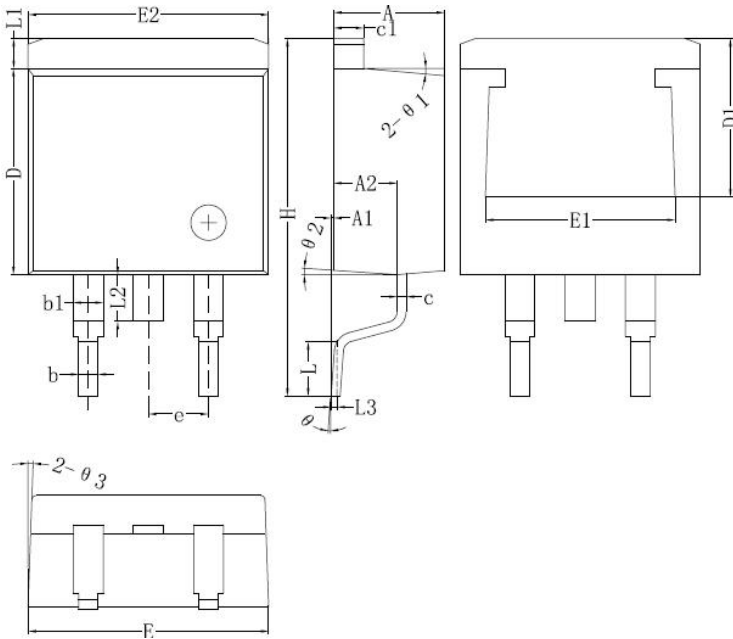
Symbol	Dimensions in millimeters		
	Min.	Typical	Max.
A	4.30	4.0	4.70
A1		1.30	
A2	2.80	3.00	3.20
A3	2.50	2.70	2.90
b	0.5	0.6	0.75
b1		1.20	
b2		1.60	
e	0.55	0.6	0.75
D	14.80	15.00	15.20
E	8.96	10.14	10.36
e		2.55	
e1		5.10	
H1	8.50	8.70	8.90
L	17.70	18.20	18.70
L1		1.80	
L2		1.00	
L3		0.80	
L4		1.10	
ΦP1(上口)	3.30	3.50	3.70
ΦP1(下口)	2.99	3.19	3.39
Q	2.50	2.70	2.90
Θ1		5°	
Θ2		4°	
Θ3		10°	
Θ4		5°	
Θ5		5°	

Mechanical Dimensions DPAK(TO-252-2)



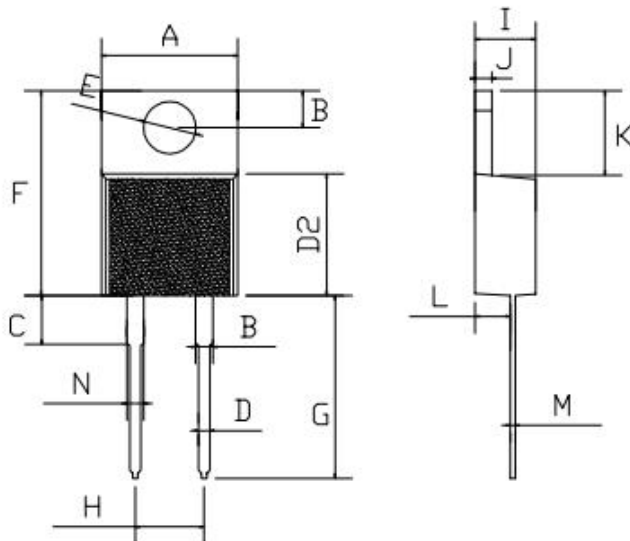
SYMBOL	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	2.20	2.40	0.086	0.094
A1	0	0.13	0	0.005
b	0.635	0.889	0.025	0.035
c	0.460	0.889	0.018	0.035
D	6.50	6.70	0.250	0.265
D1	4.95	5.46	0.195	0.215
D2	4.32 REF.		0.170 REF.	
E	6.00	6.20	0.235	0.245
e	2.286 BSC		0.090 BSC	
L	9.398	10.414	0.370	0.410
L1	1.778 REF.		0.108 REF.	
L2	1.40	1.78	0.055	0.07
L3	1.60 REF.		0.063 REF.	
L4	0.60	1.02	0.024	0.040
Φ	1.10	1.30	0.043	0.051
Θ	0°	10°	0°	10°
h	0	0.30	0	0.012
V	5.21 REF.		0.205 REF.	

Mechanical Dimensions D²PAK(TO-263-2)



Symbol	Dimensions in millimeters		
	Min.	Typical	Max.
A	4.55	4.70	4.85
A1	0	0.10	0.25
A2	2.59	2.69	2.89
b	0.71	0.81	0.96
b1		1.27	
c	0.36	0.38	0.61
c1	1.17	1.27	1.37
D	8.55	8.70	8.85
D1	6.40		
E	10.01	10.16	10.31
E1	7.6		
E2	9.98	10.08	10.18
e		2.54	
H	14.6	15.1	15.6
L	2.00	2.30	2.70
L1	1.17	1.27	1.40
L2			2.20
L3		0.25BSC	
Θ	0	-	8°
Θ1		5°	
Θ2		4°	
Θ3		4°	

Mechanical Dimensions TO-220-Isolation



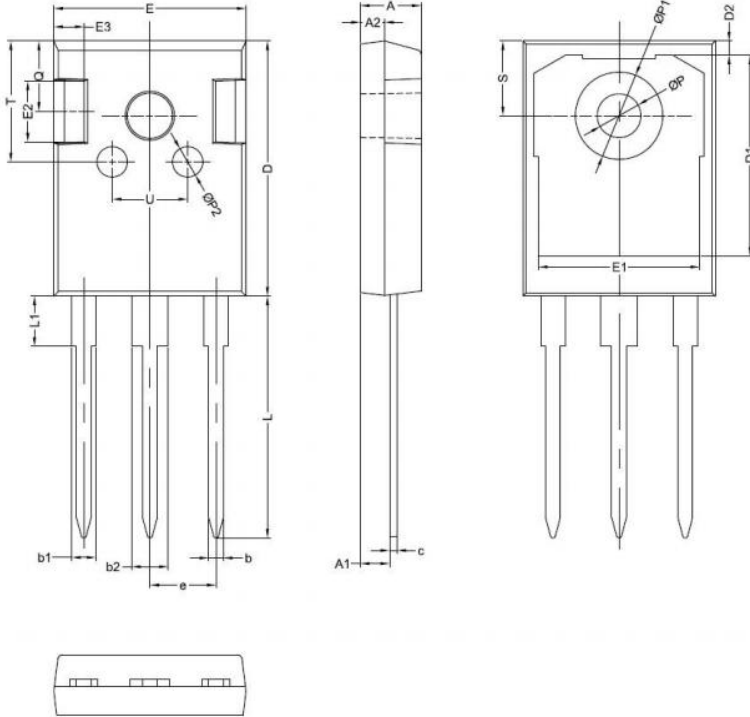
SYMBOL	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	9.7	10.4	0.381	0.409
B	2.5	3.0	0.098	0.118
C	3.5	3.9	0.137	0.153
D	0.7	0.92	0.027	0.036
E	3.72	3.95	0.146	0.155
F	14.51	15.55	0.571	0.612
G	12.95	13.9	0.509	0.547
H	4.95	5.19	0.194	0.204
I	4.38	4.65	0.172	0.183
J	1.15	1.36	0.045	0.053
K	5.86	6.38	0.230	0.251
L	2.35	2.85	0.092	0.112
M	0.32	0.58	0.012	0.022
N	1.18	1.42	0.046	0.055



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Mechanical Dimensions TO-247AD



SYMBOL	Millimeters		
	MIN.	TYP.	MAX.
A	4.80	5.00	5.20
A1	2.20	2.41	2.61
A2	1.90	2.00	2.10
b	1.10	1.20	1.40
b1	1.80	2.00	2.20
b2	2.80	3.00	3.20
c	0.50	0.60	0.75
D	20.30	21.00	21.20
D1		16.55	
D2		1.20	
E	15.45	15.80	16.00
E1		13.30	
E2		5.00	
E3		2.50	
e		5.44	
L	19.42	19.92	20.70
L1		4.13	
P	3.50	3.60	3.70
P1	7.1		7.40
P2		2.50	
Q		5.80	
S	6.05	6.15	6.25
T		10.00	
U		6.20	

S3D10065A
S3D10065F
S3D10065E
S3D10065G
S3D10065I
S3D10065D1



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