



Technical Data  
 Data Sheet N2568, REV.-



## S6D10065A/S6D10065F/S6D10065E/S6D10065G/S6D10065I/S6D10065D1 10A 650V SIC POWER SCHOTTKY RECTIFIERS

### Description

This 650V 10A diode is a high voltage Schottky rectifier that have very low total conduction losses and very stable switching characteristics over temperature extremes. The S6D10065A/S6D10065F/S6D10065E/S6D10065G/S6D10065I/S6D10065D1 are ideal for energy sensitive, high frequency applications in challenging environments.

### Features

- 175°C T<sub>J</sub> 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

S6D10065A	S6D10065F	S6D10065E	S6D10065G	S6D10065I	S6D10065D1
TO-220AC (TO-220-2)	ITO-220AC (TO-220-F2)	DPAK (TO-252-2)	D <sup>2</sup> PAK (TO-263-2)	TO-220- Isolation	TO-247AD TO-247-3



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**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	$I_{F(AV)1}$	$T_C=25^{\circ}C$	33	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, $T_C=25^{\circ}C$	48	A
	$I_{FRM2}$	10ms, Half Sine pulse, $T_C=110^{\circ}C$	25	A
Peak One Cycle Non-Repetitive Surge Current	$I_{FSM1}$	10ms, Half Sine pulse, $T_C=25^{\circ}C$	80	A
	$I_{FSM2}$	10ms, Half Sine pulse, $T_C=110^{\circ}C$	72	A
Non-Repetitive Peak Forward Surge Current	$I_{F,Max1}$	10 $\mu$ s. Pulse, $T_C=25^{\circ}C$	1250	A
	$I_{F,Max2}$	10 $\mu$ s. Pulse, $T_C=110^{\circ}C$	1100	A
Power Dissipation	$P_{tot1}$	$T_C=25^{\circ}C$	103	W
	$P_{tot2}$	$T_C=110^{\circ}C$	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 <sub>F1</sub>	@ 10A, Pulse, T <sub>J</sub> = 25 °C	1.35	1.50	V
	V <sub>F2</sub>	@ 10A, Pulse, T <sub>J</sub> = 175 °C	1.5	1.60	V
Reverse Current*	I <sub>R1</sub>	@V <sub>R</sub> = rated V <sub>R</sub> T <sub>J</sub> = 25 °C	0.7	40	uA
	I <sub>R2</sub>	@V <sub>R</sub> = rated V <sub>R</sub> T <sub>J</sub> = 175 °C	7	160	uA
Junction Capacitance	C <sub>T</sub>	V <sub>R</sub> =0V, T <sub>J</sub> =25°C, f=1MHz	769	-	pF
Reverse Recovery Charge	Q <sub>c</sub>	I <sub>F</sub> = 10A, di/dt = 200A/μs V <sub>R</sub> = 400 V, T <sub>J</sub> =25°C	47.91	-	nC
Capacitance Stored Energy	E <sub>c</sub>	V <sub>R</sub> = 400 V, T <sub>J</sub> =25°C	11.74	-	μJ

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

### Thermal-Mechanical Specifications:

Characteristics	Symbol	S6D10065A	S6D10065F	S6D10065E	S6D10065G	S6D10065I	S6D10065D1	Units
Junction Temperature	T <sub>J</sub>	-55 to +175						°C
Storage Temperature	T <sub>stg</sub>	-55 to +175						°C
Typical Thermal Resistance Junction to Case	R <sub>θJC</sub>	1.4	4	1.5	1.65	3.3	0.84(per leg) 0.42(both leg)	°C/W

### Ordering Information

Device	Package	Shipping
S6D10065A	TO-220AC(TO-220-2)	50pcs / tube
S6D10065F	ITO-220AC(TO-220-F2)	50pcs / tube
S6D10065E	DPAK(TO-252-2)	2500pcs / reel
S6D10065G	D2PAK(TO-263-2)	800pcs / reel
S6D10065I	TO-220-Isolation	50pcs / tube
S6D10065D1	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**

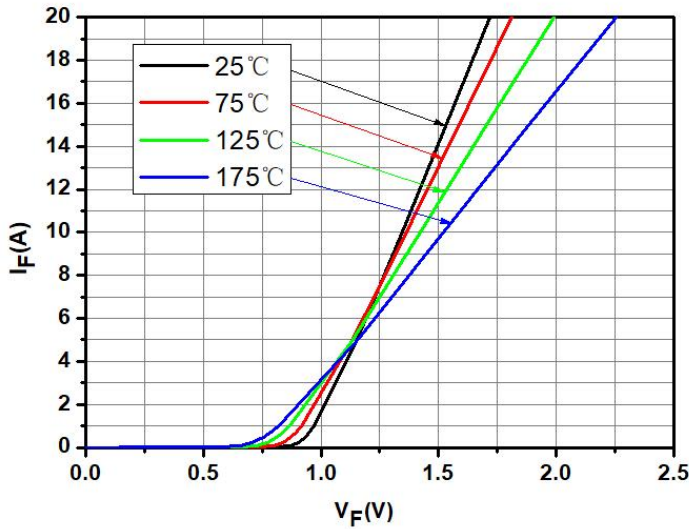


Fig.1-Typical Forward Voltage Characteristics

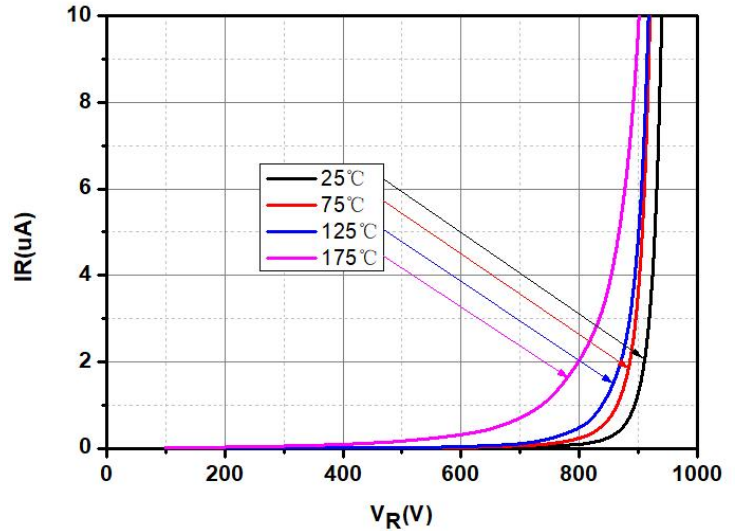


Fig.2-Typical Reverse Characteristics

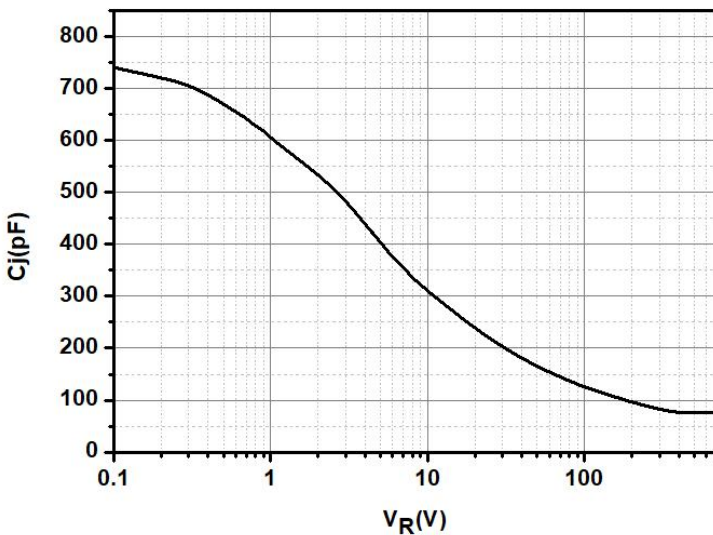


Fig.3-Capacitance vs. Reverse Voltage

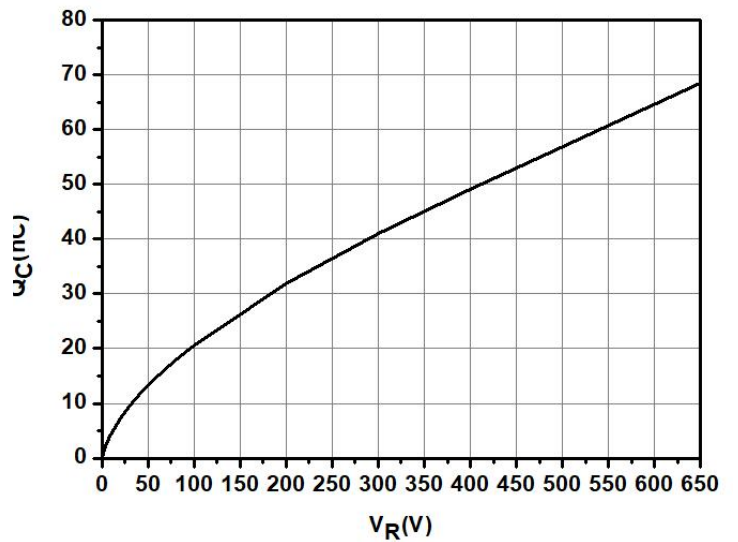


Fig.4-Total Capacitance Charge vs. Reverse Voltage

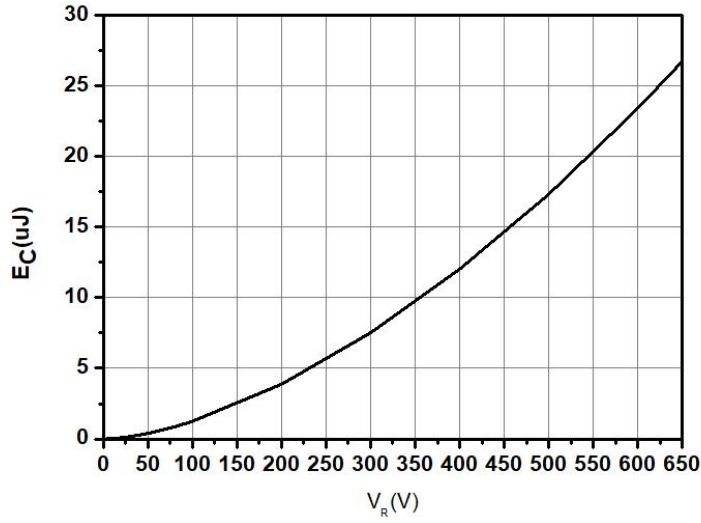


Fig.5-Capacitance Stored Energy

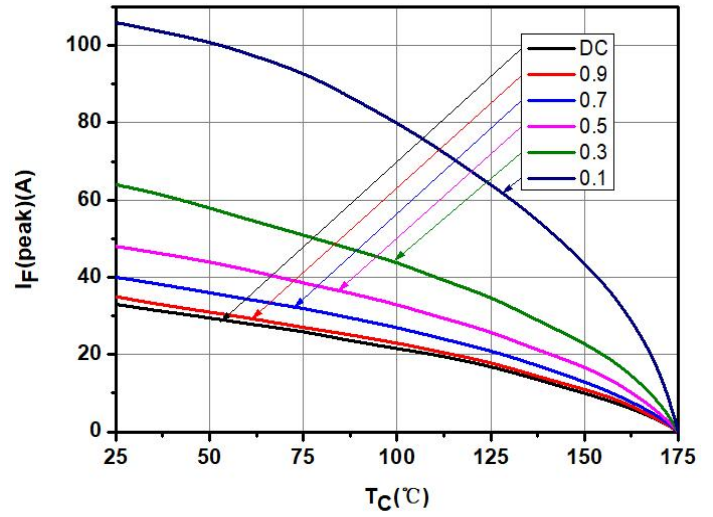


Fig.6-Current Derating

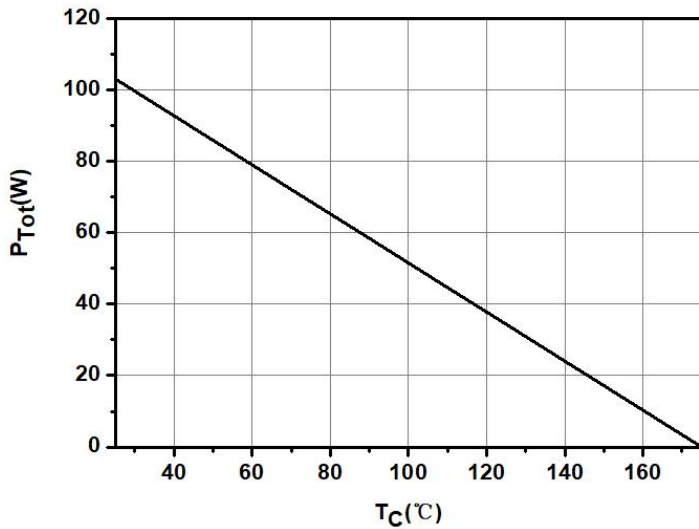


Fig.7-Power Derating

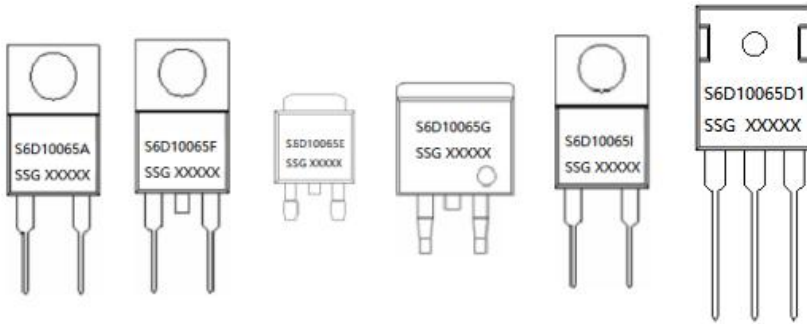
S6D10065A  
 S6D10065F  
 S6D10065E  
 S6D10065G  
 S6D10065I  
 S6D10065D1



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### Marking Diagram

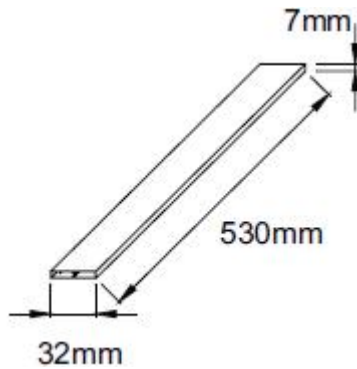


Where XXXXX is YYWWL

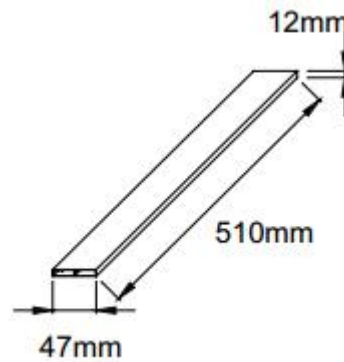
S6D = Device Type  
 A/F/E/G/I/D1 = Package type  
 10 = Forward Current (10A)  
 065 = Reverse Voltage (650V)  
 SSG = SSG  
 YY = Year  
 WW = Week  
 L = Lot Number

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

### Tube Specification

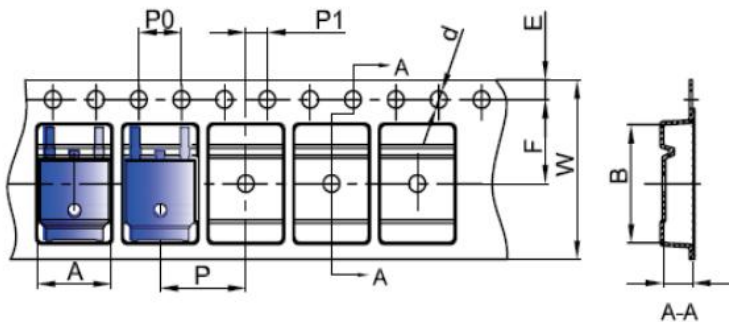


(TO-220-2/TO-220-F2/TO-220-Isolation)



(TO-247-3)

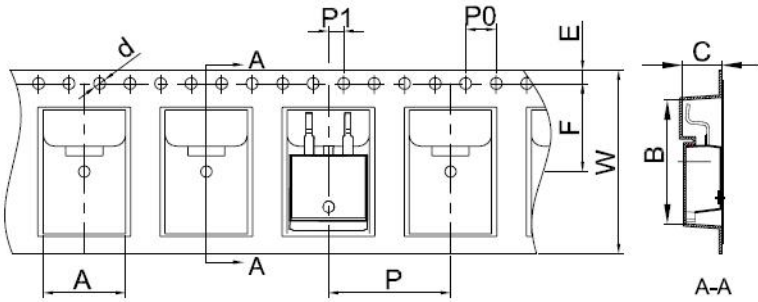
### Carrier Tape & Reel Specification DPAK(TO-252-2)



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

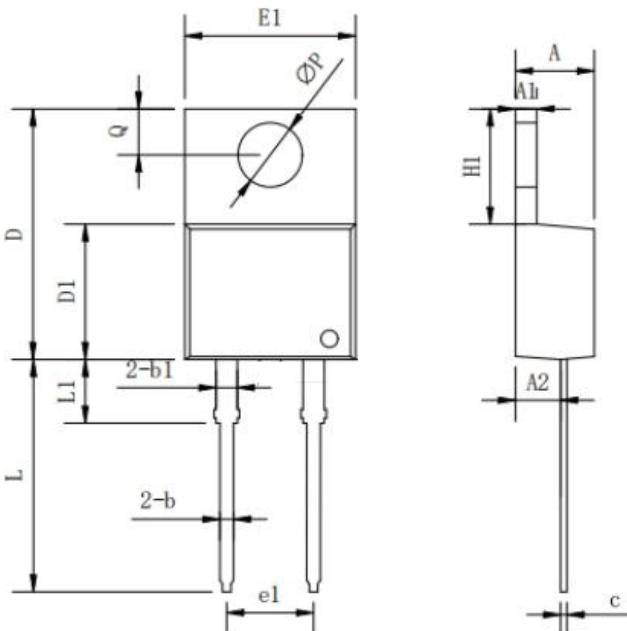
- China - Germany - Korea - Singapore - United States •
- <http://www.smc-diodes.com> - [sales@smc-diodes.com](mailto:sales@smc-diodes.com) •

**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

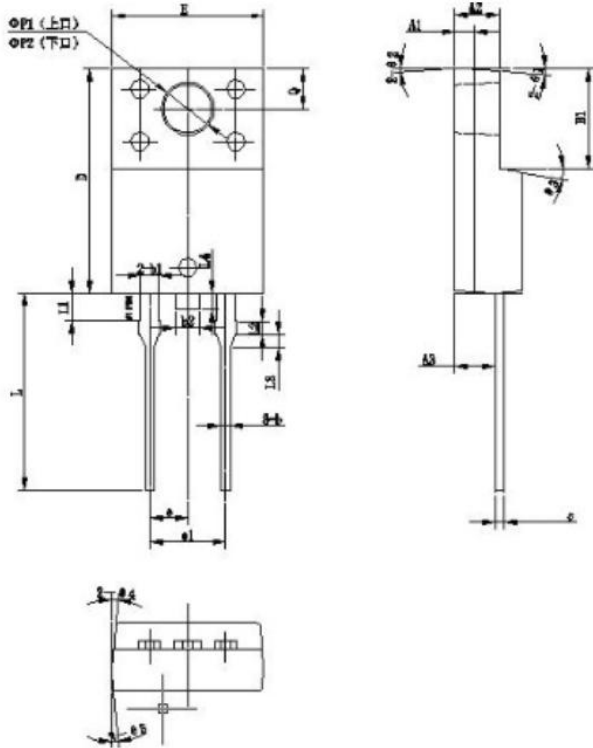
**Mechanical Dimensions TO-220AC(TO-220-2)**



Symbol	Dimensions in millimeters		
	Min.	Typical	Max.
A	3.56	-	4.83
A1	0.51	-	1.40
A2	2.03	-	2.92
b	0.38	-	1.02
b1	1.14	-	1.78
c	0.31	-	0.61
D	14.22	-	16.51
D1	8.38	-	9.42
E1	9.65	10.16	10.67
e1	-	5.08	-
H1	5.84	-	6.86
L	12.70	-	14.73
L1	-	-	6.35
ΦP	-	3.56	-
Q	2.54	-	3.43

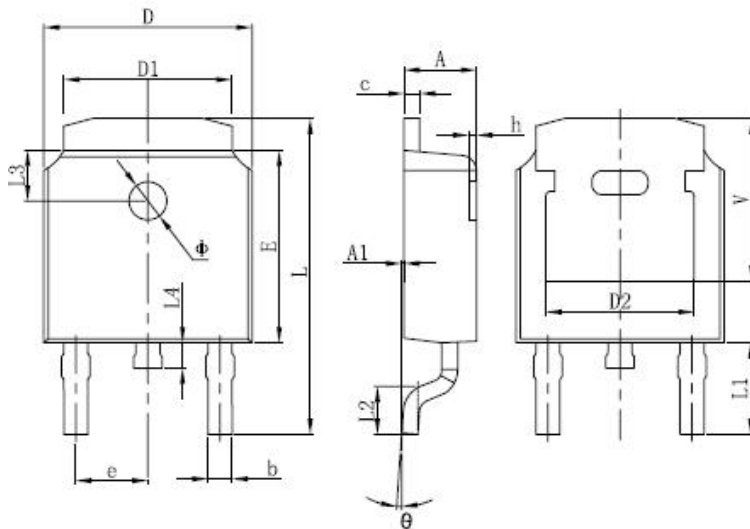


**Mechanical Dimensions ITO-220AC(TO-220-2F)**



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°	

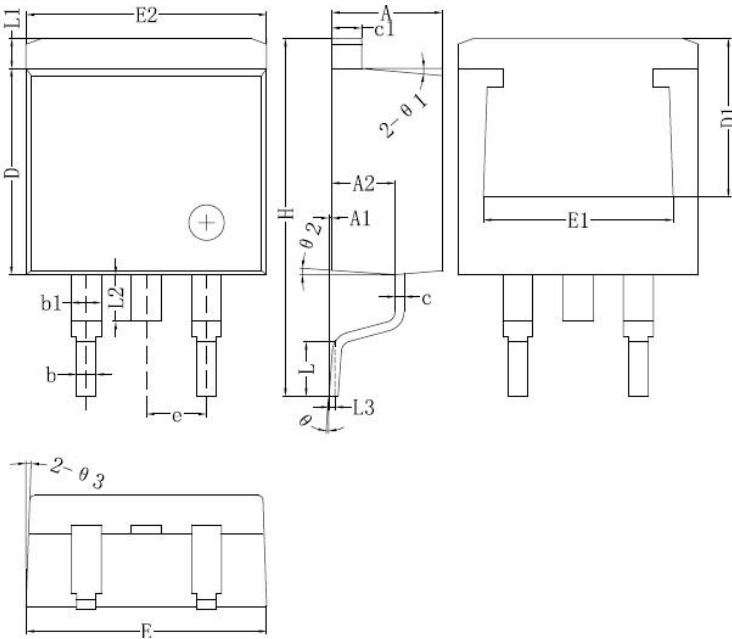
**Mechanical Dimensions DPAK(TO-252-2)**



SYMBOL	Dimensions in millimeters		
	Min.	Typ.	Max.
A	2.18	-	2.39
A1	-	-	0.13
b	0.64	-	0.89
c	0.46	-	0.89
D	6.35	-	6.73
D1	4.95	-	5.46
D2	4.32	-	-
E	5.97	6.10	6.22
e	2.29BSC		
L	9.40	-	10.41
L1	2.90 REF.		
L2	1.40	1.52	1.78
L4	-	-	1.02
Φ	1.1	-	1.3
Θ	0°	-	10°
V	5.21	-	-

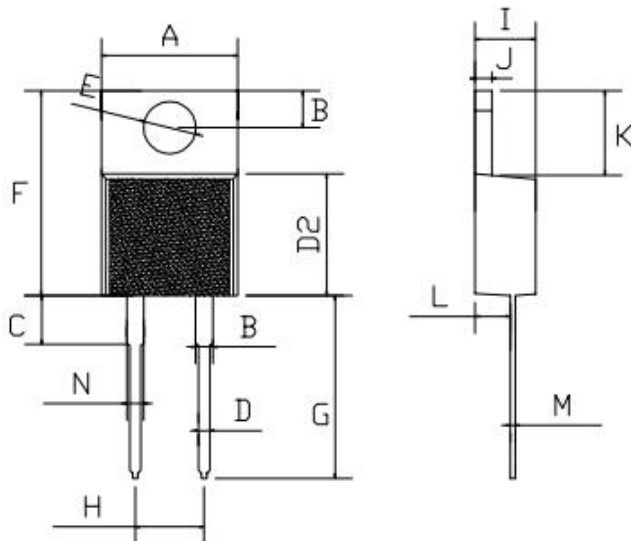


**Mechanical Dimensions D<sup>2</sup>PAK(TO-263-2)**



Symbol	Dimensions in millimeters	
	Min.	Max.
A	4.06	4.83
A1	0	0.26
b	0.51	0.99
b1	1.14	1.78
c	0.31	0.74
c1	1.14	1.65
D	8.38	9.65
D1	6.4	
E1	6.22	
E2	9.65	10.67
e	2.54BSC	
H	14.6	15.88
L	1.78	2.8
L1	-	1.68
L2	-	2.2
L3	0.255BSC	
Θ	0	8°

**Mechanical Dimensions TO-220-Isolation**



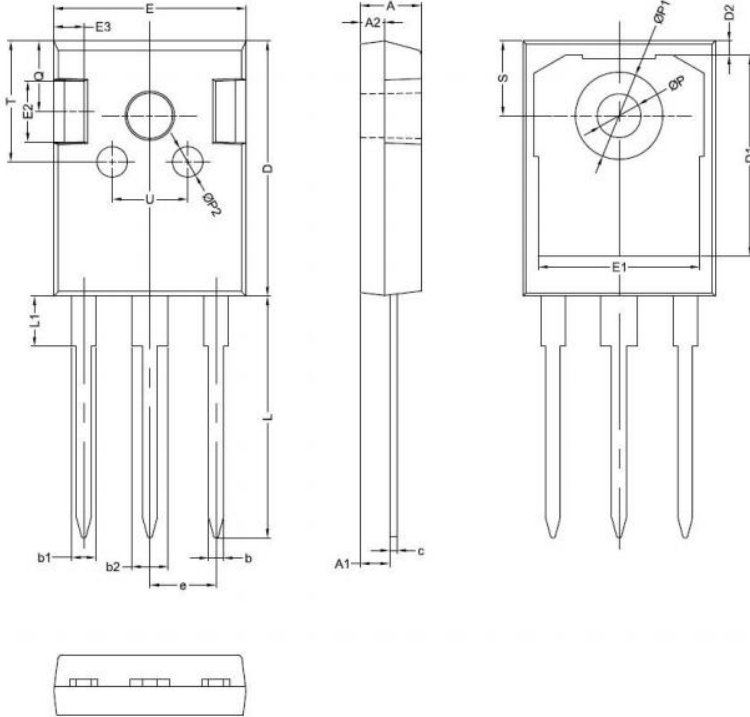
SYMBOL	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	9.7	10.4	0.381	0.409
B	2.5	3.0	0.098	0.118
C	3.5	3.9	0.137	0.153
D	0.7	0.92	0.027	0.036
E	3.72	3.95	0.146	0.155
F	14.51	15.55	0.571	0.612
G	12.95	13.9	0.509	0.547
H	4.95	5.19	0.194	0.204
I	4.38	4.65	0.172	0.183
J	1.15	1.36	0.045	0.053
K	5.86	6.38	0.230	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	

S6D10065A  
S6D10065F  
S6D10065E  
S6D10065G  
S6D10065I  
S6D10065D1



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