

## S3D03065A/S3D03065F/S3D03065E/S3D03065I 3A 650V SIC POWER SCHOTTKY RECTIFIERS

### Description


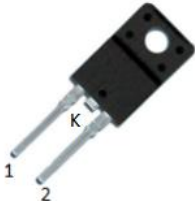
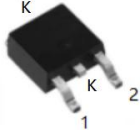



This 650V 3A diode is high voltage Schottky rectifier that has very low total conduction losses and very stable switching characteristics over temperature extremes. The S3D03065A/S3D03065F/S3D03065E/S3D03065I are ideal for energy sensitive, high frequency applications in challenging environments.

### 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
- “-A” is an AEC-Q101 qualified device
- 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

S3D03065A	S3D03065F	S3D03065E	S3D03065I
			
TO-220AC (TO-220-2)	ITO-220AC (TO-220-F2)	DPAK (TO-252-2)	TO-220-Isolation
			

**Maximum Ratings@T<sub>A</sub>=25°C unless otherwise specified**

Characteristics	Symbol	Condition	Max.	Units
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	V <sub>RRM</sub> V <sub>RWM</sub> V <sub>DC</sub>	-	650	V
Average Rectified Forward Current	I <sub>F(AV)1</sub>	T <sub>c</sub> =25°C	17	A
	I <sub>F(AV)2</sub>	T <sub>c</sub> =135°C	8	A
	I <sub>F(AV)3</sub>	T <sub>c</sub> =165°C	3	A
Repetitive Peak Forward Surge Current	I <sub>FRM1</sub>	10ms, Half Sine pulse, T <sub>c</sub> =25°C	16	A
	I <sub>FRM2</sub>	10ms, Half Sine pulse, T <sub>c</sub> =110°C	14	A
Peak One Cycle Non-Repetitive Surge Current	I <sub>FSM1</sub>	10ms, Half Sine pulse, T <sub>c</sub> =25°C	27	A
	I <sub>FSM2</sub>	10ms, Half Sine pulse, T <sub>c</sub> =110°C	25	A
Non-Repetitive Peak Forward Surge Current	I <sub>F,Max1</sub>	10µs. Pulse, T <sub>c</sub> =25°C	390	A
	I <sub>F,Max2</sub>	10µs. Pulse, T <sub>c</sub> =110°C	265	A
Power Dissipation	P <sub>tot1</sub>	T <sub>c</sub> =25°C	89	W
	P <sub>tot2</sub>	T <sub>c</sub> =110°C	39	W
TO-220 Mounting Torque		M3 Screw	1	Nm
		6-32 Screw	8.8	bf-in

**Electrical Characteristics@T<sub>A</sub>=25°C unless otherwise specified**

Characteristics	Symbol	Condition	Typ.	Max.	Units
Forward Voltage Drop*	V <sub>F1</sub>	@ 3A, Pulse, T <sub>J</sub> = 25 °C	1.4	1.7	V
	V <sub>F2</sub>	@ 3A, Pulse, T <sub>J</sub> = 175 °C	1.6	2.0	V
Reverse Current*	I <sub>R1</sub>	@V <sub>R</sub> = rated V <sub>R</sub> T <sub>J</sub> = 25 °C	0.03	2	µA
	I <sub>R2</sub>	@V <sub>R</sub> = rated V <sub>R</sub> T <sub>J</sub> = 175 °C	0.3	20	µA
Junction Capacitance	C <sub>T</sub>	V <sub>R</sub> =0V, T <sub>J</sub> =25°C, f=1MHz	230	-	pF
Reverse Recovery Charge	Q <sub>c</sub>	I <sub>F</sub> = 3A, di/dt = 200A/µs V <sub>R</sub> = 400 V, T <sub>J</sub> =25°C	14.35	-	nC
Capacitance Stored Energy	E <sub>c</sub>	V <sub>R</sub> = 400 V, T <sub>J</sub> =25°C	3.51	-	µJ

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



S3D03065A  
S3D03065F  
S3D03065E  
S3D03065I

Technical Data  
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**Thermal-Mechanical Specifications@T<sub>A</sub>=25°C unless otherwise specified**

Characteristics	Symbol	S3D03065A	S3D03065F	S3D03065E	S3D03065I	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>	1.7	4	1.5	3.3	°C/W

**Ordering Information**

Device	Package	Shipping
S3D03065A	TO-220AC(TO-220-2)	50pcs / tube
S3D03065F	ITO-220AC(TO-220-F2)	50pcs / tube
S3D03065E	DPAK(TO-252-2)	2500pcs / reel
S3D03065ETR	DPAK(TO-252-2)	2500pcs / reel
S3D03065I	TO-220-Isolation	50pcs / tube
S3D03065A-A	TO-220AC(TO-220-2)	50pcs / tube
S3D03065F-A	ITO-220AC(TO-220-F2)	50pcs / tube
S3D03065E-A	DPAK(TO-252-2)	2500pcs / reel
S3D03065I-A	TO-220-Isolation	50pcs / 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**

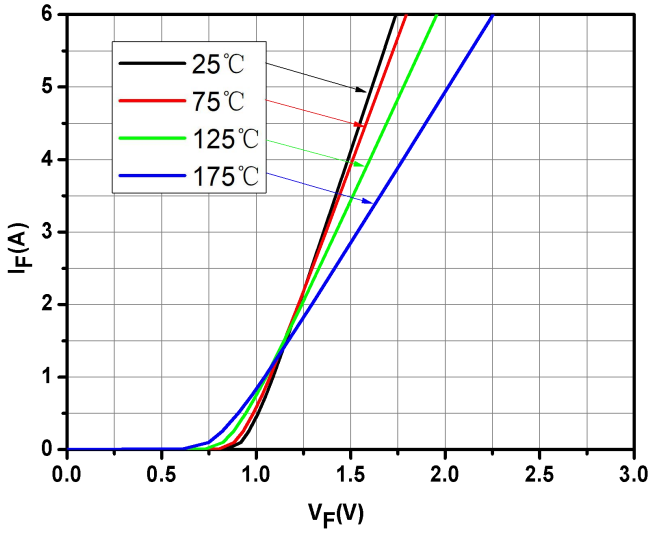


Fig.1-Typical Forward Voltage Characteristics

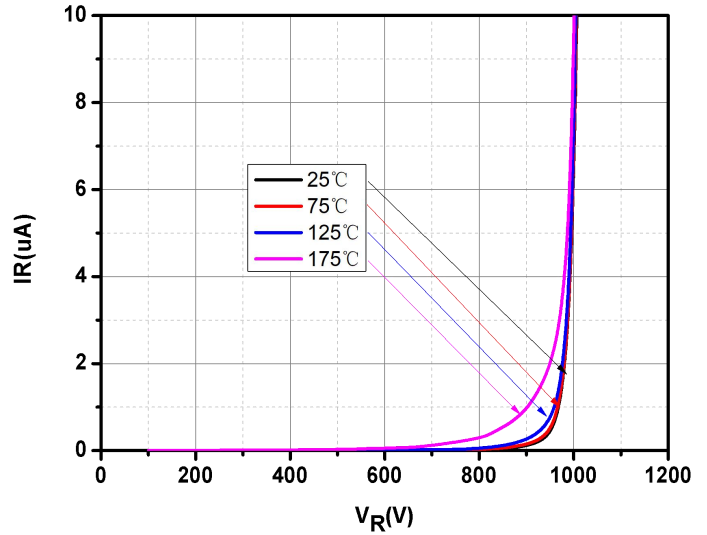


Fig.2-Typical Reverse Characteristics

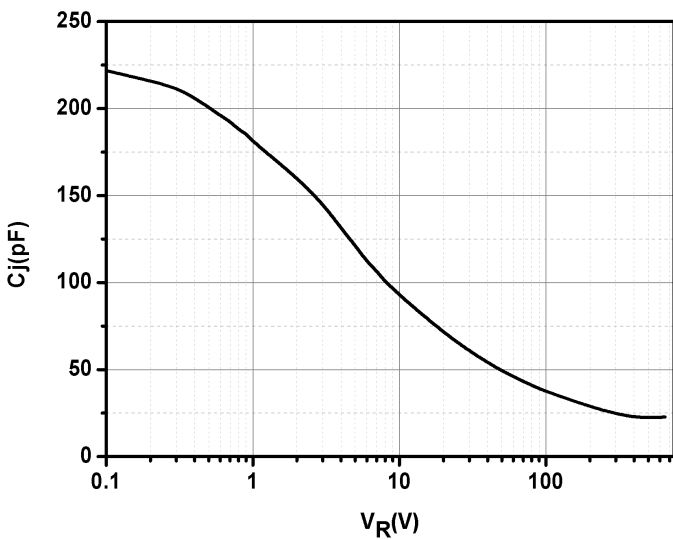


Fig.3-Capacitance vs. Reverse Voltage

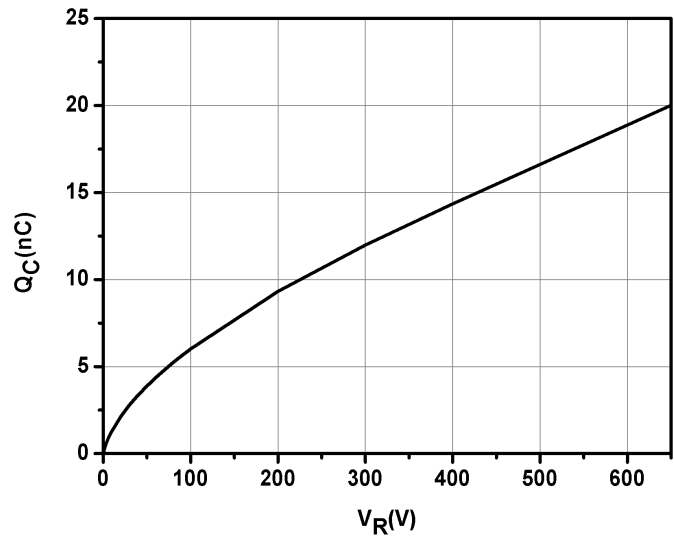


Fig.4-Total Capacitance Charge vs. Reverse Voltage

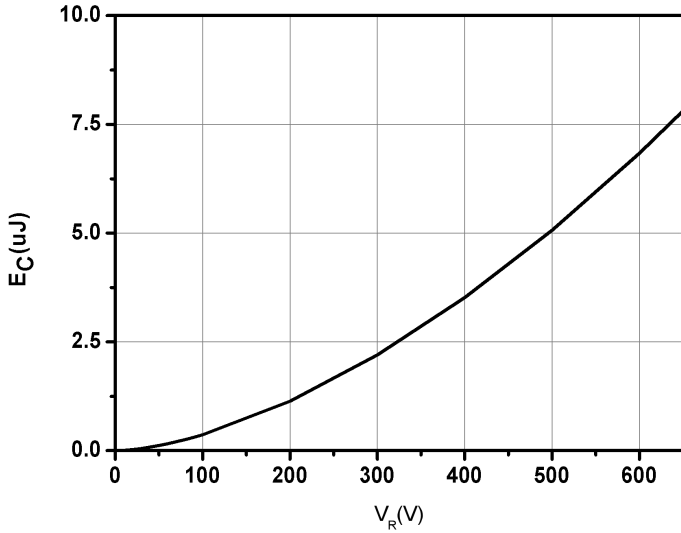


Fig.5-Capacitance Stored Energy

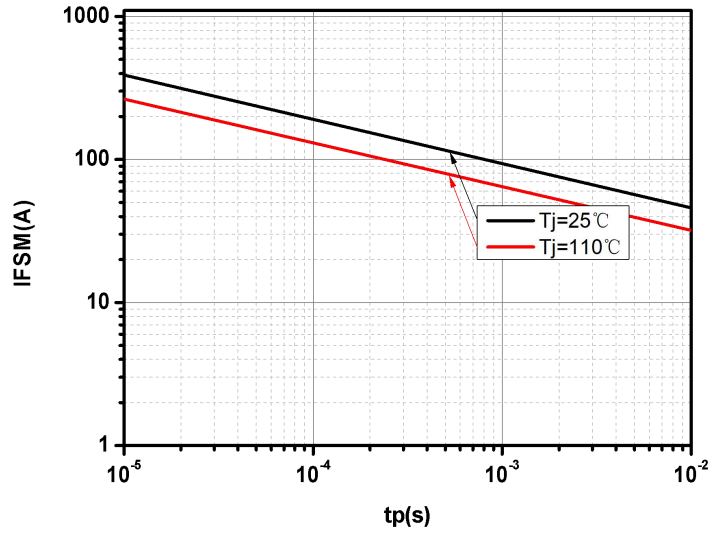


Fig.6-Non-repetitive peak forward surge current versus pulse duration (sinusoidal waveform)

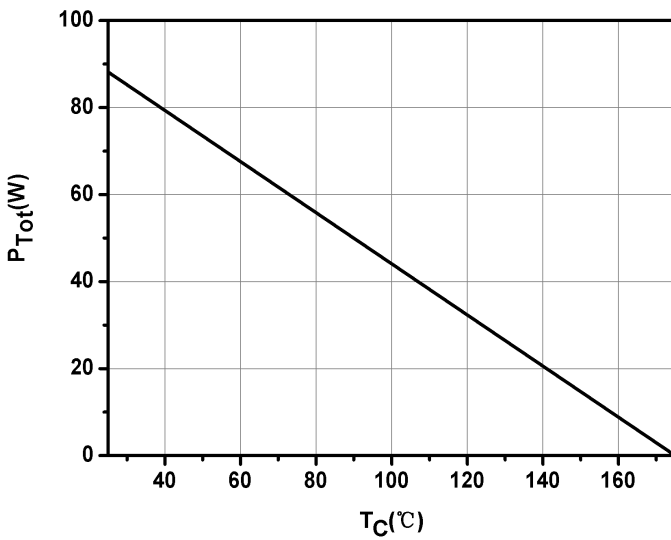


Fig.7-Power Derating

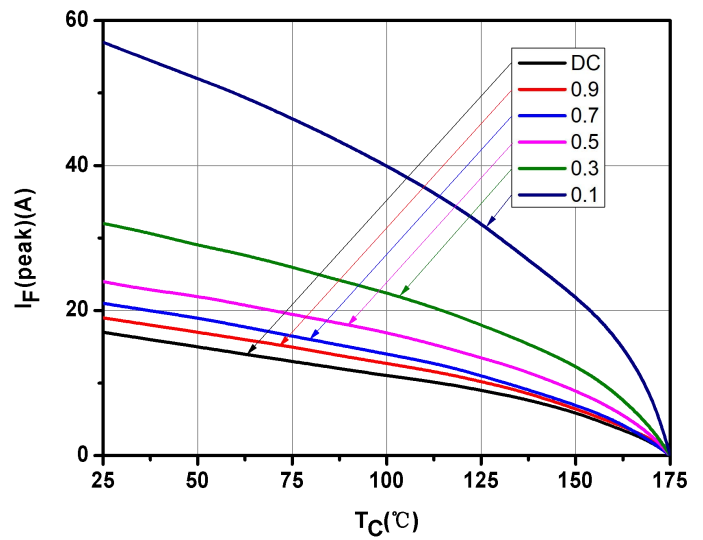
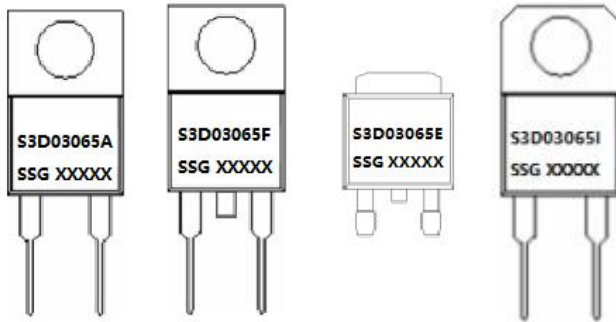


Fig.8-Current Derating

## Marking Diagram

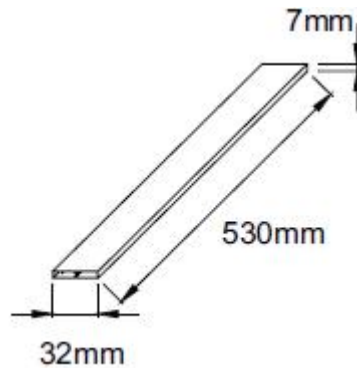


Where XXXXX is YYWWL

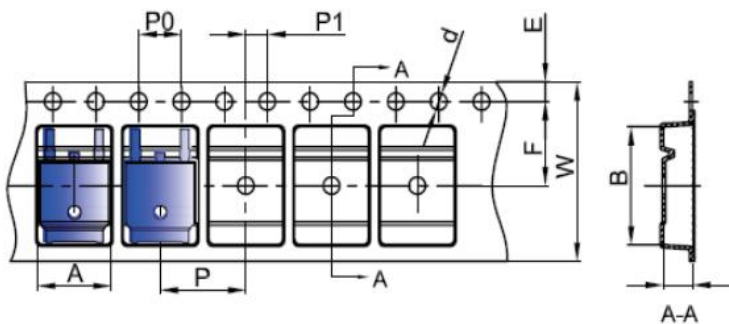
S3D = Device Type  
A/F/E/I = Package type  
03 = Forward Current (3A)  
065 = Reverse Voltage (650V)  
SSG = SSG  
YY = Year  
WW = Week  
L = Lot Number

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

## Tube Specification(TO-220-2/TO-220-F2/TO-220-Isolation)

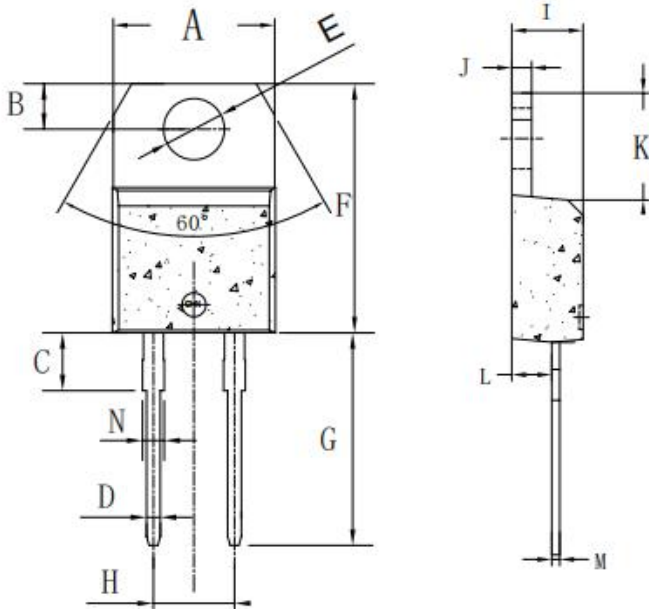


## Carrier Tape & Reel Specification DPAK(TO-252-2)



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

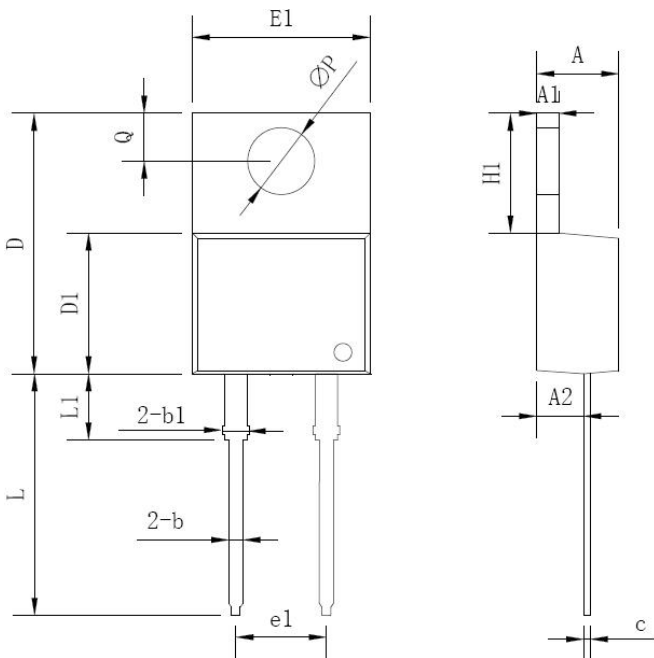
**Mechanical Dimensions TO-220-Isolation**



Symbol	Dimensions in millimeters		
	Min.	Typical	Max.
A	9.7	-	10.4
B	2.65	-	3.1
C	2.8	-	4.2
D	0.7	-	0.92
E	3.75	-	3.95
F	14.8	-	16.1
G	13.05	-	13.6
H	4.9	-	5.3
I	4.38	-	4.61
J	1.15	-	1.36
K	5.85	-	6.82
L	2.35	-	2.75
M	0.35	-	0.65
N	1.18	-	1.42

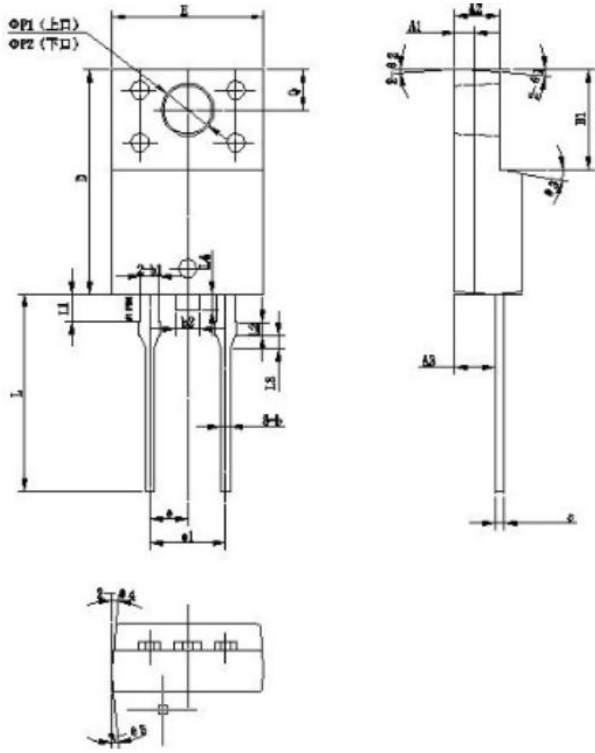
Notes: New Mechanical Dimensions is performed from date code 25041.

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



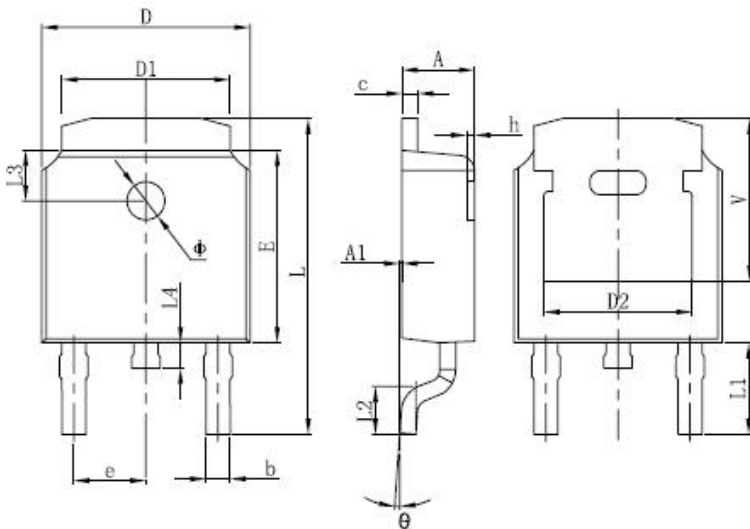
Symbol	Dimensions in millimeters		
	Min.	Typical	Max.
A	3.56	-	4.83
A1	0.51	-	1.40
A2	2.03	-	2.92
b	0.38	-	1.02
b1	1.14	-	1.78
c	0.31	-	0.61
D	14.22	-	16.51
D1	8.38	-	9.42
E1	9.65	10.16	10.67
e1	-	5.08	-
H1	5.84	-	6.86
L	12.70	-	14.73
L1	-	-	6.35
ΦP	-	3.56	-
Q	2.54	-	3.43

**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
e1		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	6.1	6.22
e		2.29BSC	
L	9.4	-	10.41
L1		2.90 REF.	
L2	1.4	1.52	1.78
L3		1.60 REF.	
L4	-	-	1.02
Φ	1.1	-	1.3
Θ	0°	-	10°
V	5.21	-	-



**Technical Data**  
**Data Sheet N2362, REV.F**



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