

1N4454-1, 1N4454UR-1 1N4454UB, UBCA, UBCC, UBD

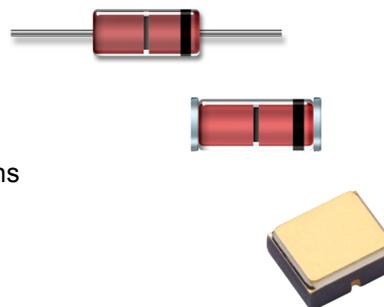


Silicon Switching Diode

Rev. V1

Features

- Available in JAN, JANTX, and JANTXV per MIL-PRF-19500/144
- Metallurgically Bonded, Hermetically Sealed Glass Packages
- DO-35 and DO-213AA
- Ceramic Surface Mount UB, UBCA, UBCC and UBD Configurations
- Ideal for Military and Hi-Reliability, High Speed Switching Applications



Absolute Maximum Ratings ($T_A = +25^\circ\text{C}$ unless otherwise specified)

Ratings	Symbol	Value
Breakdown Voltage	V_{BR}	75 V dc
Working Peak Reverse Voltage	V_{RWM}	50 V (pk)
Operating Current ^{(1) (2)}	$I_{O(PCB)}$	200 mA dc
Peak Surge Current (8.3 ms)	I_{FSM}	2.0 A (pk)
Junction & Storage Temperature Range 1N4454-1, 1N4454UR-1 1N4454UB, UBCA, UBCC, UBD	T_J, T_{STG}	-55°C to +175°C -55°C to +200°C

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Electrical Specifications @ $T_A = +25^\circ\text{C}$ (unless otherwise specified)

Parameter	Test Conditions	Symbol	Units	Min.	Max.
Forward Voltage	$I_F = 10 \text{ mA dc}$	V_{F1}	V dc	—	.8
Breakdown Voltage	$I_R = 5 \mu\text{A dc}$	V_{BR1}	V dc	50	—
Reverse Current	$V_R = 50 \text{ V dc}$	I_{R1}	nA dc		100
Reverse Current	$T_A = +150^\circ\text{C}; V_R = 50 \text{ V dc}$	I_{R2}	$\mu\text{A dc}$		100
Forward Voltage	$T_A = +150^\circ\text{C}; I_F = 10 \text{ mA dc}$	V_{F2}	V dc	—	.7
Breakdown Voltage	$T_A = -55^\circ\text{C}; I_R = 10 \mu\text{A dc}$	V_{BR2}	V dc	75	—
Capacitance	$V_R = 0 \text{ V dc}; f = 1 \text{ MHz}; V_{\text{sig}} = 50 \text{ mV}_{\text{p-p max}}$	C	pF		2.0
Reverse Recovery Time	$I_F = I_{RM} = 10 \text{ mA dc}$	t_{rr}	ns		4

Thermal Characteristics

Types	Symbol	Max. Value
Thermal Resistance Junction to Ambient ^{(2) (3) (4)}	$R_{\theta JA}$	325 °C/W
Thermal Resistance Junction to Lead ⁽³⁾ L = 3/8 inch (9.53 mm)	$R_{\theta JL}$	250 °C/W
Thermal Resistance Junction to End Cap ⁽³⁾	$R_{\theta JEC}$	100 °C/W
Thermal Resistance Junction to Solder Pad ^{(3) (4)}	$R_{\theta JSP}$	120 °C/W

- (1) For temperature-current derating curve see figure 5.
- (2) $T_A = +75^\circ\text{C}$ for both axial and metal electrode leadless face diodes (MELF) (UR) on printed circuit board (PCB), PCB = FR4-.0625 inch (1.59 mm) 1-layer 1-Oz Cu, horizontal, in still air; pads for (UR) = 0.61 inch (1.55 mm) x .105 inch (2.67 mm); pads for axial = .092 inch (2.34 mm) diameter, strip = .030 inch (0.76 mm) x 1 inch (25.4 mm) long, lead length $L \leq .187 \text{ inch} (< 4.75 \text{ mm})$; $R_{\theta JA}$ with a defined PCB thermal resistance condition included, is measured at $I_O = 200 \text{ mA dc}$.
- (3) See figures 7, 8 and 9 for thermal impedance curves.
- (4) $R_{\theta JSP}$ refers to thermal resistance from junction to the solder pads of the UB package

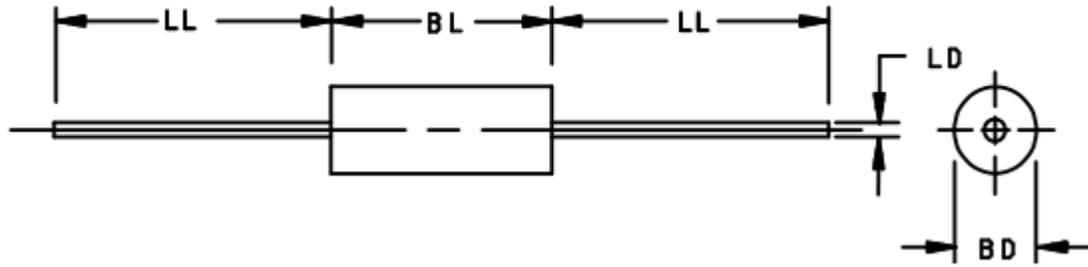
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Outline Drawing (DO-34)



Types	Symbol	Dimensions			
		Inches		Millimeters	
		Min	Max	Min	Max
1N4532 (DO-34)	BD	.050	.075	1.27	1.91
	BL	.080	.120	2.03	3.05
	LD	.018	.022	0.46	0.56
	LL	1.000	1.500	25.40	38.10

NOTES:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. In accordance with ASME Y14.5M, diameters are equivalent to Φ x symbology.

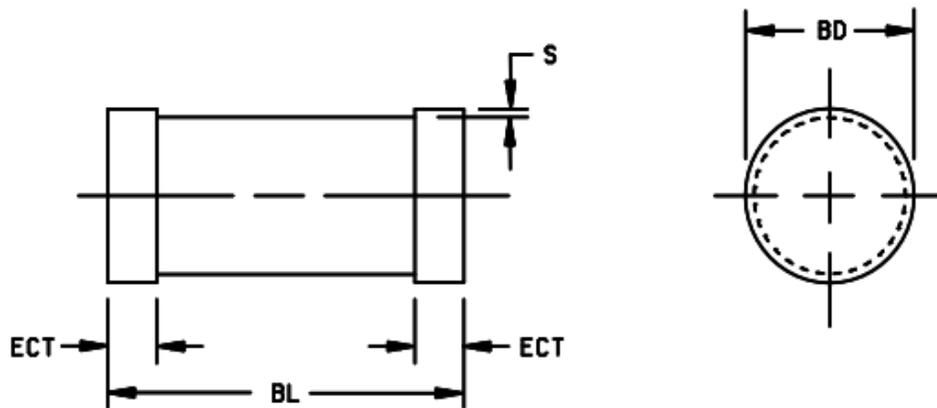
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Silicon Switching Diode

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Outline Drawing (DO-213AA)



Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
BD	.063	.067	1.60	1.70
BL	.130	.146	3.30	3.70
ECT	.016	.022	0.41	0.55
S	.001 min		0.03 min	

NOTES:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Dimensions are pre-solder dip.
4. Referencing to dimension S, minimum clearance of glass body to mounting surface on all orientations.
5. In accordance with ASME Y14.5M, diameters are equivalent to Φx symbology.

FIGURE 2. Physical dimensions for type 1N4454UR-1 (DO-213AA).

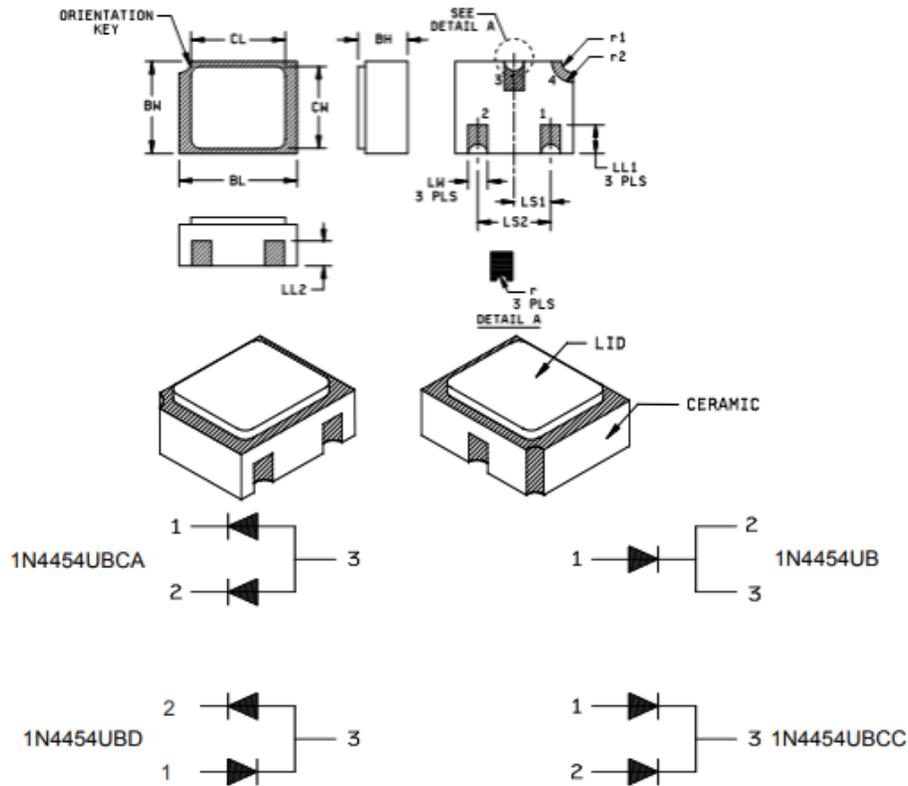
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Silicon Switching Diode

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Outline Drawing (UB)



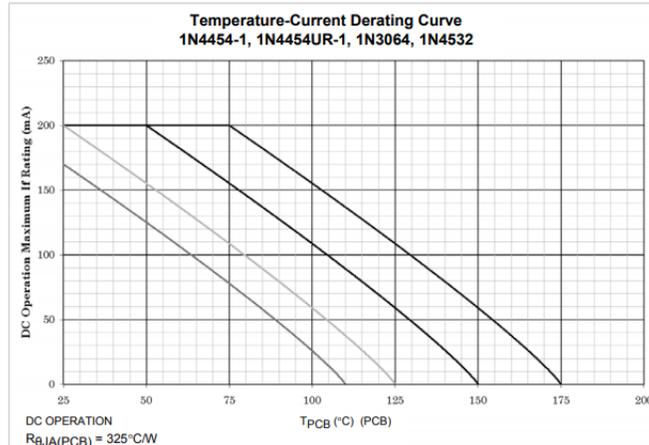
Symbol	Dimensions				Symbol	Dimensions			
	Inches		Millimeters			Inches		Millimeters	
	Min	Max	Min	Max		Min	Max	Min	Max
BH	.046	.056	1.17	1.42	LS1	.035	.039	0.89	0.99
BL	.115	.128	2.92	3.25	LS2	.071	.079	1.80	2.01
BW	.085	.108	2.16	2.74	LW	.016	.024	0.41	0.61
CL		.128		3.25	r		.008		0.20
CW		.108		2.74	r1		.012		0.31
LL1	.022	.038	0.56	0.97	r2		.022		0.56
LL2	.017	.035	0.43	0.89					

NOTES:

1. Dimensions are in inches. Millimeters are given for general information only.
2. Ceramic package only.
3. Hatched areas on package denote metallized areas. Pad 4 = shielding, connected to the lid.
4. In accordance with ASME Y14.5M, diameters are equivalent to ϕ x symbology.

FIGURE 3. Physical dimensions, surface mount (UB version).

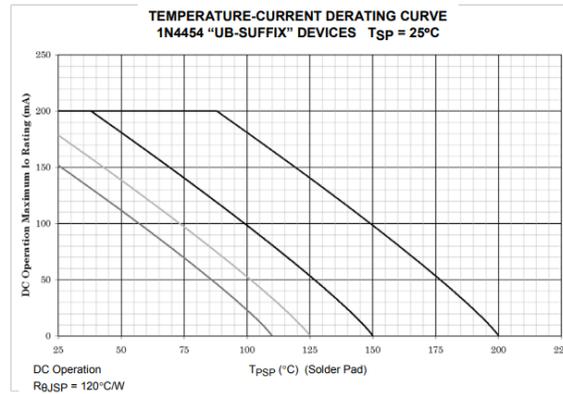
Graphs



NOTES:

1. All devices are capable of operating at $\leq T_J$ specified on this curve. Any parallel line to this curve will intersect the appropriate power for the desired maximum T_J allowed.
2. Derate design curve constrained by the maximum junction temperature ($T_J \leq 175^\circ\text{C}$) and current rating specified. (See 1.3.)
3. Derate design curve chosen at $T_J \leq 150^\circ\text{C}$, where the maximum temperature of electrical test is performed.
4. Derate design curves chosen at $T_J \leq 125^\circ\text{C}$, and 110°C to show current rating where most users want to limit T_J in their application.

FIGURE 5. Temperature-current derating graph (axial and MELF).



NOTES:

1. This is the true inverse of the worst case thermal resistance value. All devices are capable of operating at $\leq T_J$ specified on this curve. Any parallel line to this curve will intersect the appropriate current for the desired maximum T_J allowed.
2. Derate design curve constrained by the maximum junction temperature ($T_J \leq +200^\circ\text{C}$) and current rating specified. (See 1.3.)
3. Derate design curve chosen at $T_J \leq +150^\circ\text{C}$, where the maximum temperature of electrical test is performed.
4. Derate design curves chosen at $T_J \leq +125^\circ\text{C}$, and $+110^\circ\text{C}$ to show current rating where most users want to limit T_J in their application.

FIGURE 6. Temperature-current derating graph ("UB-suffix" devices).

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Graphs

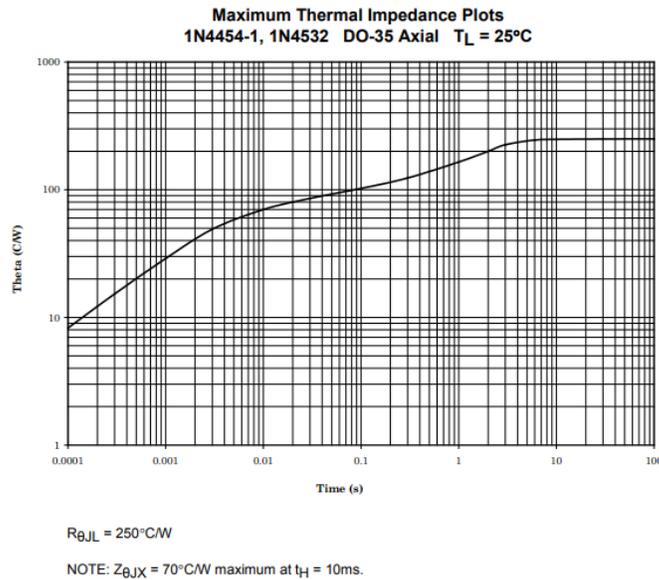


FIGURE 7. Thermal impedance (axial leads).

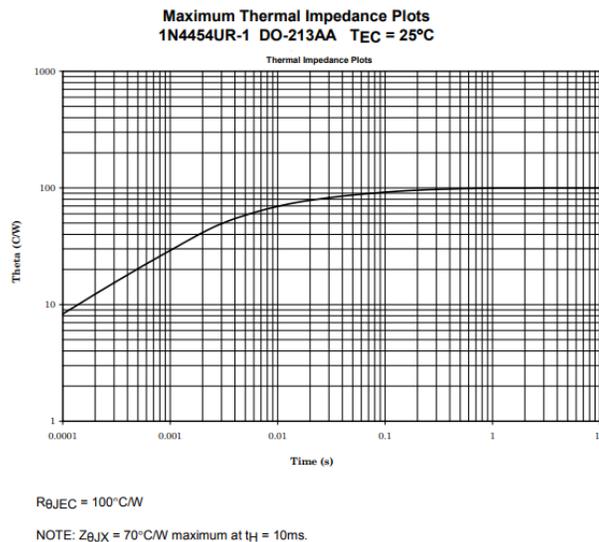


FIGURE 8. Thermal impedance (MELF surface mount).

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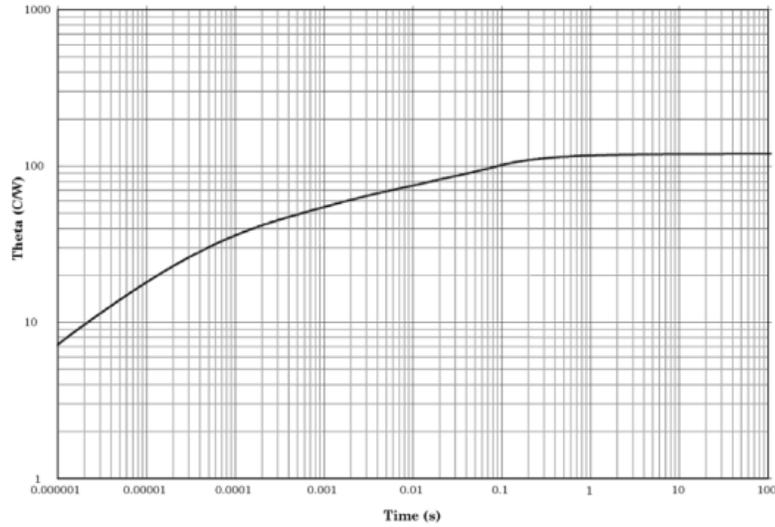


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Graphs

Maximum Thermal Impedance Plots
1N4454UB, $T_{SP} = 25^{\circ}\text{C}$



$R_{\theta JSP} = 120^{\circ}\text{C/W}$

NOTE: $Z_{\theta JX} = 90^{\circ}\text{C/W}$ maximum at $t_H = 10\text{ms}$.

FIGURE 9. Thermal impedance (UB versions).

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