STPS3L60

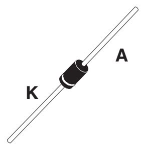
Power Schottky rectifier

Features

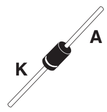
- Negligible switching losses
- Low forward voltage drop
- Avalanche capability specified

Description

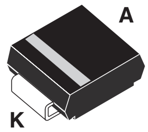
Axial and surface mount power Schottky rectifier suited for switch mode power supplies and high frequency dc to dc converters. Packaged in DO-201AD, DO-15, SMB and SMBflat, this device is intended for use in low voltage, high frequency inverters and small battery chargers and for applications where there are space constraints, for example telecom battery charger.



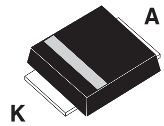
DO-201AD
STPS3L60



DO-15
STPS3L60Q



SMB
STPS3L60U



SMBflat
STPS3L60UF

Table 1. Device summary

$I_{F(AV)}$	3 A
V_{RRM}	60 V
$T_{j\ (max)}$	150 °C
$V_{F\ (max)}$	0.61 V

1 Characteristics

Table 2. Absolute ratings(1)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		60	V
$I_{F(RMS)}$	RMS forward current		10	A
$I_{F(AV)}$	Average forward current	T_L = 105 °C δ = 0.5 (DO-201AD, SMB)	3	A
		T_L = 72 °C δ = 0.5 (DO-15)		
		T_L = 127 °C δ = 0.5 (SMBflat)		
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms Sinusoidal	100	A
P_{ARM}	Repetitive peak avalanche power	t_p = 1 µs T_j = 25 °C	2000	W
T_{stg}	Storage temperature range		-65 to + 150	°C
T_j	Maximum operating junction temperature(2)		150	°C
dV/dt	Critical rate of rise reverse voltage		10000	V/µs

1. limiting values, per diode
2. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ condition to avoid thermal runaway for a diode on its own heatsink

Table 3. Thermal resistance

Symbol	Parameter			Value	Unit
$R_{th\ (j-l)}$	Junction to leads		SMBflat	10	°C/W
			SMB	20	
		Lead length = 10 mm	DO-201AD	20	
			DO-15	35	

Table 4. Static electrical characteristics

Symbol	Parameter	Tests Conditions		Min.	Typ.	Max.	Unit
I_R (1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-	-	150	µA
		T_j = 100 °C		-	4	15	mA
		T_j = 125 °C		-	14	30	
V_F (1)	Forward voltage drop	T_j = 25 °C	I_F = 3 A	-	-	0.62	V
		T_j = 100 °C		-	0.53	0.61	
		T_j = 125 °C		-	0.51	0.59	
		T_j = 25 °C	I_F = 6 A	-	-	0.79	
		T_j = 100 °C		-	0.62	0.71	
		T_j = 125 °C		-	0.6	0.69	

1. Pulse test :t_p = 380 µs, δ < 2%

To evaluate the conduction losses use the following equation :
$P = 0.44 \times I_{F(AV)} + 0.05 \times I_F{}^2{}_{(RMS)}$

Figure 1. Average forward power dissipation versus average forward current

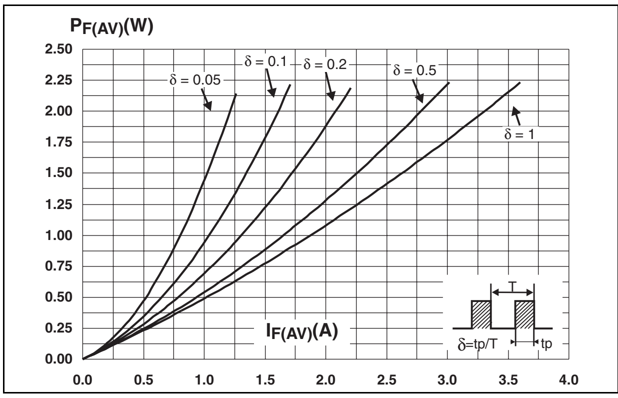


Figure 2. Average forward current versus ambient temperature (δ = 0.5) (DO-201AD, SMB)

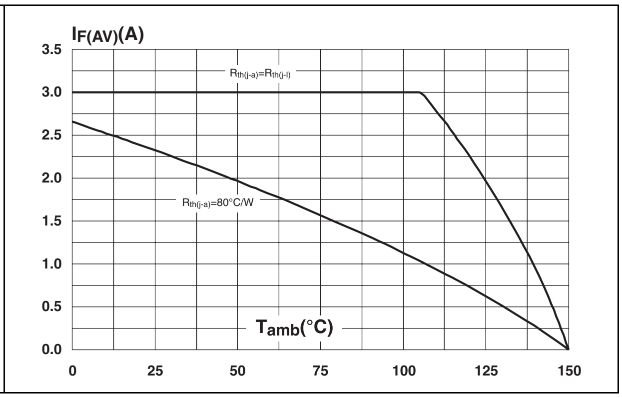


Figure 3. Average forward current versus ambient temperature (δ = 0.5) (DO-15)

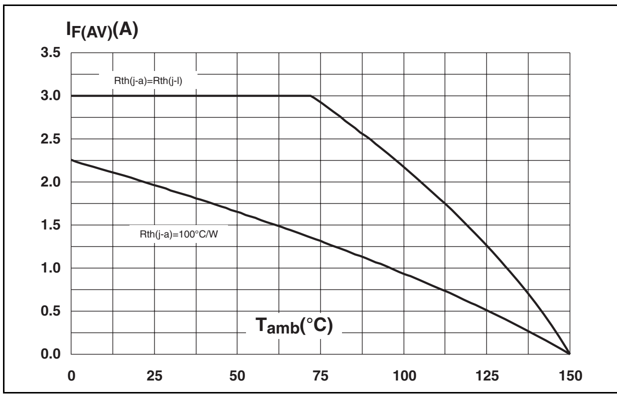


Figure 4. Average forward current versus ambient temperature (δ = 0.5) (SMBflat)

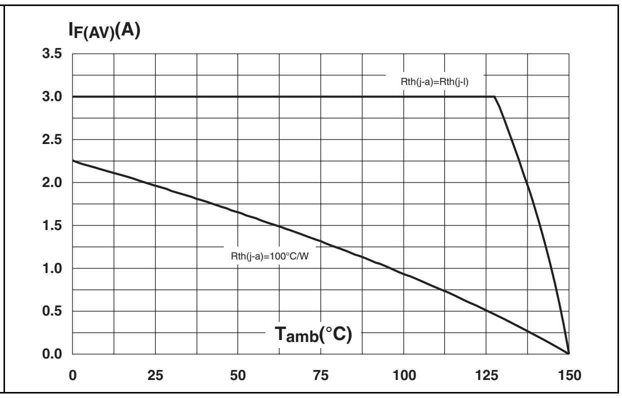


Figure 5. Normalized avalanche power derating versus pulse duration

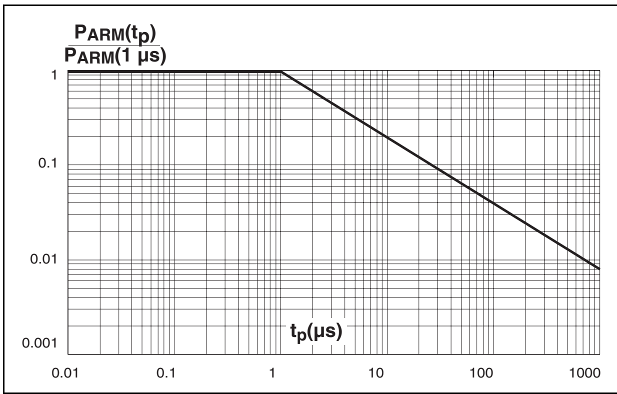


Figure 6. Normalized avalanche power derating versus junction temperature

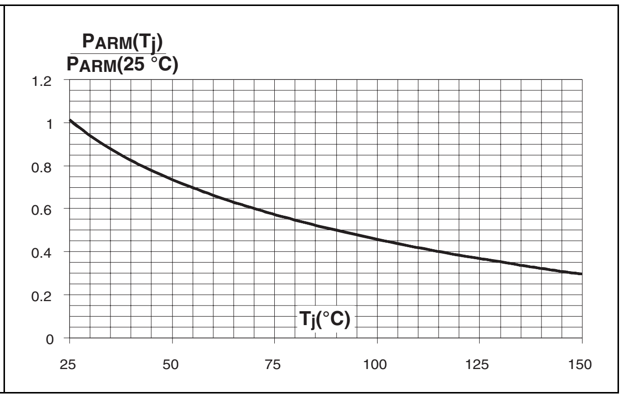


Figure 7. Non repetitive surge peak forward current versus overload duration (maximum values) (DO-201AD)

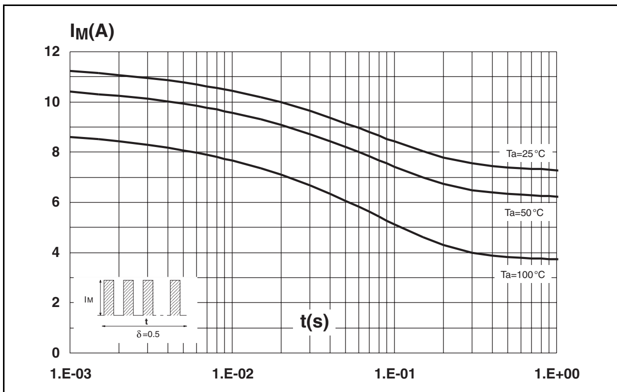


Figure 8. Non repetitive surge peak forward current versus overload duration (maximum values) (DO-15)

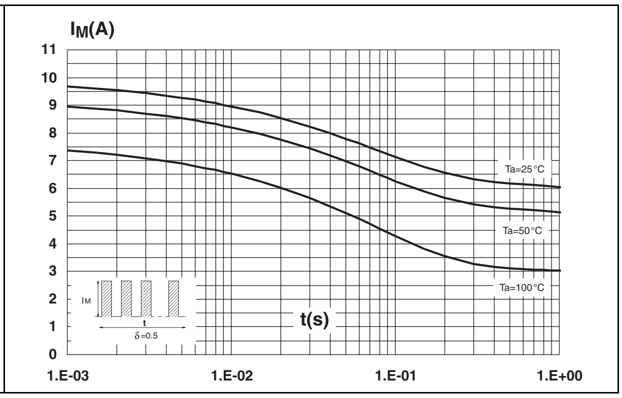


Figure 9. Non repetitive surge peak forward current versus overload duration (maximum values) (SMB)

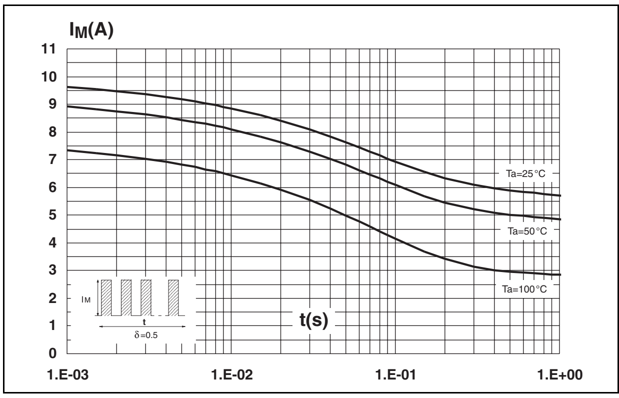


Figure 10. Non repetitive surge peak forward current versus overload duration (maximum values) (SMBflat)

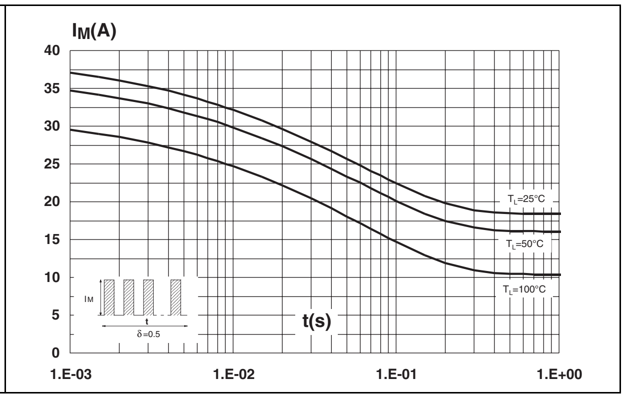


Figure 11. Relative variation of thermal impedance junction to ambient versus pulse duration (DO-201AD)

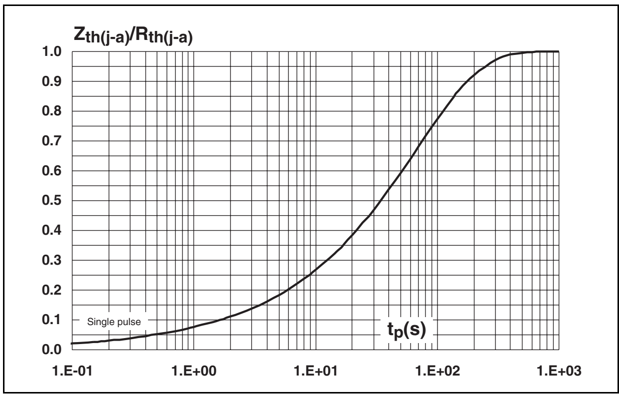


Figure 12. Relative variation of thermal impedance junction to ambient versus pulse duration (DO-15)

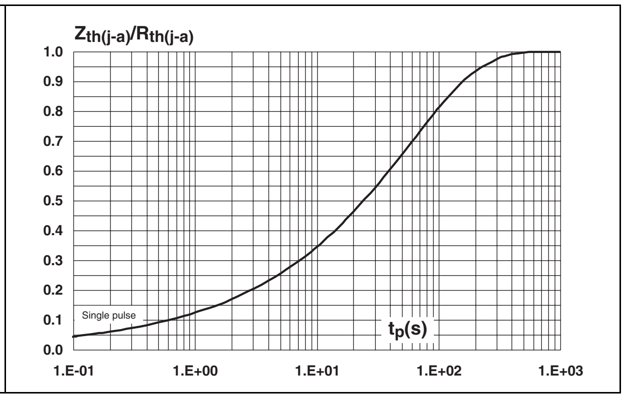


Figure 13. Relative variation of thermal impedance junction to ambient versus pulse duration (SMB)

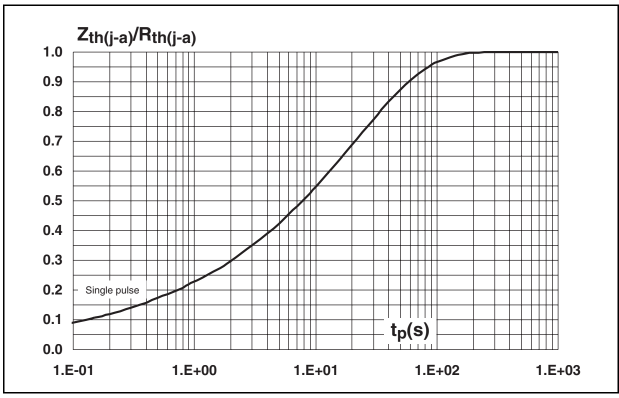


Figure 14. Relative variation of thermal impedance junction to lead versus pulse duration (SMBflat)

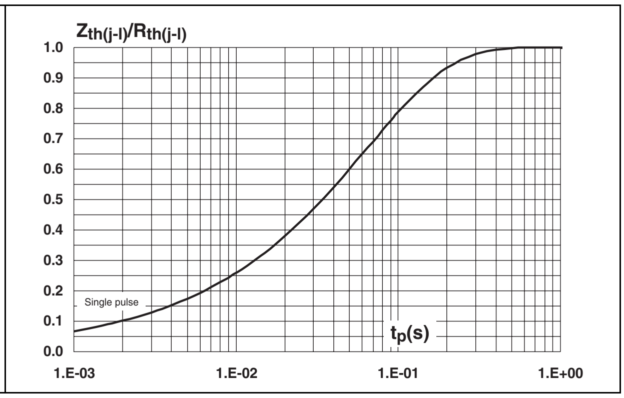


Figure 15. Reverse leakage current versus reverse voltage applied (typical values)

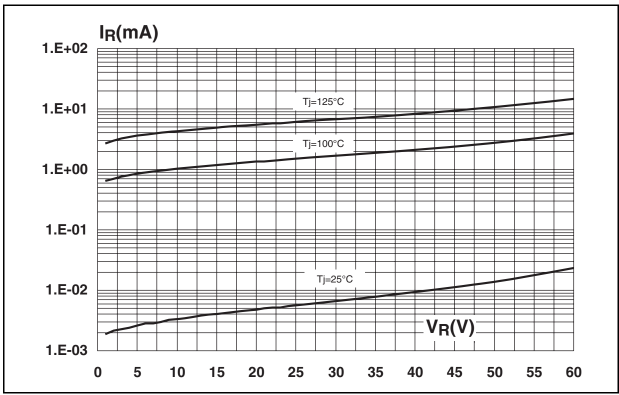


Figure 16. Junction capacitance versus reverse voltage applied (typical values)

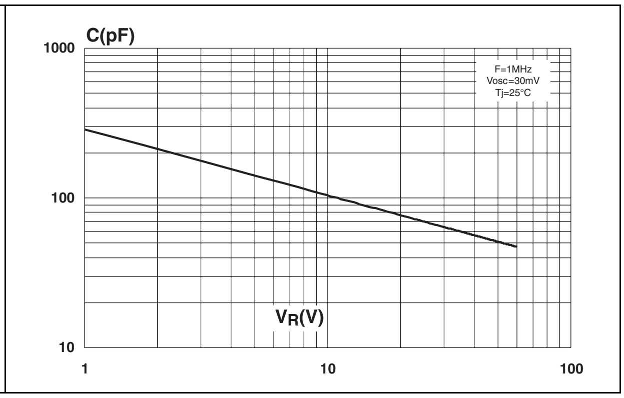


Figure 17. Forward voltage drop versus forward current (high level)

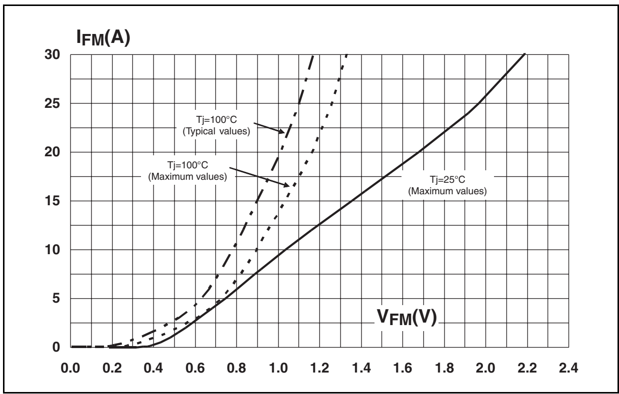


Figure 18. Forward voltage drop versus forward current (low level)

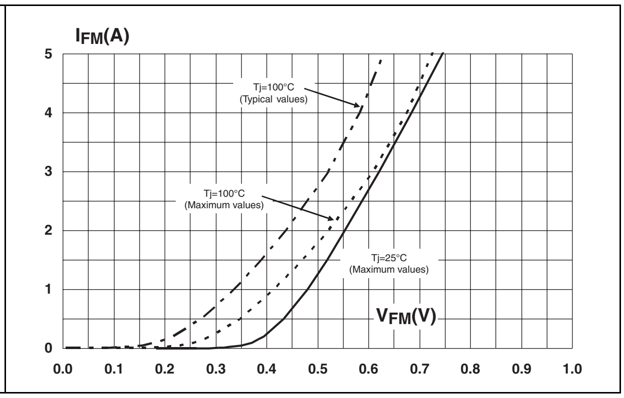


Figure 19. Thermal resistance junction to ambient versus copper surface under each lead (SMB)

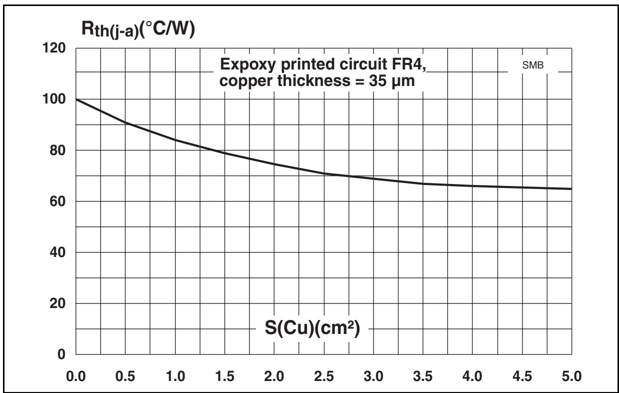
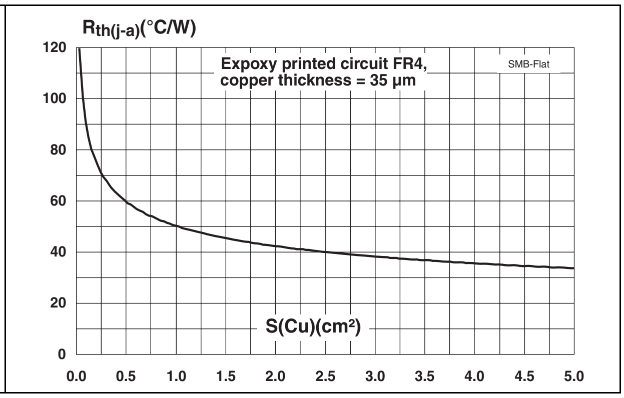


Figure 20. Thermal resistance junction to ambient versus copper surface under each lead (SMBflat)

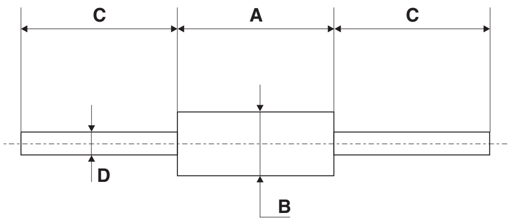


2 Package information

- Epoxy meets UL94,V0

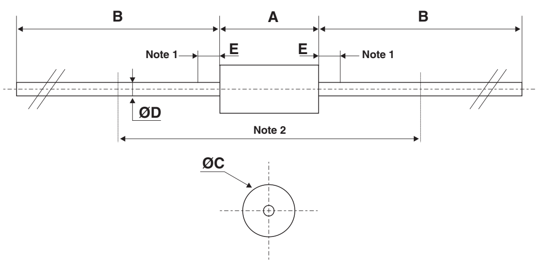
In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

Figure 21. DO-15 plastic dimensions



Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	6.05	6.75	0.238	0.266
B	2.95	3.53	0.116	0.139
C	26	31	1.024	1.220
D	0.71	0.88	0.028	0.035

Figure 22. DO-201AD plastic dimensions

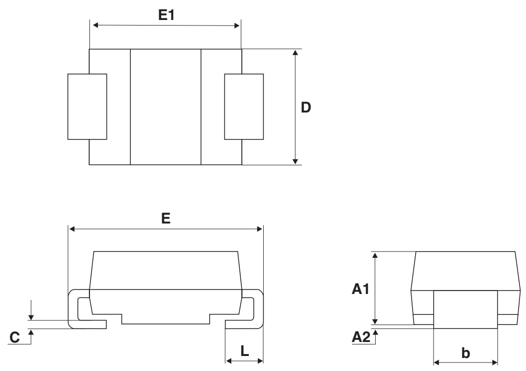


Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A		9.50		0.374
B	25.40		1.000	
∅C		5.30		0.209
∅D		1.30		0.051
E		1.25		0.049

Notes:

1. The lead diameter ∅D is not controlled over zone E
2. The minimum axial length within which the device may be placed with its leads bent at right angles is 0.59”(15 mm)

Table 5. SMB dimensions



Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.075	0.096
A2	0.05	0.20	0.002	0.008
b	1.95	2.20	0.077	0.087
c	0.15	0.40	0.006	0.016
D	3.30	3.95	0.130	0.156
E	5.10	5.60	0.201	0.220
E1	4.05	4.60	0.159	0.181
L	0.75	1.50	0.030	0.059

Figure 23. SMB footprint, dimensions in mm (inches)

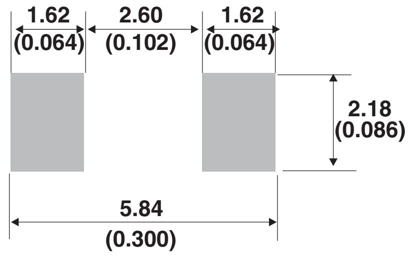
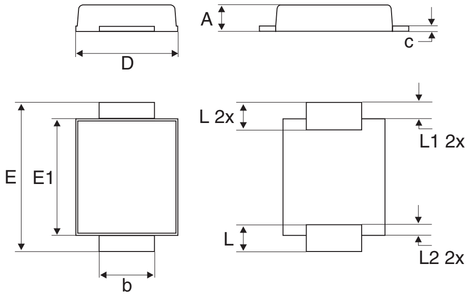
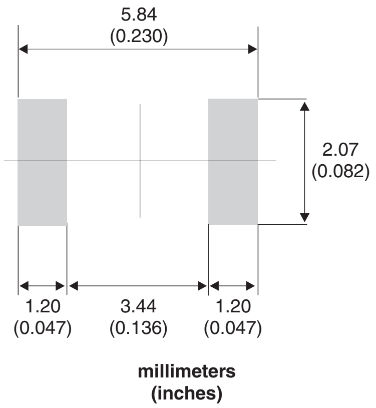


Table 6. SMBflat dimensions



Ref.	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.90		1.10	0.035		0.043
b	1.95		2.20	0.077		0.087
c	0.15		0.40	0.006		0.016
D	3.30		3.95	0.130		0.156
E	5.10		5.60	0.200		0.220
E1	4.05		4.60	0.189		0.181
L	0.75		1.50	0.029		0.059
L1		0.40			0.016	
L2		0.60			0.024	

Figure 24. SMBflat footprint dimensions[a]



a. SMB footprint may also be used.

3 Ordering information

Table 7. Ordering information

Order codes	Marking	Package	Weight	Base qty	Delivery mode
STPS3L60	STPS3L60	DO-201AD	1.12 g	600	Ammopack
STPS3L60RL	STPS3L60	DO-201AD	1.12 g	1900	Tape and reel
STPS3L60Q	STPS3L60	DO-15	0.4 g	1000	Ammopack
STPS3L60QRL	STPS3L60	DO-15	0.4 g	6000	Tape and reel
STPS3L60U	G36	SMB	0.107 g	2500	Tape and reel
STPS3L60UF	FG36	SMBflat	0.136 g	5000	Tape and reel

4 Revision history

Table 8. Document revision history

Date	Revision	Changes
July-2003	5A	Previous issue
12-Jun-2009	6	Reformatted to current standards. Added SMBflat package. Added ECOPACK statement. Added cathode band graphics.