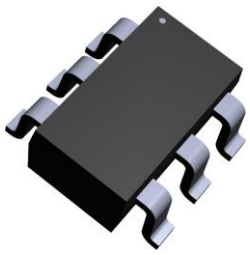
DSL05

Secondary protection for VDSL2 and G.FAST lines

Datasheet - production data



SOT23-6L

Features

- High surge capability to comply with GR-1089 and ITU-T K20/21/45
- Keeps peak power capability at high temperature
- Voltages: 8, 12, 16 and 24 V
- Low capacitance device: C_{typ} = 0.95 pF
- RoHS package
- Low leakage current: 50 nA at 25 °C

Complies with the following standards

Refer to *Section 2: "Schematics"*.

- Telcordia GR-1089
  - 2.5 kV 2/10 µs - 500 A 2/10 µs
  - AC power fault tests
- ITU-T K20/21/45
  - 6 kV 10/700 µs - 150 A 5/310 µs
  - power induction and contact tests
- IEC 61000-4-2, level 4
  - 15 kV (air discharge)
  - 8 kV (contact discharge)
- IEC 61000-4-5, level 2
  - 1 kV, 42 Ω
- MIL STD 883G-Method 3015-7: Class 3
  - 8 kV (human body model)

Description

DSL05 is designed to protect DSL line drivers against surges defined in worldwide telecommunication standards. This device protects line drivers of various systems such as xDSL and G.FAST. The low capacitance makes it suitable from ADSL to G.FAST data rates.

DSL05 is able to survive severe conditions even when used with downgraded or oscillating gas tube.

This device is packaged in a SOT23-6L.

Figure 1: Functional diagram

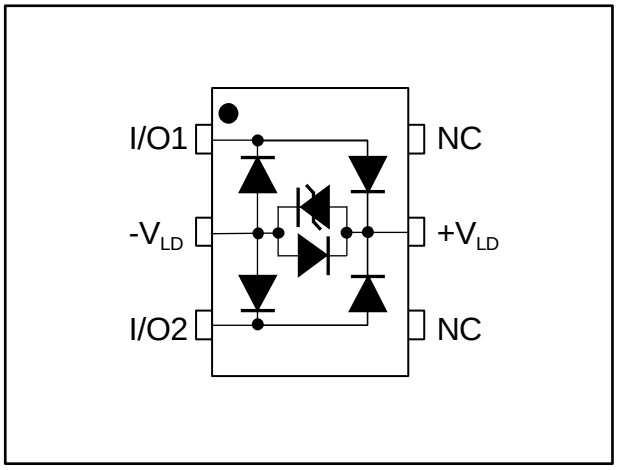


Table 1: Device summary

Order code	V_{RM}(V)
DSL05-008SC6	8
DSL05-012SC6	12
DSL05-016SC6	16
DSL05-024SC6	24

1 Characteristics

Table 2: Absolute ratings (T_{amb} = -40 to 85 °C)

Symbol	Parameter		Value	Unit
I_{pp}	Peak pulse current	8/20µs	30	A
dI/dt	Critical rate of on-state current rise		1000	A/µs
T_{stg}	Storage junction temperature range		-55 to +150	°C
T_j	Maximum operating junction temperature			
T_L	Maximum temperature for soldering during 10 s		260	°C

Table 3: Electrical characteristics (T_{amb} = 25 °C, pin 1 to pin 3)

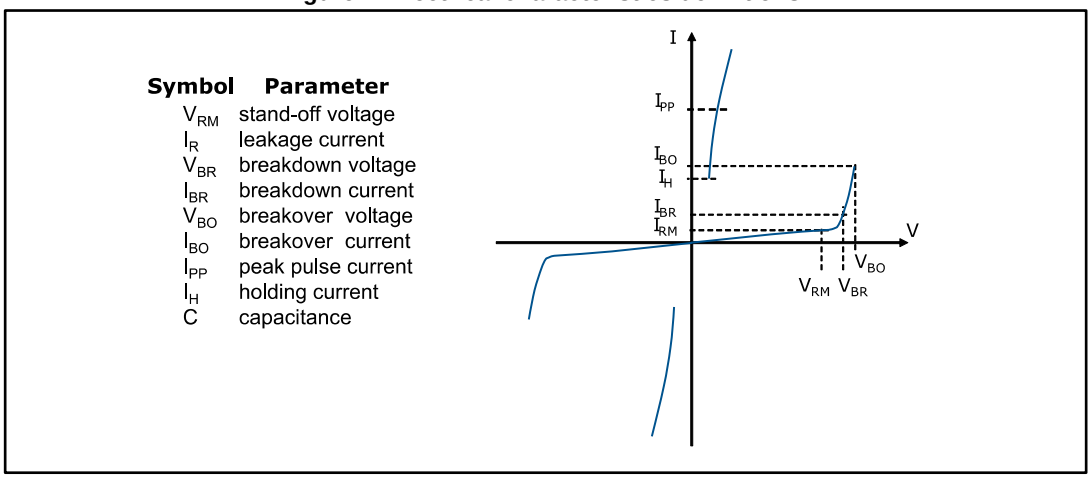
Order code	I_{RM} at V_{RM}					V_{BR} at 1 mA	V_{BO}	IH	C(1)	ΔC(2)
	Typ.	Max.	Typ.	Max.		Min.	Max.	Typ.	Max.	Typ.
			T_{amb} = 85 °C							
	nA				V	V	V	mA	pF	pF
DSL05-008SC6	0.1	50	7	100	8	9.5	15	50	1.5	0.25
DSL05-012SC6	0.1	50	7	100	12	12.8	18	10	1.5	0.25
DSL05-016SC6	0.1	50	7	100	16	18	25	30	1.5	0.25
DSL05-024SC6	0.1	50	7	100	24	25.5	31	50	1.5	0.25

Notes:

(1)Test conditions: V_R = 2 V bias, V_{RMS} = 1 V, f = 1 MHz

(2)Measured between 1 V and V_{RM}

Figure 2: Electrical characteristics definitions



1.1 Characteristics (curves)

Figure 3: Peak pulse power dissipation versus initial junction temperature (maximum values)

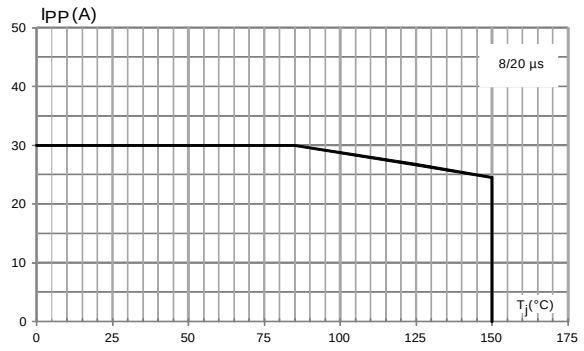


Figure 4: Leakage current versus junction temperature

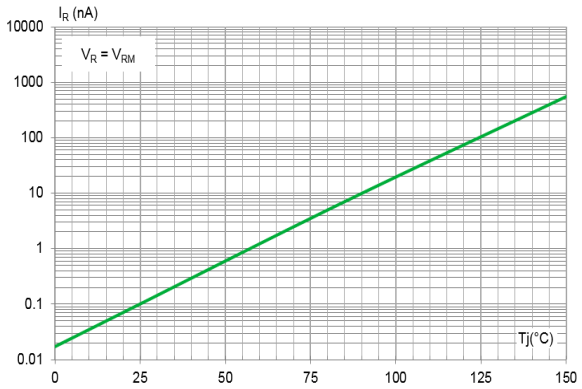


Figure 5: Junction capacitance versus reverse voltage

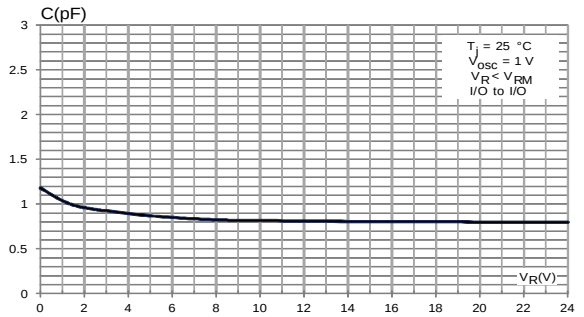


Figure 6: Junction capacitance versus junction temperature

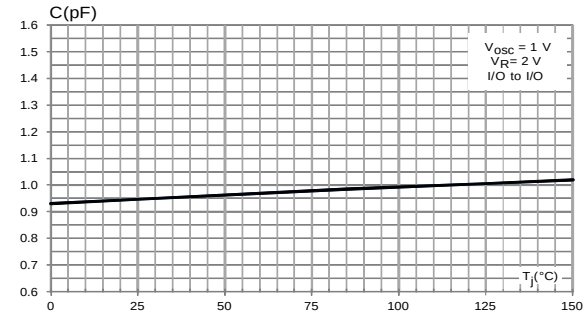
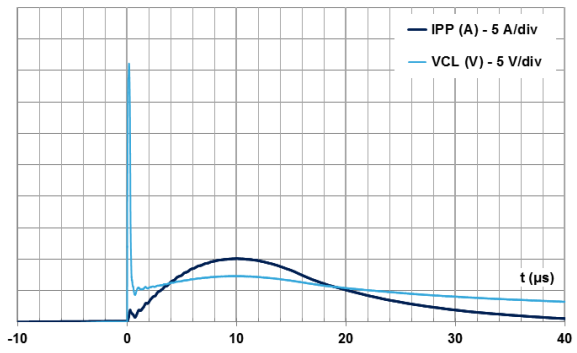


Figure 7: Clamping response to 8/20 µs surge (I_{pp} = 10 A)



2 Schematics

Figure 8: xDSL and G.FAST schematic for CPE applications

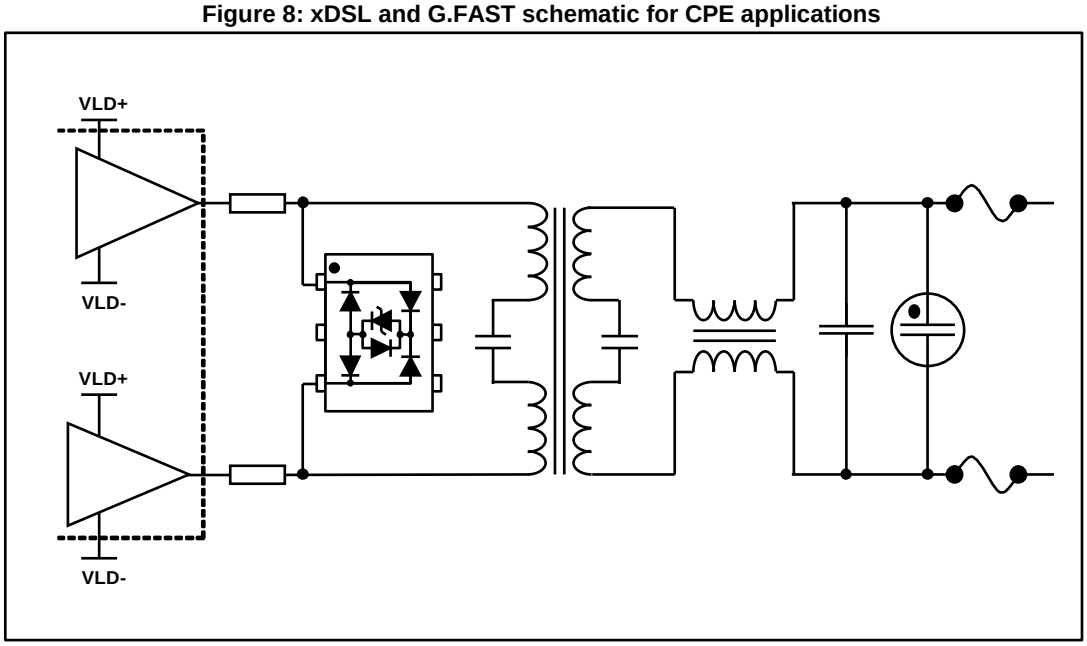
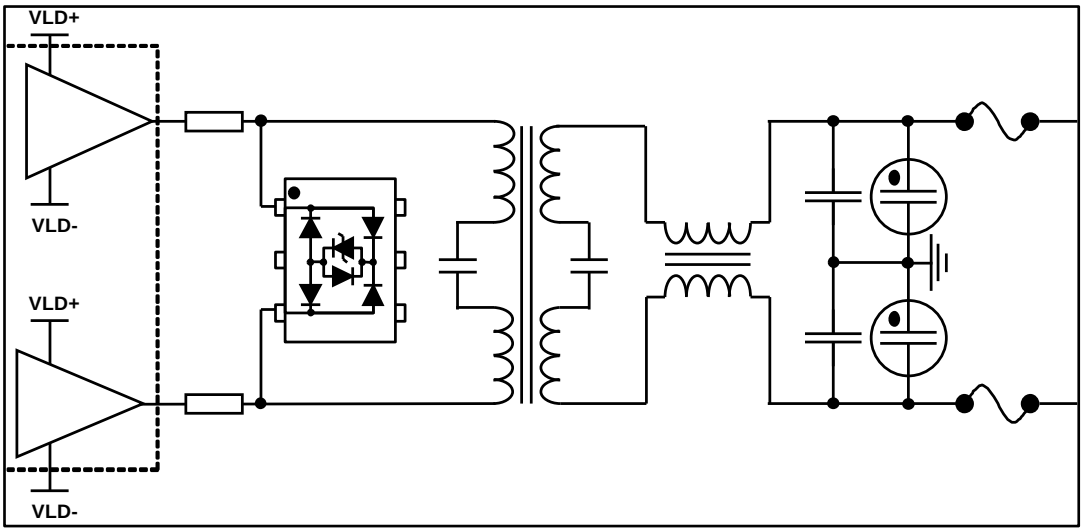


Figure 9: xDSL and G.FAST schematic for infrastructure applications



On topologies given in *Figure 8: "xDSL and G.FAST schematic for CPE applications"* and *Figure 9: "xDSL and G.FAST schematic for infrastructure applications"*, +VLD and -VLD may not be connected.

3 Package information

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.

- Epoxy meets UL 94,V0
- Lead-free package

3.1 SOT23-6L package information

Figure 10: SOT23-6L package outline

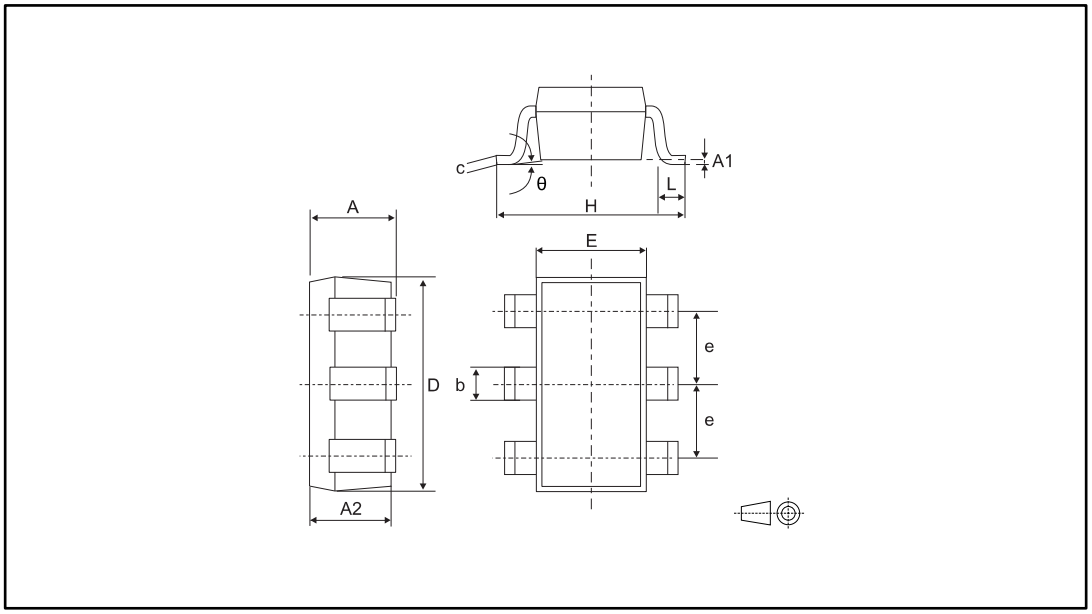


Table 4: SOT23-6L package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.9		1.45	0.0354		0.0571
A1	0		0.15	0		0.0059
A2	0.9		1.3	0.0354		0.0512
b	0.30		0.5	0.0118		0.0197
c	0.09		0.2	0.0035		0.0079
D	2.8		3.05	0.1102		0.1201
E	1.5		1.75	0.0591		0.0689
e		0.95			0.0374	
H	2.6		3	0.1024		0.1181
L	0.3		0.6	0.0118		0.0236
θ	0		10	0		0.3937

Figure 11: Footprint recommendations, dimensions in mm (inches)

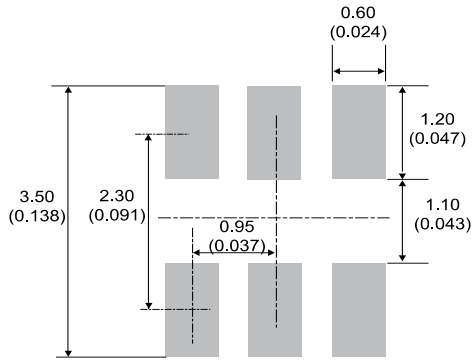


Figure 12: Marking layout (refer to ordering information table for marking)

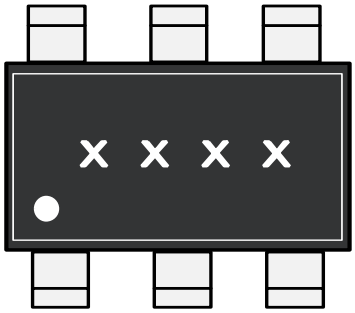
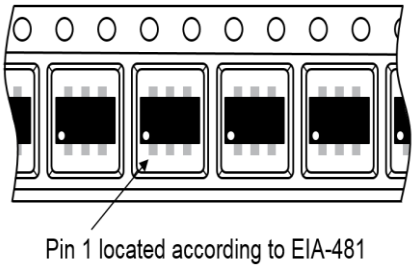


Figure 13: Package orientation in reel



Note: Pocket dimensions are not on scale
Pocket shape may vary depending on package

Figure 14: Tape and reel orientation

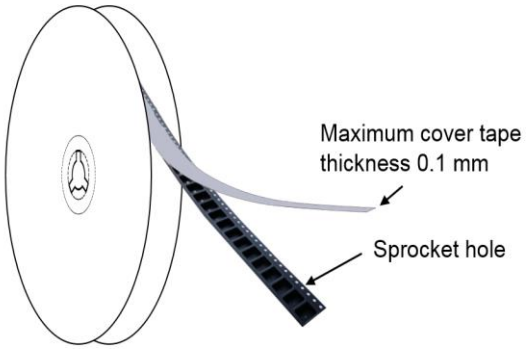


Figure 15: Reel dimensions (mm)

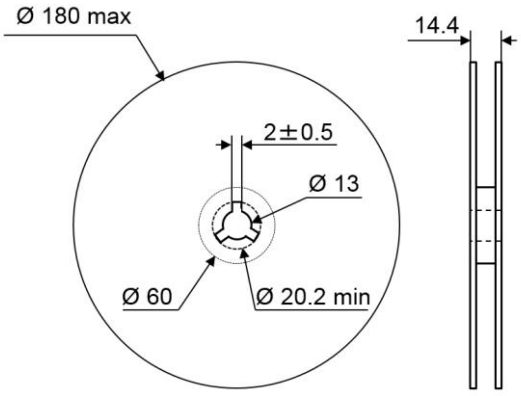


Figure 16: Inner box dimensions (mm)

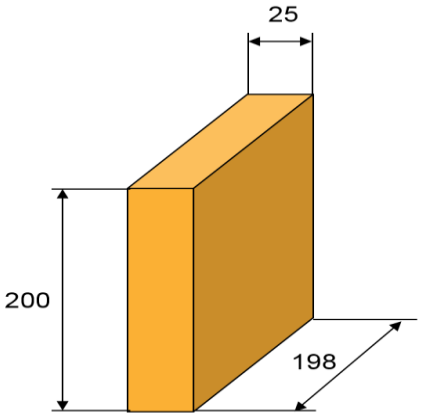


Figure 17: Tape and reel outline

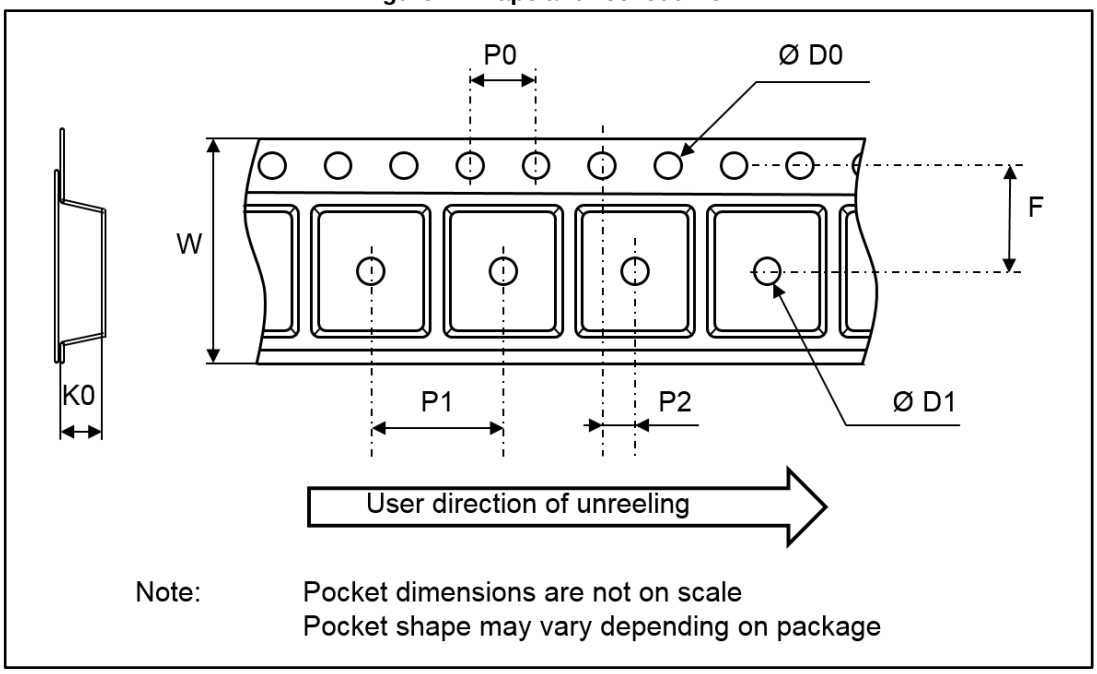
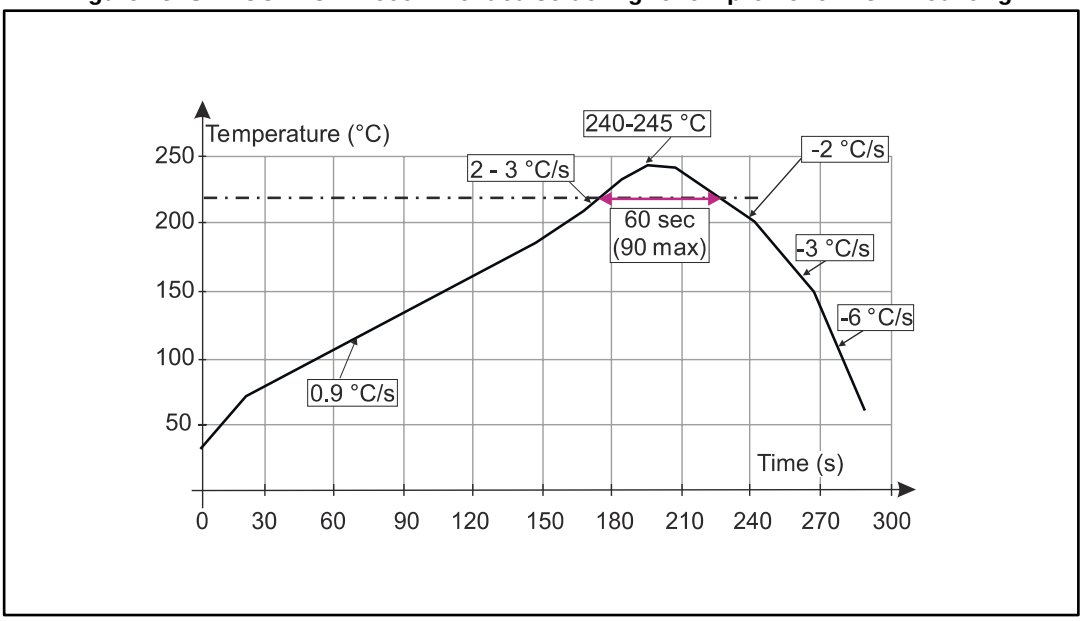


Table 5: Tape and reel mechanical data

Ref.	Dimensions		
	Millimeters		
	Min.	Typ.	Max.
P1	3.9	4	4.1
P0	3.9	4	4.1
D0	1.45	1.5	1.6
D1	1		
F	3.45	3.5	3.55
K0	1.3	1.4	1.6
P2	1.95	2	2.05
W	7.9	8	8.3

Figure 18: ST ECOPACK® recommended soldering reflow profile for PCB mounting



Minimize air convection currents in the reflow oven to avoid component movement. Maximum soldering profile corresponds to the latest IPC/JEDEC J-STD-020.

4 Ordering information

Figure 19: Ordering information scheme

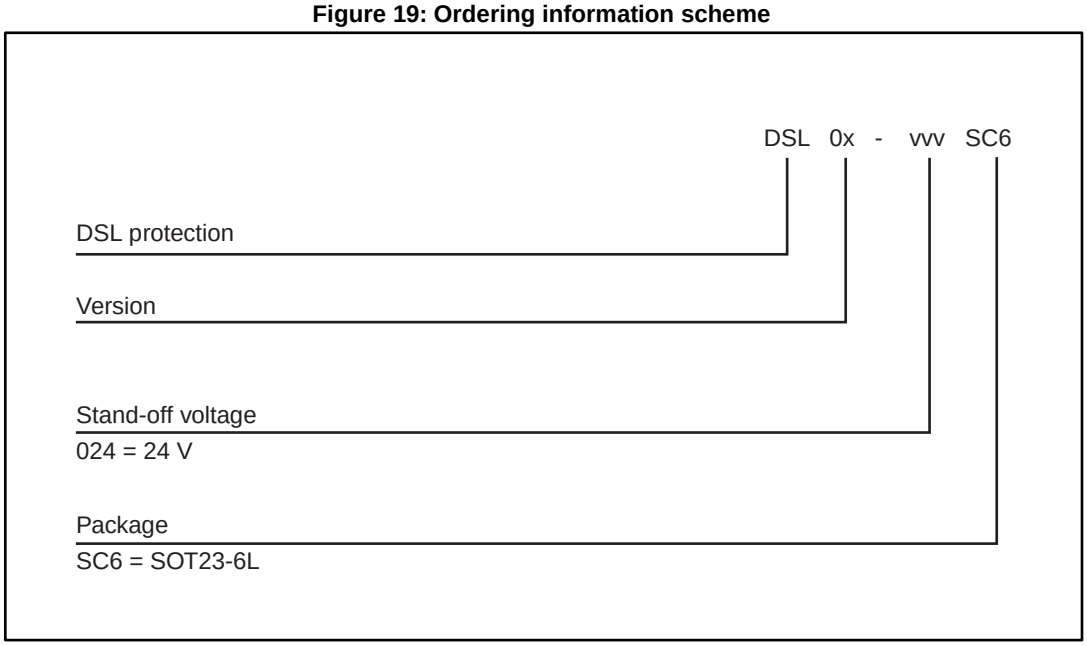


Table 6: Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
DSL05-008SC6	D508	SOT23-6L	14 g	3000	Tape and reel
DSL05-012SC6	D512				
DSL05-016SC6	D516				
DSL05-024SC6	D524				

5 Revision history

Table 7: Document revision history

Date	Revision	Changes
05-Jul-2016	1	Initial release.
03-Oct-2016	2	Updated Table 3: "Electrical characteristics (Tamb = 25 °C, pin 1 to pin 3)".
22-Aug-2017	3	Added RPN DSL05-016SC6. Updated *Table 3: "Electrical characteristics (Tamb = 25 °C, pin 1 to pin 3)"* and *Figure 4: "Leakage current versus junction temperature"*.

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