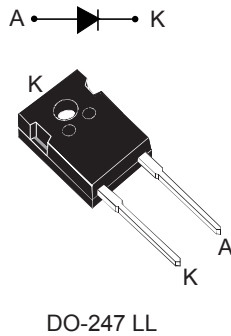


Automotive 650 V, 80 A ultrafast low forward voltage drop rectifier



Features

- PPAP capable 
- AECQ-101 qualified
- Ultrafast switch
- Low forward voltage
- Reduce conduction losses
- Operating T_j from $-40\text{ }^{\circ}\text{C}$ to $+175\text{ }^{\circ}\text{C}$
- ECOPACK2 compliant

Applications

- EV Charging station
- OBC (On board battery chargers)
- Boost PFC

Description

The **STTH80L065WLY**, featuring ST's new ultrafast 650 V technology, is suitable for switching power supplies and industrial applications, including rectification and discontinuous mode PFC boost diodes. Its low forward voltage characteristics enable high performance in freewheeling applications.



Product status link

[STTH80L065WLY](#)

Product summary

Symbol	Value
$I_{F(AV)}$	80 A
V_{RRM}	650 V
$V_{F(typ.)}$	1.15 V
T_j	-40 to $+175\text{ }^{\circ}\text{C}$

1 Characteristics

Table 1. Absolute ratings (limiting values at 25 °C, unless otherwise specified)

Symbol	Parameter	Value	Unit
V_{RRM}	Repetitive peak reverse voltage ($T_j = -40\text{ °C}$ to $+175\text{ °C}$)	650	V
$I_{F(RMS)}$	Forward rms current	95	A
$I_{F(AV)}$	Average forward current, $\delta = 0.8$, square wave	$T_C = 125\text{ °C}$ 80	A
I_{FSM}	Surge non repetitive forward current	$t_p = 10\text{ ms}$ sinusoidal 700	A
T_{stg}	Storage temperature range	-65 to +175	°C
T_j	Operating junction temperature range	-40 to +175	°C

Table 2. Thermal resistance parameter

Symbol	Parameter	Typ.	Max.	Unit
$R_{th(j-c)}$	Junction to case	0.28	0.40	°C/W

For more information, refer to the following application note related to the thermal management:

- [AN5088](#): Rectifiers thermal management, handling and mounting recommendations

Table 3. Static electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25\text{ °C}$	-		65	μA
		$T_j = 175\text{ °C}$	-	440	4400	
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ °C}$	-	1.40	1.85	V
		$T_j = 125\text{ °C}$	-	1.15	1.55	
		$T_j = 175\text{ °C}$	-	1.05	1.35	

1. Pulse test: $t_p = 5\text{ ms}$, $\delta < 2\%$

2. Pulse test: $t_p = 380\text{ }\mu\text{s}$, $\delta < 2\%$

To evaluate the conduction losses, use the following equation:

$$P = 0.85 \times I_{F(AV)} + 0.0063 \times I_{F(RMS)}^2$$

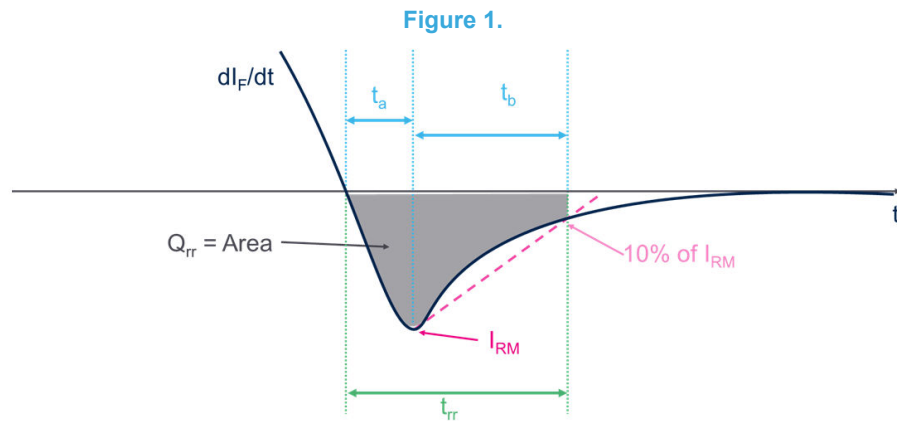
For more information, refer to the following application notes related to the power losses:

- [AN604](#): Calculation of conduction losses in a power rectifier
- [AN4021](#): Calculation of reverse losses on a power diode

Table 4. Dynamic electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	$T_j = 25\text{ }^{\circ}\text{C}$	$I_F = 0.5\text{ A}, I_{rr} = 0.25\text{ A}, I_R = 1\text{ A}$	-		70	ns
			$I_F = 1\text{ A}, V_R = 30\text{ V}, dI_F/dt = -50\text{ A}/\mu\text{s}$	-	70	100	
$I_{RM}^{(1)}$	Reverse recovery current	$T_j = 125\text{ }^{\circ}\text{C}$	$I_F = 80\text{ A}, V_R = 400\text{ V}, dI_F/dt = -200\text{ A}/\mu\text{s}$	-	17	24	A
$Q_{rr}^{(1)}$	Reverse recovery charge			-	2500		nC
$t_{rr}^{(1)}$	Reverse recovery time			-	280		ns

1. Measurements taken at 10% of I_{RM} , $S = tb/ta$



For more information, refer to the following application notes related to the power losses:

- [AN5028](#): Calculation of turn-off power losses generated by an ultrafast diode

1.1 Characteristics (curves)

Figure 2. Average forward power dissipation versus average forward current (square waveform)

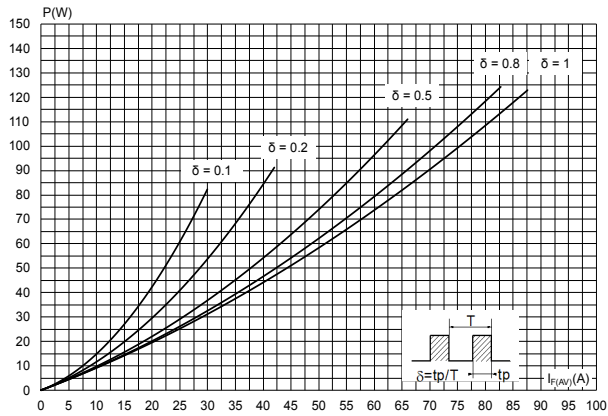


Figure 3. Forward voltage drop versus forward current (typical values)

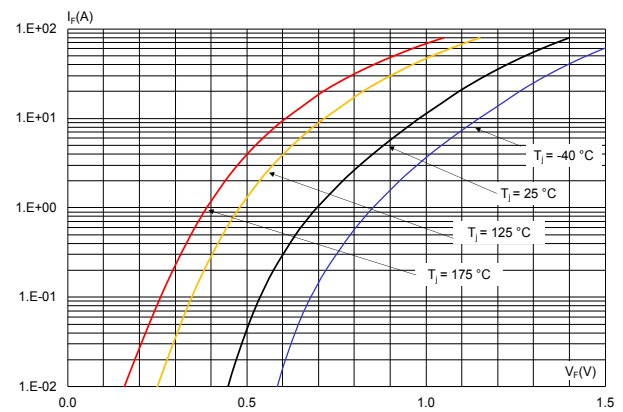


Figure 4. Forward voltage drop versus forward current (maximum values)

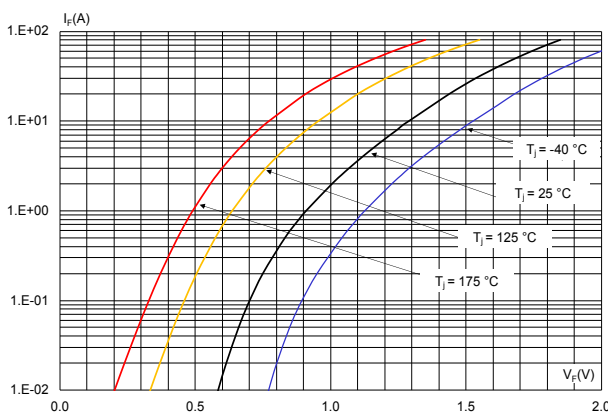


Figure 5. Relative variation of thermal impedance junction to case versus pulse duration

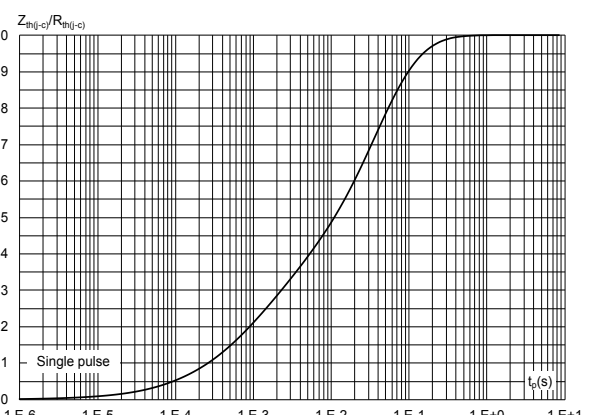


Figure 6. Peak reverse recovery current versus di_F/dt (typical values)

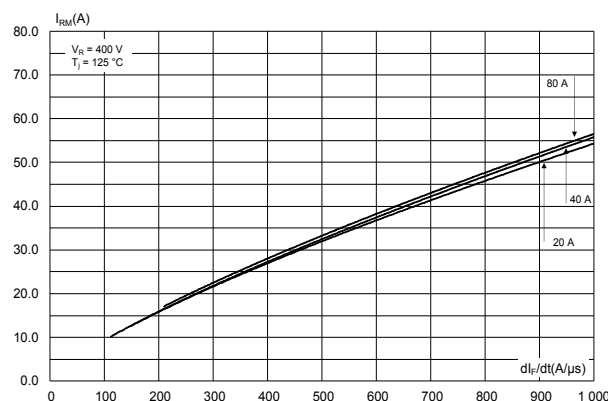


Figure 7. Reverse recovery time versus di_F/dt (typical values)

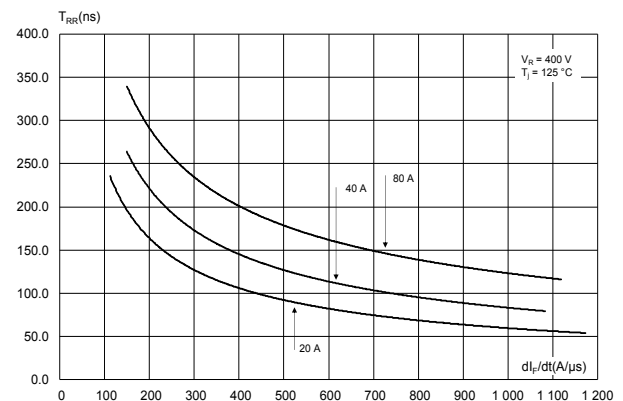
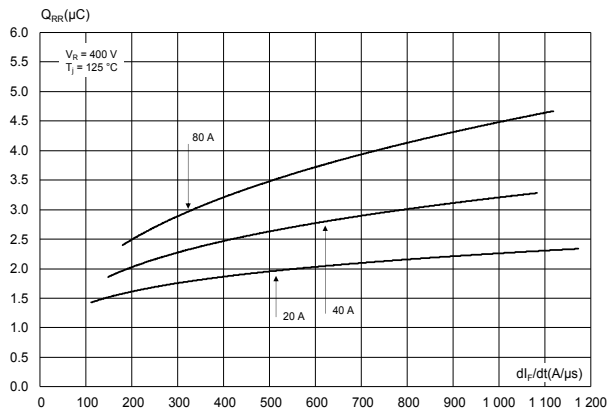
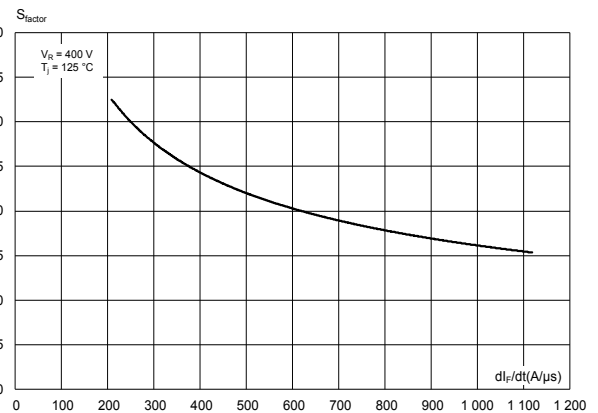
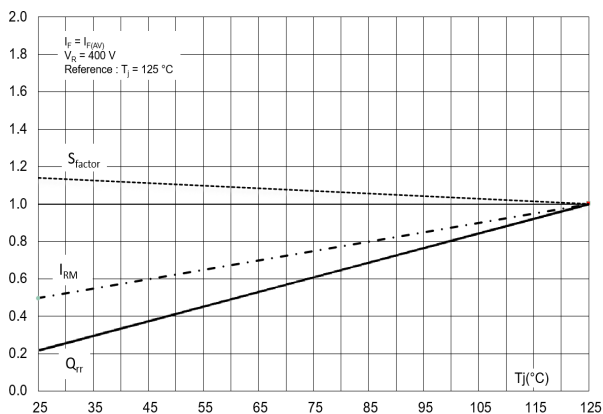
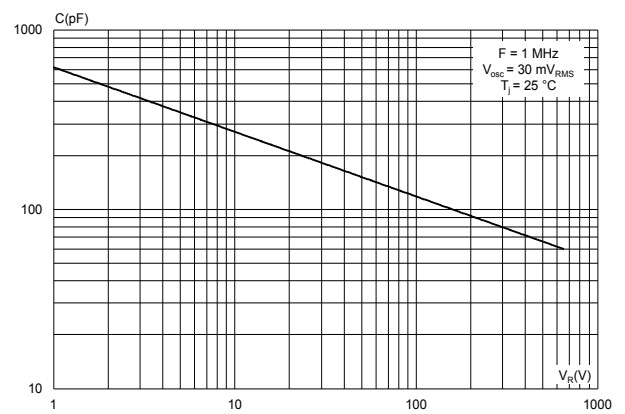
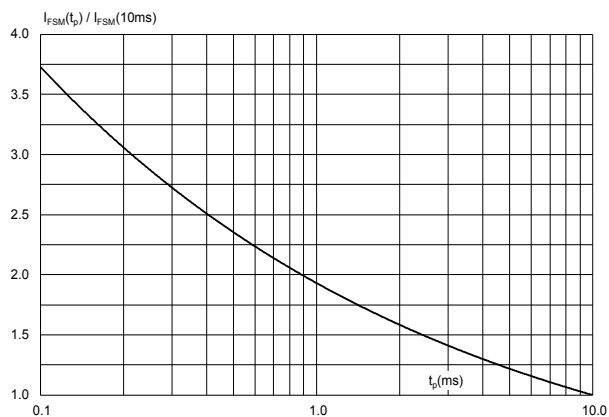
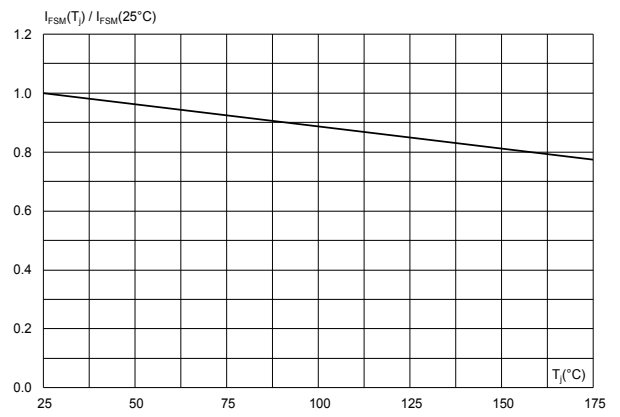


Figure 8. Reverse recovery charges versus di_F/dt (typical values)

Figure 9. Reverse recovery softness factor versus di_F/dt (typical values)

Figure 10. Relative variation of dynamic parameters versus junction temperature

Figure 11. Junction capacitance versus reverse voltage applied (typical values)

Figure 12. Relative variation of non-repetitive peak surge forward current versus pulse duration (sinusoidal waveform)

Figure 13. Relative variation of non-repetitive peak surge forward current versus initial junction temperature (sinusoidal waveform)


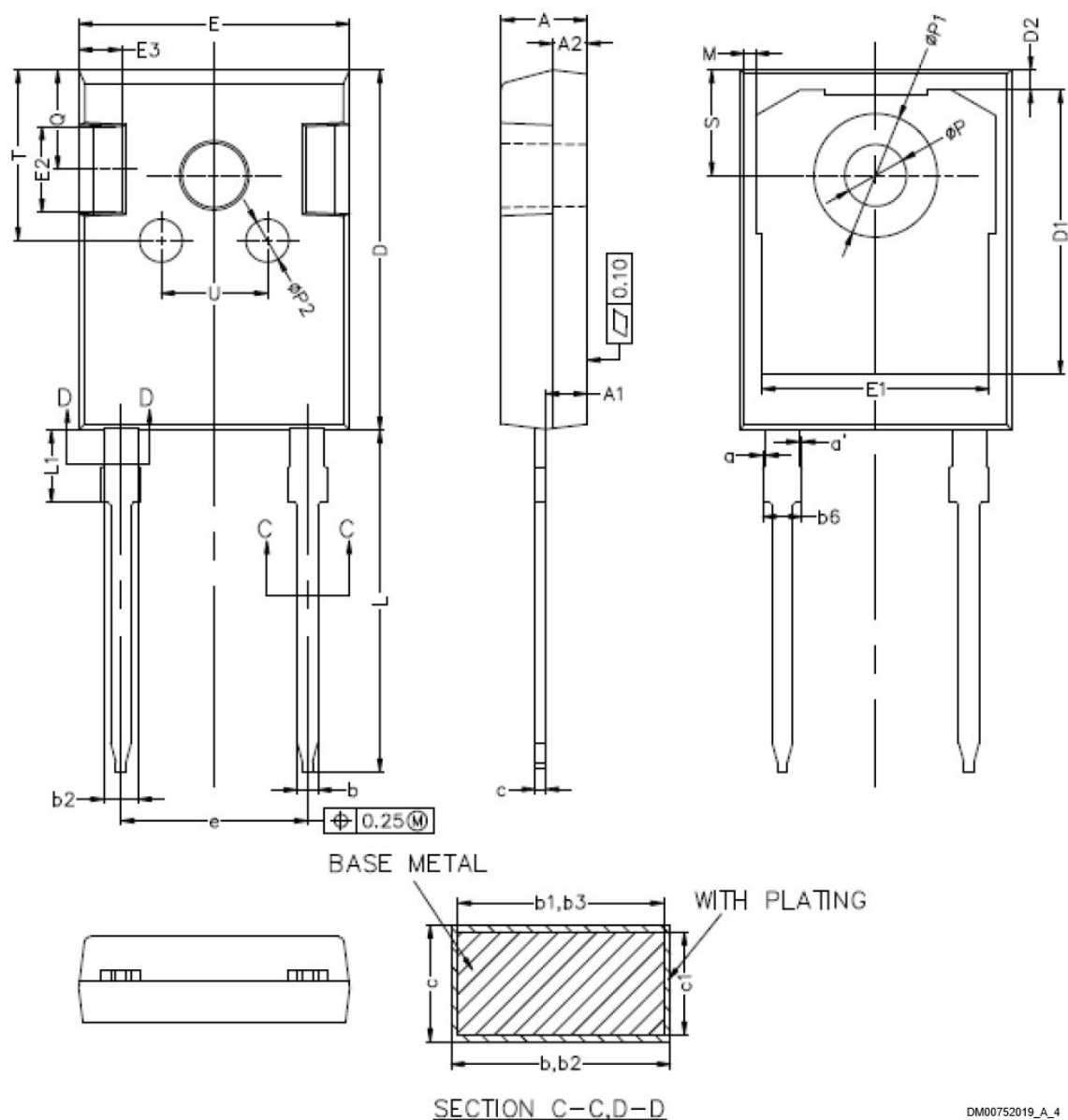
2 Package information

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.

2.1 DO-247 LL package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.8 N·m
- Maximum torque value: 1.0 N·m

Figure 14. DO-247 LL package outline



DM00752019_A_4

Note: This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 5. DO-247 LL package mechanical data

Ref.	Dimensions					
	Millimeters			Inches (for reference only)		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.90	5.00	5.10	0.192	0.197	0.201
A1	2.31	2.41	2.51	0.090	0.095	0.099
A2	1.90	2.00	2.10	0.074	0.079	0.083
a	0.00		0.15	0.000		0.006
a'	0.00		0.15	0.000		0.006
b	1.16		1.29	0.045		0.051
b1	1.15	1.20	1.25	0.045	0.047	0.049
b2	1.96		2.06	0.077		0.082
b3	1.95	2.00	2.02	0.077	0.079	0.080
b6			2.25			0.089
c	0.59		0.66	0.023		0.026
c1	0.58	0.60	0.62	0.022	0.024	0.025
D	20.90	21.00	21.10	0.822	0.827	0.831
D1	16.25	16.55	16.85	0.639	0.652	0.664
D2	1.05	1.20	1.35	0.041	0.047	0.054
E	15.70	15.80	15.90	0.618	0.622	0.626
E1	13.06	13.26	13.46	0.514	0.522	0.530
E2	4.90	5.00	5.10	0.192	0.197	0.201
E3	2.40	2.50	2.60	0.094	0.098	0.103
e	10.78	10.88	10.98	0.424	0.428	0.433
L	19.80	19.92	20.10	0.779	0.784	0.792
L1	3.93		4.46	0.154		0.176
M	0.35		0.95	0.013		0.038
P	3.50	3.60	3.70	0.137	0.142	0.146
P1	7.00		7.40	0.275		0.292
P2	2.40	2.50	2.60	0.094	0.098	0.103
Q	5.60		6.00	0.220		0.237
S	6.05	6.15	6.25	0.238	0.242	0.247
T	9.80		10.20	0.385		0.402
U	6.00		6.40	0.236		0.252

Note: For packing information, inner box dimensions and tube dimensions, refer to [TN1173](#).



3 Ordering information

Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STTH80L065WLY	STTH80L065WLY	DO-247 long leads	5.9 g	30	Tube

Revision history

Table 7. Document revision history

Date	Revision	Changes
18-Nov-2025	1	Initial release.
26-Nov-2025	2	Updated Table 6 .

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