

# DART SENSORS

## CENELEC Test Data

Dart Sensors (DS) new generation interlock sensor has been expressly developed to meet the exacting CENELEC standard. It uses the 16mm wafer size but incorporates a number of design features not previously adopted.

- ◇ The part will be available with pins or bare wires for soldered applications.
- ◇ The connection pins are intended to be solderless. A matching socket part number is available, or spring clips can be used.

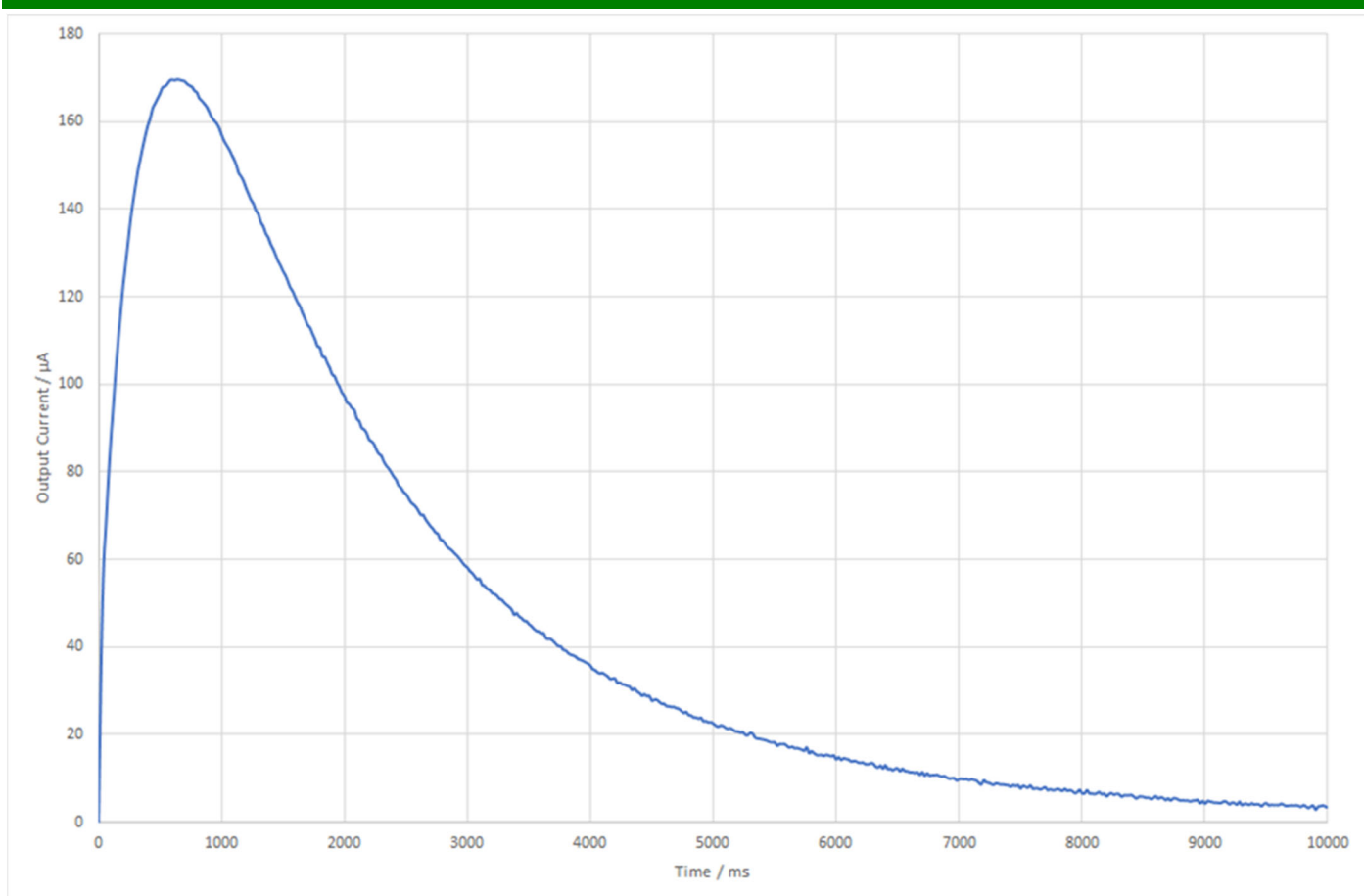
### RECOMMENDED OPERATING CONDITIONS

|                       |                                                                         |
|-----------------------|-------------------------------------------------------------------------|
| Sample Pump           | DS SKU: 3-P035, remains open for 0.3 seconds. 0.35-0.5ml sample volume. |
| Signal Processing     | Curve prediction algorithm recommended or integration, max 95% of peak. |
| Operation Temperature | Heat the sensor to 30-40°C                                              |

### ABSOLUTE MAXIMUM RATINGS

| Parameter         | Value      | Units |
|-------------------|------------|-------|
| Temperature Range | -40 to +85 | °C    |
| Humidity Range    | Up to 95   | %RH   |

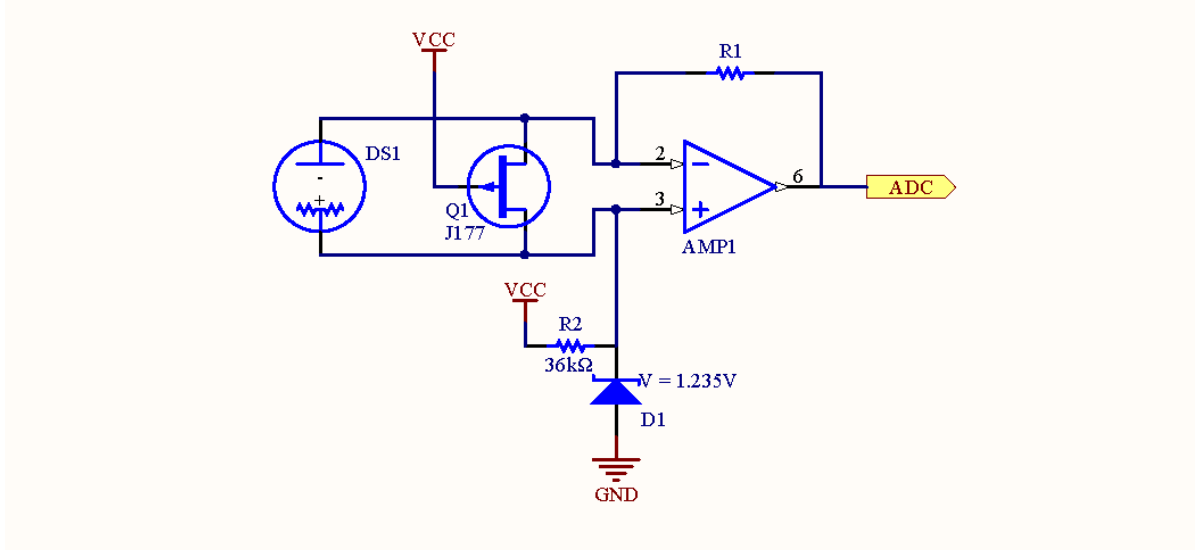
### TYPICAL OUTPUT



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APPLICATION CIRCUIT



The reference circuit above is available pre-built from Dart Sensors for development purposes. It incorporates a JFET to short the sensor, preventing offsets from building up when not in use. It also generates a virtual ground, a requirement when operating in single-supply environments.

TEST DATA

Refer to table below.

Thirteen sensors were treated as follows (alcohol concentration 35µg/100 ml).

1. Upper table

Each sensor was tested unconditioned at 35°C, integrating to 5% of peak value. Typical response trace is shown below.

2. Centre table

Each sensor was subjected to one cycle to the CENELEC standard and retested as in table 1.

The data show:

- i. Peak outputs fall but integrals hold up within a range of -1 to +5% of original value.
- ii. Peak and clear times extend: integrals to 5% of peak now range from 9 to 14 seconds. Examination of the response traces showed that integration to 10% of peak would reduce the total time to around 8 seconds, and operation at (say) 40-45°C and application of predictive software would reduce the time still further.
- iii. The data across the batch tend to fall in a tight range.

3. Lower table

In order to gain information on the reserve capacity of the sensors to resist severe repeated cycling through 85°C, each sensor was finally subjected to 31 cycles to the CENELEC standard and retested as in table 1.

0% failure rate under the CENELEC thermal cycling test (ISO 16750-4:2010, 5.3.1.2, with Tmin -40°C and Tmax +85°C).



|           |                |                            |           |                        |                |                                |               |                   | CALIBRATION DRIFT  |                       |     |
|-----------|----------------|----------------------------|-----------|------------------------|----------------|--------------------------------|---------------|-------------------|--------------------|-----------------------|-----|
| Sensor    | Date & Time    | Gain Resistance / $\Omega$ | Peak / mV | Peak Current / $\mu$ A | Peak Time / ms | Clear <sub>95%</sub> Time / ms | Integral / mC | CALIBRATION DRIFT |                    |                       |     |
|           |                |                            |           |                        |                |                                |               | Peak $\Delta$ / % | Clear $\Delta$ / % | Integral $\Delta$ / % |     |
| 0 CYCLES  | Test Sample 1  | 10/03/2020 12:08           | 1000      | 141                    | 141            | 680                            | 8620          | 0.4451            | 0                  | 0                     | 0   |
|           | Test Sample 2  | 10/03/2020 12:16           | 1000      | 151                    | 151            | 680                            | 8400          | 0.4625            | 0                  | 0                     | 0   |
|           | Test Sample 3  | 10/03/2020 12:22           | 1000      | 165                    | 165            | 620                            | 7740          | 0.4613            | 0                  | 0                     | 0   |
|           | Test Sample 4  | 10/03/2020 12:29           | 1000      | 158                    | 158            | 620                            | 8040          | 0.4556            | 0                  | 0                     | 0   |
|           | Test Sample 5  | 10/03/2020 13:30           | 1000      | 152                    | 152            | 660                            | 8200          | 0.4414            | 0                  | 0                     | 0   |
|           | Test Sample 6  | 10/03/2020 14:52           | 1000      | 150                    | 150            | 660                            | 8600          | 0.4489            | 0                  | 0                     | 0   |
|           | Test Sample 7  | 10/03/2020 13:43           | 1000      | 155                    | 155            | 620                            | 7820          | 0.4324            | 0                  | 0                     | 0   |
|           | Test Sample 8  | 10/03/2020 13:47           | 1000      | 156                    | 156            | 620                            | 7840          | 0.4373            | 0                  | 0                     | 0   |
|           | Test Sample 9  | 10/03/2020 13:52           | 1000      | 170                    | 170            | 640                            | 7420          | 0.4561            | 0                  | 0                     | 0   |
|           | Test Sample 10 | 10/03/2020 13:56           | 1000      | 156                    | 156            | 640                            | 7940          | 0.4439            | 0                  | 0                     | 0   |
|           | Test Sample 11 | 10/03/2020 14:00           | 1000      | 169                    | 169            | 640                            | 8240          | 0.4820            | 0                  | 0                     | 0   |
|           | Test Sample 12 | 10/03/2020 14:03           | 1000      | 157                    | 157            | 600                            | 8400          | 0.4666            | 0                  | 0                     | 0   |
|           | Test Sample 13 | 10/03/2020 14:07           | 1000      | 157                    | 157            | 580                            | 8400          | 0.4615            | 0                  | 0                     | 0   |
| 1 CYCLE   | Test Sample 1  | 19/03/2020 14:11           | 1000      | 122                    | 122            | 960                            | 10220         | 0.4442            | -13                | 19                    | 0   |
|           | Test Sample 2  | 19/03/2020 14:44           | 1000      | 92                     | 92             | 1240                           | 14260         | 0.4702            | -39                | 70                    | 2   |
|           | Test Sample 3  | 19/03/2020 14:48           | 1000      | 114                    | 114            | 960                            | 11640         | 0.4826            | -31                | 50                    | 5   |
|           | Test Sample 4  | 19/03/2020 14:53           | 1000      | 140                    | 140            | 700                            | 9440          | 0.4571            | -11                | 17                    | 0   |
|           | Test Sample 5  | 19/03/2020 14:37           | 1000      | 129                    | 129            | 860                            | 10280         | 0.4645            | -15                | 25                    | 5   |
|           | Test Sample 6  | 19/03/2020 14:57           | 1000      | 133                    | 133            | 760                            | 10540         | 0.4664            | -11                | 23                    | 4   |
|           | Test Sample 7  | 19/03/2020 15:02           | 1000      | 115                    | 115            | 980                            | 11300         | 0.4553            | -26                | 45                    | 5   |
|           | Test Sample 8  | 19/03/2020 15:06           | 1000      | 126                    | 126            | 880                            | 10160         | 0.4514            | -19                | 30                    | 3   |
|           | Test Sample 9  | 19/03/2020 15:09           | 1000      | 142                    | 142            | 780                            | 9780          | 0.4804            | -16                | 32                    | 5   |
|           | Test Sample 10 | 19/03/2020 15:11           | 1000      | 115                    | 115            | 960                            | 11540         | 0.4624            | -26                | 45                    | 4   |
|           | Test Sample 11 | 19/03/2020 15:15           | 1000      | 116                    | 116            | 1000                           | 11900         | 0.4943            | -31                | 44                    | 3   |
|           | Test Sample 12 | 19/03/2020 15:21           | 1000      | 112                    | 112            | 1000                           | 11440         | 0.4615            | -29                | 36                    | -1  |
|           | Test Sample 13 | 19/03/2020 15:26           | 1000      | 115                    | 115            | 940                            | 11300         | 0.4626            | -27                | 35                    | 0   |
| 31 CYCLES | Test Sample 1  | 30/03/2020 12:58           | 1000      | 65                     | 65             | 1160                           | 19480         | 0.3976            | -54                | 126                   | -11 |
|           | Test Sample 2  | 30/03/2020 13:09           | 1000      | 67                     | 67             | 1240                           | 19480         | 0.4007            | -56                | 132                   | -13 |
|           | Test Sample 3  | 30/03/2020 13:13           | 1000      | 73                     | 73             | 1220                           | 19060         | 0.4297            | -56                | 146                   | -7  |
|           | Test Sample 4  | 30/03/2020 13:17           | 1000      | 80                     | 80             | 980                            | 16140         | 0.3812            | -49                | 101                   | -16 |
|           | Test Sample 5  | 30/03/2020 13:20           | 1000      | 84                     | 84             | 1040                           | 18000         | 0.4384            | -45                | 120                   | -1  |
|           | Test Sample 6  | 30/03/2020 13:26           | 1000      | 84                     | 84             | 900                            | 17180         | 0.4152            | -44                | 100                   | -8  |
|           | Test Sample 7  | 30/03/2020 13:32           | 1000      | 74                     | 74             | 1080                           | 17040         | 0.3890            | -52                | 118                   | -10 |
|           | Test Sample 8  | 30/03/2020 13:37           | 1000      | 80                     | 80             | 1000                           | 14120         | 0.3897            | -49                | 80                    | -11 |
|           | Test Sample 9  | 30/03/2020 13:42           | 1000      | 85                     | 85             | 1000                           | 16880         | 0.4363            | -50                | 127                   | -4  |
|           | Test Sample 10 | 30/03/2020 13:47           | 1000      | 72                     | 72             | 1220                           | 18000         | 0.3991            | -54                | 127                   | -10 |
|           | Test Sample 11 | 30/03/2020 13:52           | 1000      | 75                     | 75             | 1180                           | 18580         | 0.4227            | -56                | 125                   | -12 |
|           | Test Sample 12 | 30/03/2020 13:58           | 1000      | 71                     | 71             | 1200                           | 19620         | 0.4276            | -55                | 134                   | -8  |
|           | Test Sample 13 | 30/03/2020 14:03           | 1000      | 77                     | 77             | 1080                           | 16940         | 0.4193            | -51                | 102                   | -9  |