



## Features

- Low On-Resistance
- Fast Switching Speed
- 100% avalanche tested
- Lead Free and Green Devices Available (RoHS Compliant)

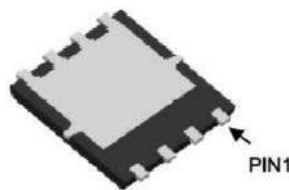
## Product Summary

|                             |     |            |
|-----------------------------|-----|------------|
| $V_{DSS}$                   | 40  | V          |
| $R_{DS(ON)-Typ@V_{GS}=10V}$ | 3.5 | m $\Omega$ |
| $I_D$                       | 80  | A          |

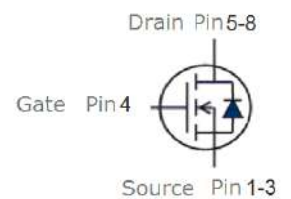
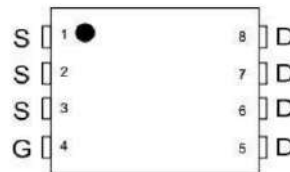
## Application

- DC/DC Converters
- On board power for server
- Synchronous rectification

top view



DFN5x6-8



## Absolute Maximum Ratings

| Symbol   | Parameter                                       | Rating                        | Unit             |
|--|---|-------------------------------|------------------|
| <b>Common Ratings</b> ( $T_C=25^\circ\text{C}$ Unless Otherwise Noted) |   |                               |                  |
| $V_{DSS}$  | Drain-Source Voltage                            | 40                            | V                |
| $V_{GSS}$  | Gate-Source Voltage                             | $\pm 20$                      |                  |
| $T_J$  | Maximum Junction Temperature                    | 150                           | $^\circ\text{C}$ |
| $T_{STG}$  | Storage Temperature Range                       | -55 to 150                    | $^\circ\text{C}$ |
| $I_S$  | Diode Continuous Forward Current                | $T_C=25^\circ\text{C}$<br>50  | A                |
| <b>Mounted on Large Heat Sink</b>                                      |   |                               |                  |
| $I_{DP}^{①}$   | 300 $\mu\text{s}$ Pulse Drain Current Tested    | $T_C=25^\circ\text{C}$<br>320 | A                |
| $I_D^{②}$  | Continuous Drain Current@ $T_C(V_{GS}=10V)$     | $T_C=25^\circ\text{C}$<br>80  | A                |
|  |   | $T_C=100^\circ\text{C}$<br>51 |                  |
|  | Continuous Drain Current@ $T_A(V_{GS}=10V)^{③}$ | $T_A=25^\circ\text{C}$<br>25  |                  |
|  |   | $T_A=70^\circ\text{C}$<br>19  |                  |
| $P_D$  | Maximum Power Dissipation@ $T_C$                | $T_C=25^\circ\text{C}$<br>65  | W                |
|  |   | $T_C=100^\circ\text{C}$<br>26 |                  |
|  | Maximum Power Dissipation@ $T_A^{③}$            | $T_A=25^\circ\text{C}$<br>4.2 |                  |
|  |   | $T_A=70^\circ\text{C}$<br>2.7 |                  |



| Symbol                                | Parameter                              | Rating | Unit          |
|---------------------------------------|--|--------|---------------|
| $R_{\theta JC}$                       | Thermal Resistance-Junction to Case    | 1.92   | $^{\circ}C/W$ |
| $R_{\theta JA}$ <sup>③</sup>          | Thermal Resistance-Junction to Ambient | 30     | $^{\circ}C/W$ |
| <b>Drain-Source Avalanche Ratings</b> |  |        |               |
| $E_{AS}$ <sup>④</sup>                 | Avalanche Energy, Single Pulsed        | 121    | mJ            |

**Electrical Characteristics** ( $T_C=25^{\circ}C$  Unless Otherwise Noted)

| Symbol  | Parameter                        | Test Condition                                       | LIMITS |      |           | Unit       |
|---|----------------------------------|--|--------|------|-----------|------------|
|   |                                  |  | Min.   | Typ. | Max.      |            |
| <b>Static Characteristics</b>                   |                                  |  |        |      |           |            |
| $BV_{DSS}$                                      | Drain-Source Breakdown Voltage   | $V_{GS}=0V, I_{DS}=250\mu A$                         | 40     |      |           | V          |
| $I_{DSS}$                                       | Zero Gate Voltage Drain Current  | $V_{DS}=40V, V_{GS}=0V$                              |        |      | 1         | $\mu A$    |
|   |                                  | $T_J=125^{\circ}C$                                   |        |      | 30        |            |
| $V_{GS(th)}$                                    | Gate Threshold Voltage           | $V_{DS}=V_{GS}, I_{DS}=250\mu A$                     | 1      |      | 2.5       | V          |
| $I_{GSS}$                                       | Gate Leakage Current             | $V_{GS}=\pm 20V, V_{DS}=0V$                          |        |      | $\pm 100$ | nA         |
| $R_{DS(ON)}$ <sup>⑤</sup>                       | Drain-Source On-state Resistance | $V_{GS}=4.5V, I_{DS}=35A$                            |        | 4.5  | 5.5       | m $\Omega$ |
|   |                                  | $V_{GS}=10V, I_{DS}=50A$                             |        | 3.5  | 4.5       | m $\Omega$ |
| <b>Diode Characteristics</b>                    |                                  |  |        |      |           |            |
| $V_{SD}$ <sup>⑤</sup>                           | Diode Forward Voltage            | $I_{SD}=50A, V_{GS}=0V$                              |        |      | 1.2       | V          |
| $t_{rr}$  | Reverse Recovery Time            | $I_{SD}=50A, di_{SD}/dt=100A/\mu s$                  |        | 18   |           | ns         |
| $Q_{rr}$  | Reverse Recovery Charge          |  |        | 29   |           | nC         |
| <b>Dynamic Characteristics</b> <sup>⑥</sup>     |                                  |  |        |      |           |            |
| $R_G$   | Gate Resistance                  | $V_{GS}=0V, V_{DS}=0V, F=1MHz$                       |        | 1.3  |           | $\Omega$   |
| $C_{iss}$                                       | Input Capacitance                | $V_{GS}=0V, V_{DS}=20V, Frequency=1.0MHz$            |        | 1560 |           | pF         |
| $C_{oss}$                                       | Output Capacitance               |  |        | 780  |           |            |
| $C_{rss}$                                       | Reverse Transfer Capacitance     |  |        | 80   |           |            |
| $t_{d(ON)}$                                     | Turn-on Delay Time               | $V_{DD}=20V, I_{DS}=50A, V_{GEN}=10V, R_G=4.7\Omega$ |        | 13   |           | ns         |
| $t_r$   | Turn-on Rise Time                |  |        | 21   |           |            |
| $t_{d(OFF)}$                                    | Turn-off Delay Time              |  |        | 29   |           |            |
| $t_f$   | Turn-off Fall Time               |  |        | 9    |           |            |
| <b>Gate Charge Characteristics</b> <sup>⑥</sup> |                                  |  |        |      |           |            |
| $Q_g$   | Total Gate Charge                | $V_{DS}=32V, V_{GS}=10V, I_{DS}=50A$                 |        | 29   |           | nC         |
| $Q_{gs}$  | Gate-Source Charge               |  |        | 5    |           |            |
| $Q_{gd}$  | Gate-Drain Charge                |  |        | 9    |           |            |



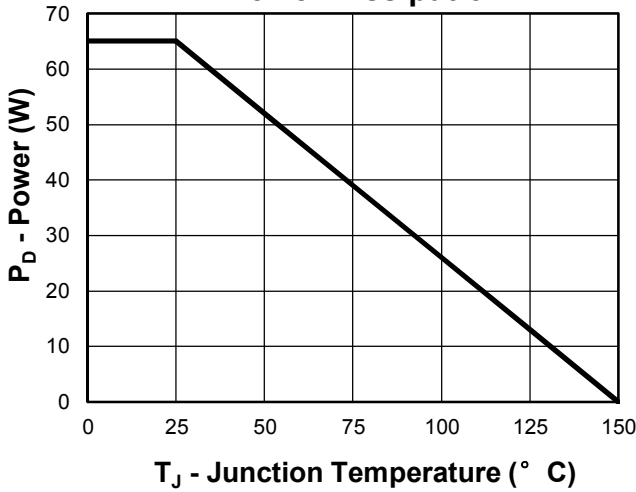
Notes:

- ①Pulse width limited by safe operating area.
- ②Calculated continuous current based on maximum allowable junction temperature. The package limitation current is 50A.
- ③When mounted on 1 inch square copper board,  $t \leq 10\text{sec}$ .
- ④Limited by  $T_{J\text{max}}$ ,  $I_{AS} = 22\text{A}$ ,  $V_{DD} = 24\text{V}$ ,  $R_G = 50\Omega$ , Starting  $T_J = 25^\circ\text{C}$ .
- ⑤Pulse test;Pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .
- ⑥Guaranteed by design, not subject to production testing.

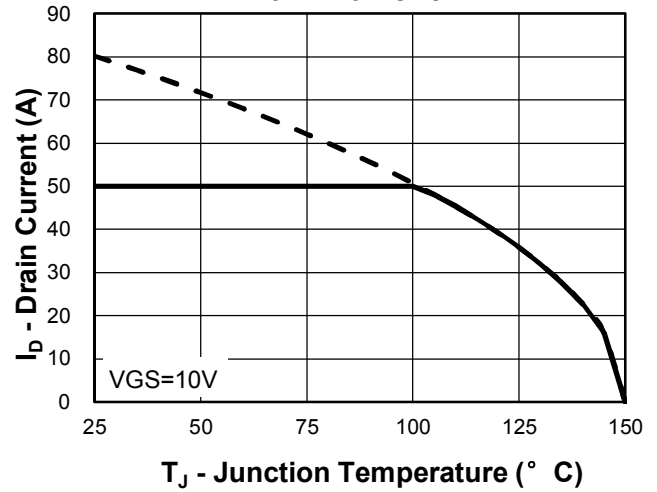


### Typical Characteristics

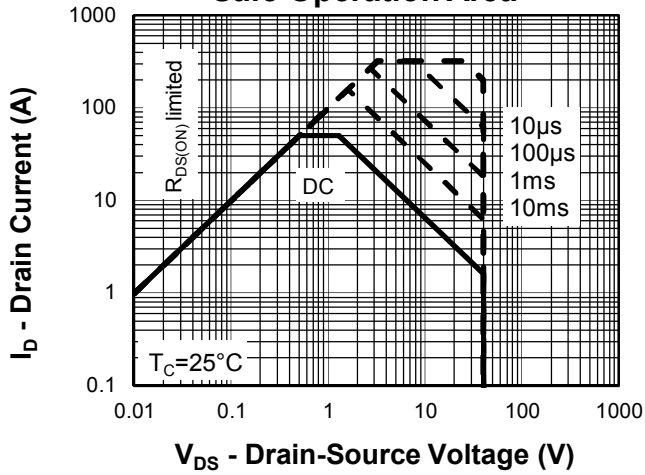
#### Power Dissipation



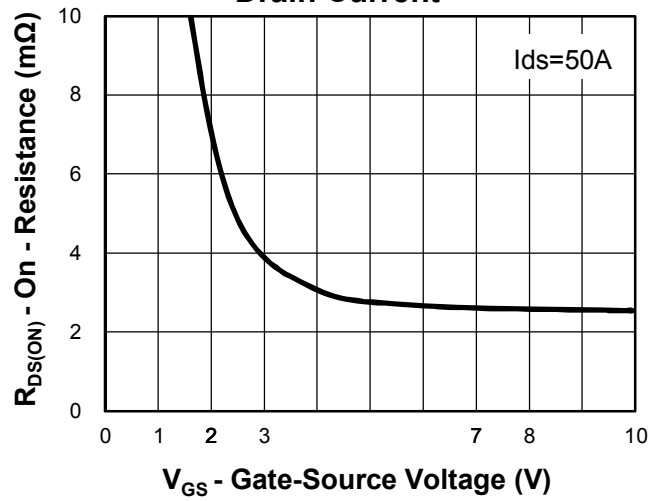
#### Drain Current



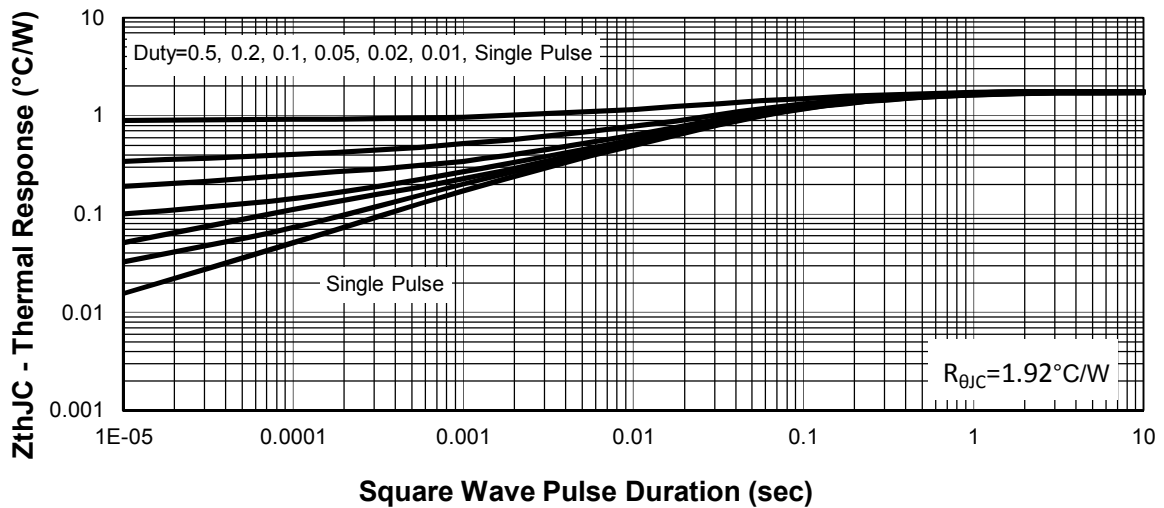
#### Safe Operation Area



#### Drain Current



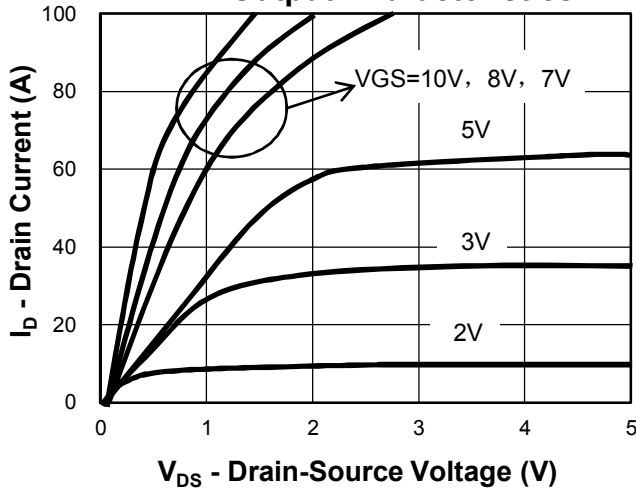
#### Thermal Transient Impedance



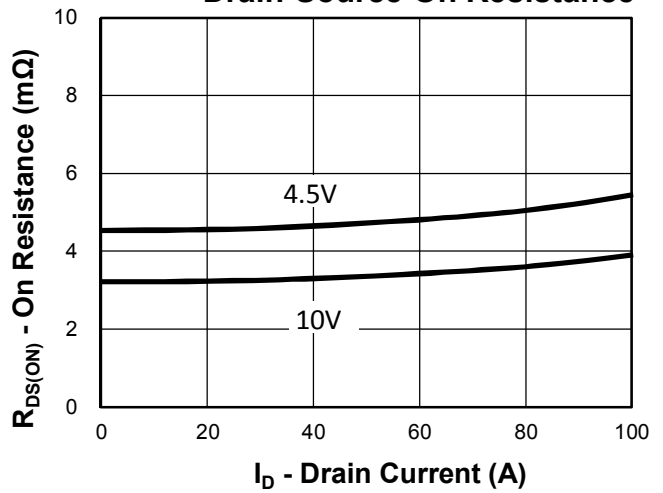


### Typical Characteristics

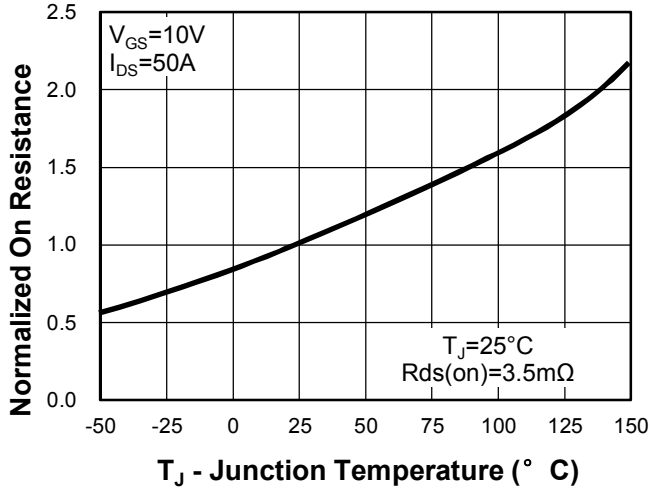
#### Output Characteristics



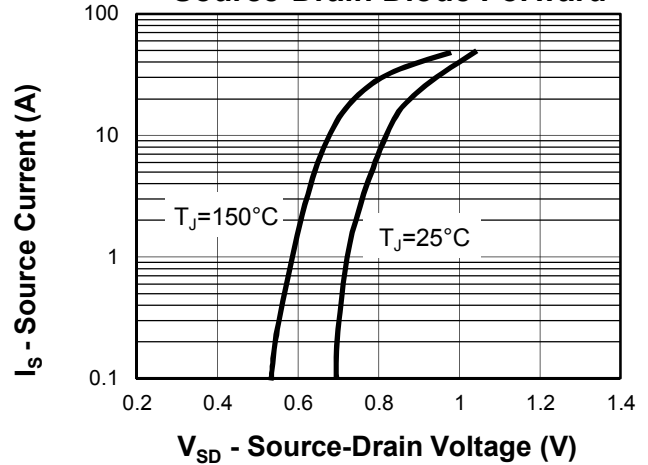
#### Drain-Source On Resistance



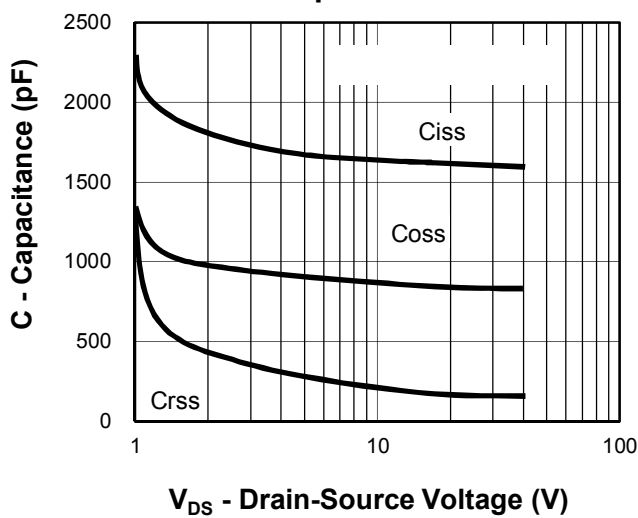
#### Drain-Source On Resistance



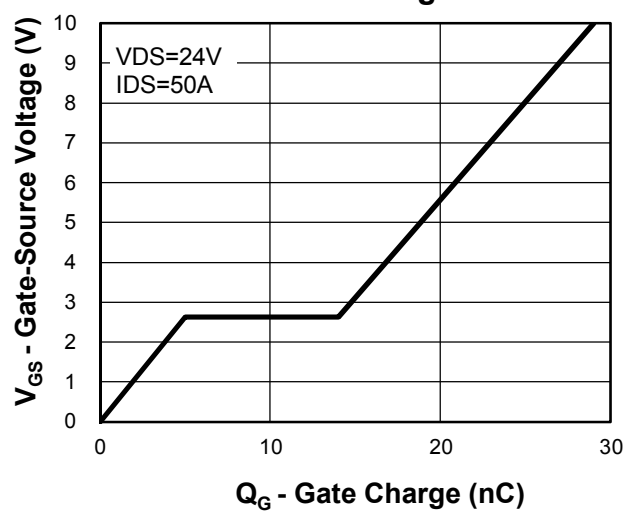
#### Source-Drain Diode Forward



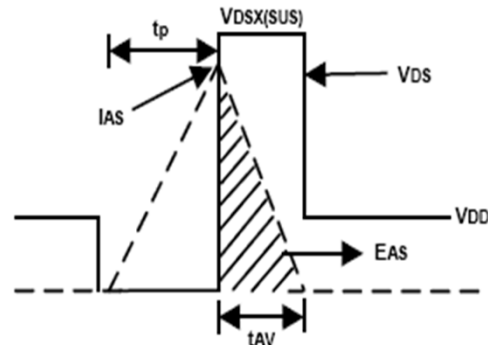
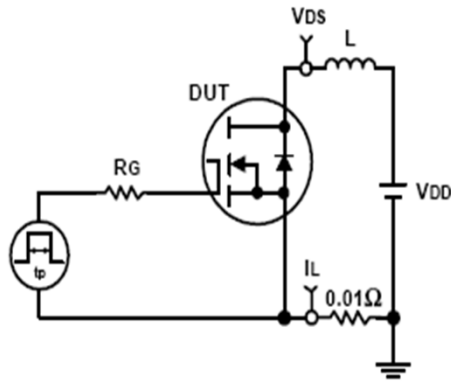
#### Capacitance



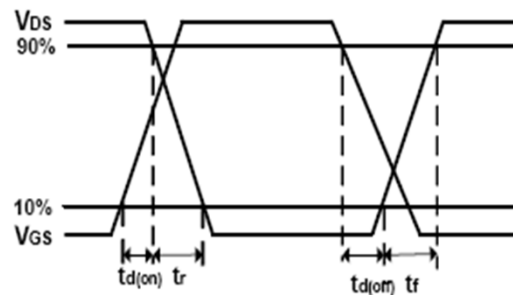
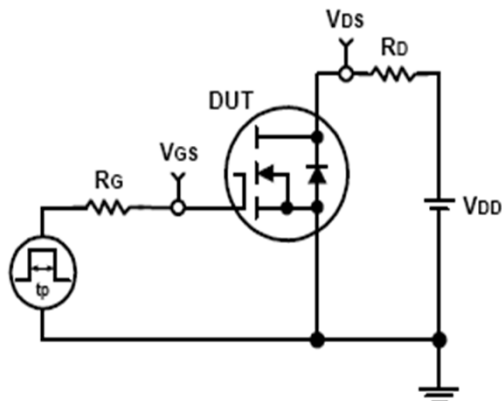
#### Gate Charge



### Avalanche Test Circuit and Waveforms

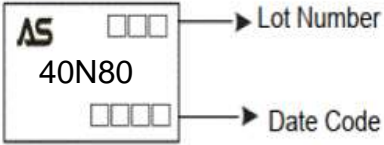


### Switching Time Test Circuit and Waveforms

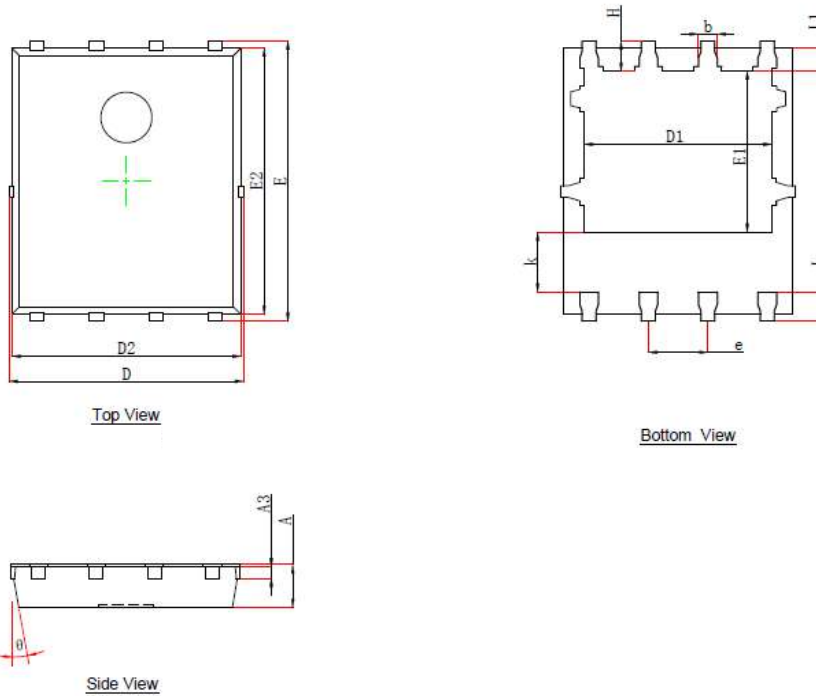


## Ordering and Marking Information

| Ordering Device No. | Marking | Package  | Packing   | Quantity |
|---------------------|---------|----------|-----------|----------|
| ASDM40N80Q          | 40N80   | DFN5*6-8 | Tape&Reel | 4000     |

| PACKAGE  | MARKING  |
|----------|--|
| DFN5*6-8 |  <p>The diagram shows a rectangular marking area on a component. It contains the letters 'AS' in the top left, '40N80' in the center, and two sets of four empty boxes. An arrow points from the top-right boxes to the text 'Lot Number', and another arrow points from the bottom-right boxes to the text 'Date Code'.</p> |

### DFN5x6\_P, 8 Leads



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 0.900                     | 1.000 | 0.035                | 0.039 |
| A3     | 0.254REF.                 |       | 0.010REF.            |       |
| D      | 4.944                     | 5.096 | 0.195                | 0.201 |
| E      | 5.974                     | 6.126 | 0.235                | 0.241 |
| D1     | 3.910                     | 4.110 | 0.154                | 0.162 |
| E1     | 3.375                     | 3.575 | 0.133                | 0.141 |
| D2     | 4.824                     | 4.976 | 0.190                | 0.196 |
| E2     | 5.674                     | 5.826 | 0.223                | 0.229 |
| k      | 1.190                     | 1.390 | 0.047                | 0.055 |
| b      | 0.350                     | 0.450 | 0.014                | 0.018 |
| e      | 1.270TYP.                 |       | 0.050TYP.            |       |
| L      | 0.559                     | 0.711 | 0.022                | 0.028 |
| L1     | 0.424                     | 0.576 | 0.017                | 0.023 |
| H      | 0.574                     | 0.726 | 0.023                | 0.029 |
| θ      | 10°                       | 12°   | 10°                  | 12°   |



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