



PD55008L

RF POWER TRANSISTORS

The LdmoST Plastic FAMILY

ADVANCED DATA

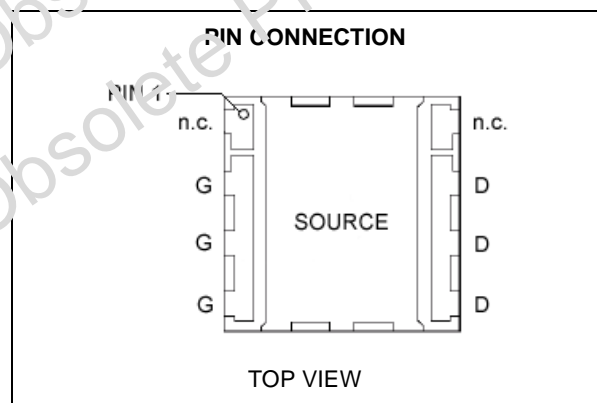
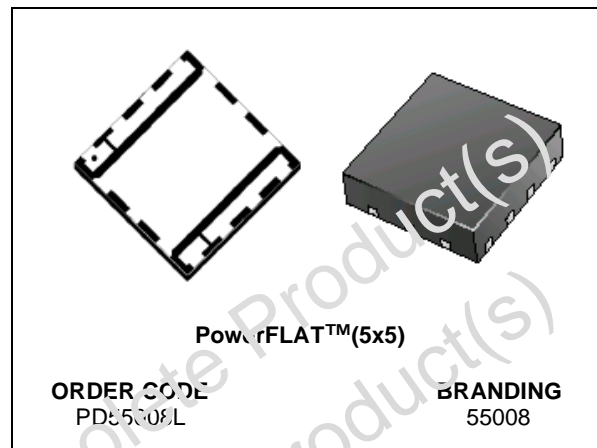
N-CHANNEL ENHANCEMENT-MODE LATERAL MOSFETs

- EXCELLENT THERMAL STABILITY
- COMMON SOURCE CONFIGURATION
- $P_{OUT} = 8\text{ W}$ with 17 dB gain @ 500 MHz / 12.5V
- INTEGRATED ESD PROTECTION
- NEW LEADLESS PLASTIC PACKAGE
- SUPPLIED IN TAPE & REEL OF 3K UNITS

DESCRIPTION

The PD55008L is a common source N-Channel, enhancement-mode lateral Field-Effect RF power transistor. It is designed for high gain, broad band commercial and industrial applications. It operates at 12 V in common source mode at frequencies up to 1 GHz.

PD55008L boasts the excellent gain, linearity and reliability of STH1LV latest CMOS technology mounted in the innovative leadless SMD plastic package, PowerFLAT™. PD55008L's superior linearity performance makes it an ideal solution for car mobile radio.



ABSOLUTE MAXIMUM RATINGS ($T_{CASE} = 25\text{ }^{\circ}\text{C}$)

| Symbol | Parameter | Value | Unit |
|------------|---|-------------|--------------------|
| V_{DS} | Drain-Source Voltage | 40 | V |
| V_{GS} | Gate-Source Voltage | -0.5 to 15 | V |
| I_D | Drain Current | 5 | A |
| P_{DISS} | Power Dissipation (@ $T_c = 70\text{ }^{\circ}\text{C}$) | 19.5 | W |
| T_j | Max. Operating Junction Temperature | 150 | $^{\circ}\text{C}$ |
| T_{STG} | Storage Temperature | -65 to +150 | $^{\circ}\text{C}$ |

THERMAL DATA

| | | | |
|---------------|-----------------------------------|-----|-----------------------------|
| $R_{th(j-c)}$ | Junction -Case Thermal Resistance | 4.1 | $^{\circ}\text{C}/\text{W}$ |
|---------------|-----------------------------------|-----|-----------------------------|

PD55008L

ELECTRICAL SPECIFICATION ($T_{CASE} = 25\text{ }^{\circ}\text{C}$)

STATIC

| Symbol | Test Conditions | Min. | Typ. | Max. | Unit |
|--------------|---|------|------|------|---------------|
| I_{DSS} | $V_{GS} = 0\text{ V}$ $V_{DS} = 28\text{ V}$ | | | 1 | μA |
| I_{GSS} | $V_{GS} = 5\text{ V}$ $V_{DS} = 0\text{ V}$ | | | 1 | μA |
| $V_{GS(Q)}$ | $V_{DS} = 10\text{ V}$ $I_D = 150\text{ mA}$ | 2.0 | | 5.0 | V |
| $V_{DS(ON)}$ | $V_{GS} = 10\text{ V}$ $I_D = 0.5\text{ A}$ | | 0.13 | 0.14 | V |
| G_{FS} | $V_{DS} = 10\text{ V}$ $I_D = 1.5\text{ A}$ | | 1.6 | | mho |
| C_{ISS} | $V_{GS} = 0\text{ V}$ $V_{DS} = 12.5\text{ V}$ $f = 1\text{ MHz}$ | | 53 | | pF |
| C_{OSS} | $V_{GS} = 0\text{ V}$ $V_{DS} = 12.5\text{ V}$ $f = 1\text{ MHz}$ | | 38 | | pF |
| C_{RSS} | $V_{GS} = 0\text{ V}$ $V_{DS} = 12.5\text{ V}$ $f = 1\text{ MHz}$ | | 3.2 | | pF |

DYNAMIC

| Symbol | Test Conditions | Min. | Typ. | Max. | Unit |
|---------------|---|------|------|------|------|
| P_{OUT} | $V_{DD} = 12.5\text{ V}$ $I_{DQ} = 150\text{ mA}$ $f = 500\text{ MHz}$ | 3 | | | W |
| G_P | $V_{DD} = 12.5\text{ V}$ $I_{DQ} = 150\text{ mA}$ $P_{OUT} = 8\text{ W}$ $f = 500\text{ MHz}$ | 17 | 19 | | dB |
| η_D | $V_{DD} = 12.5\text{ V}$ $I_{DQ} = 150\text{ mA}$ $P_{OUT} = 8\text{ W}$ $f = 500\text{ MHz}$ | 55 | 63 | | % |
| Load mismatch | $V_{DD} = 15.5\text{ V}$ $I_{DQ} = 150\text{ mA}$ $P_{OUT} = 8\text{ W}$ $f = 500\text{ MHz}$ ALL PHASE ANGLES | 20:1 | | | VSWR |

ESD PROTECTION CHARACTERISTICS

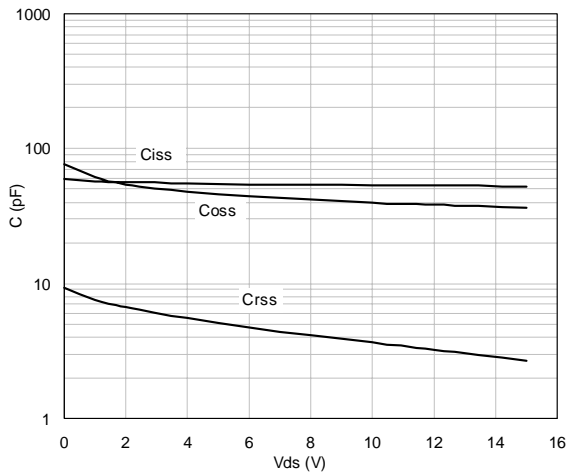
| Test Conditions | Class |
|------------------|-------|
| Human Body Model | 2 |
| Machine Model | M3 |

MOISTURE SENSITIVITY LEVEL

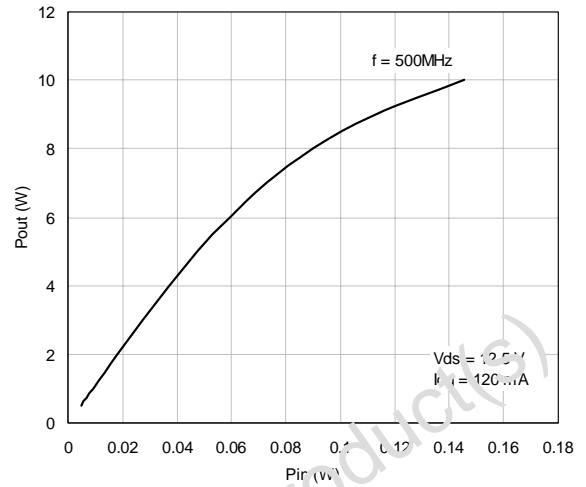
| Test Methodology | Rating |
|------------------|--------|
| J-STD-020B | MSL 3 |

TYPICAL PERFORMANCE

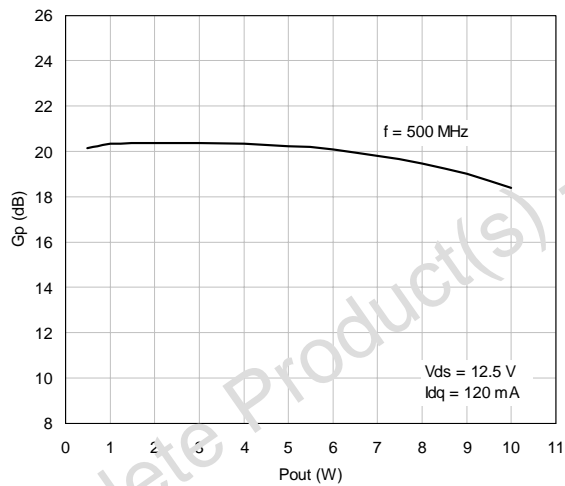
Capacitance Vs Supply Voltage



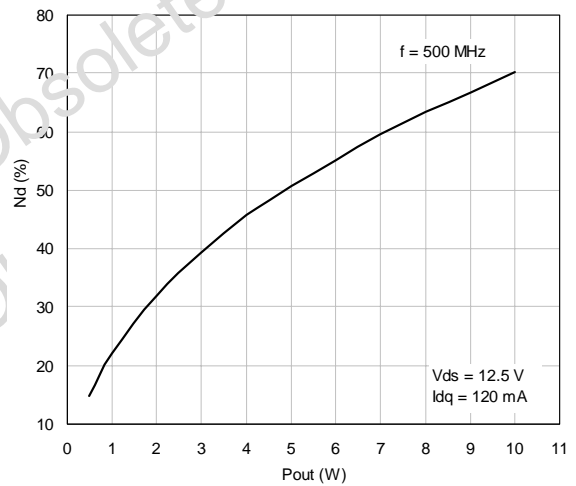
Output Power Vs Input Power



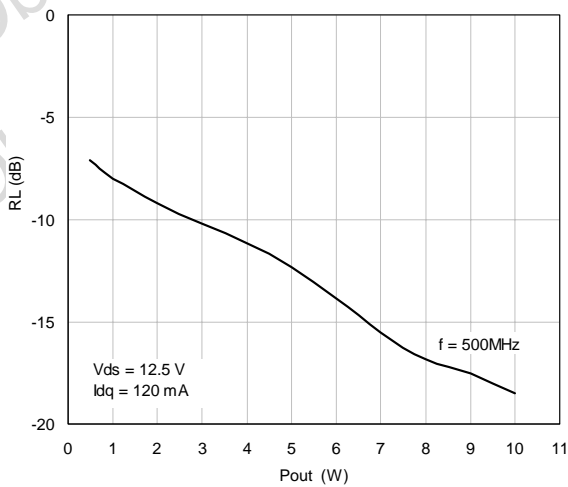
Power Gain Vs Output Power



Efficiency Vs Output Power



Input Return Loss Vs Output Power



PD55008L

S-PARAMETER (PD55008L)

($V_{DS} = 12.5V$ $I_{DS} = 0.15A$)

| FREQ (MHz) | $ S_{11} $ | $\angle S_{11}$ | $ S_{21} $ | $\angle S_{21}$ | $ S_{12} $ | $\angle S_{12}$ | $ S_{22} $ | $\angle S_{22}$ |
|---------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| 50 | 0.783 | -134 | 16.75 | 100 | 0.034 | 11 | 0.654 | -135 |
| 100 | 0.774 | -153 | 8.73 | 82 | 0.034 | -6 | 0.667 | -150 |
| 150 | 0.791 | -159 | 5.61 | 70 | 0.033 | -15 | 0.698 | -155 |
| 200 | 0.814 | -163 | 4.00 | 61 | 0.029 | -22 | 0.737 | -157 |
| 250 | 0.838 | -165 | 3.00 | 54 | 0.027 | -28 | 0.775 | -159 |
| 300 | 0.862 | -166 | 2.34 | 47 | 0.023 | -32 | 0.806 | -161 |
| 350 | 0.879 | -168 | 1.87 | 41 | 0.021 | -35 | 0.837 | -163 |
| 400 | 0.894 | -169 | 1.52 | 37 | 0.018 | -37 | 0.861 | -164 |
| 450 | 0.908 | -171 | 1.26 | 32 | 0.015 | -37 | 0.881 | -166 |
| 500 | 0.919 | -172 | 1.06 | 28 | 0.013 | -37 | 0.910 | -167 |
| 550 | 0.927 | -173 | 0.91 | 25 | 0.010 | -36 | 0.911 | -168 |
| 600 | 0.937 | -174 | 0.78 | 22 | 0.009 | -33 | 0.917 | -169 |
| 650 | 0.942 | -175 | 0.68 | 19 | 0.007 | 20 | 0.931 | -170 |
| 700 | 0.945 | -176 | 0.60 | 16 | 0.005 | -7 | 0.938 | -171 |
| 750 | 0.948 | -177 | 0.53 | 14 | 0.005 | 14 | 0.940 | -172 |
| 800 | 0.953 | -178 | 0.47 | 12 | 0.006 | 36 | 0.950 | -173 |
| 850 | 0.956 | -179 | 0.42 | 11 | 0.007 | 48 | 0.954 | -173 |
| 900 | 0.956 | -179 | 0.38 | 9 | 0.007 | 60 | 0.957 | -174 |
| 950 | 0.957 | 180 | 0.34 | 7 | 0.009 | 66 | 0.960 | -175 |
| 1000 | 0.957 | 179 | 0.31 | 6 | 0.010 | 71 | 0.960 | -176 |
| 1050 | 0.958 | 178 | 0.28 | 4 | 0.012 | 73 | 0.960 | -176 |
| 1100 | 0.959 | 177 | 0.26 | 3 | 0.013 | 75 | 0.967 | -177 |
| 1150 | 0.960 | 177 | 0.24 | 2 | 0.014 | 73 | 0.967 | -177 |
| 1200 | 0.959 | 176 | 0.22 | 1 | 0.015 | 79 | 0.966 | -178 |
| 1250 | 0.958 | 176 | 0.20 | 0 | 0.017 | 78 | 0.970 | -178 |
| 1300 | 0.957 | 175 | 0.19 | -1 | 0.019 | 78 | 0.970 | -179 |
| 1350 | 0.956 | 174 | 0.18 | -2 | 0.020 | 78 | 0.971 | -180 |
| 1400 | 0.954 | 174 | 0.16 | -3 | 0.020 | 80 | 0.971 | -180 |
| 1450 | 0.952 | 173 | 0.15 | -4 | 0.022 | 80 | 0.968 | 180 |
| 1500 | 0.951 | 173 | 0.14 | -5 | 0.023 | 81 | 0.970 | 179 |

S-PARAMETER (PD55008L)(V_{DS} = 12.5V I_{DS} = 0.8A)

| FREQ (MHz) | S ₁₁ | S ₁₁ ∠Φ | S ₂₁ | S ₂₁ ∠Φ | S ₁₂ | S ₁₂ ∠Φ | S ₂₂ | S ₂₂ ∠Φ |
|---------------|-----------------|--------------------|-----------------|--------------------|-----------------|--------------------|-----------------|--------------------|
| 50 | 0.828 | -147 | 19.60 | 97 | 0.023 | 11 | 0.691 | -154 |
| 100 | 0.822 | -162 | 10.11 | 84 | 0.023 | -1 | 0.714 | -164 |
| 150 | 0.829 | -167 | 6.61 | 75 | 0.022 | -7 | 0.729 | -166 |
| 200 | 0.839 | -169 | 4.82 | 68 | 0.021 | -11 | 0.749 | -167 |
| 250 | 0.852 | -170 | 3.71 | 62 | 0.019 | -16 | 0.772 | -167 |
| 300 | 0.866 | -171 | 2.97 | 56 | 0.017 | -17 | 0.793 | -168 |
| 350 | 0.877 | -172 | 2.43 | 51 | 0.015 | -18 | 0.815 | -168 |
| 400 | 0.887 | -173 | 2.02 | 46 | 0.014 | -18 | 0.833 | -169 |
| 450 | 0.898 | -174 | 1.71 | 42 | 0.012 | -16 | 0.852 | -169 |
| 500 | 0.907 | -175 | 1.47 | 38 | 0.010 | -12 | 0.871 | -170 |
| 550 | 0.916 | -175 | 1.27 | 34 | 0.009 | -10 | 0.879 | -170 |
| 600 | 0.923 | -176 | 1.10 | 31 | 0.008 | | 0.887 | -172 |
| 650 | 0.929 | -177 | 0.98 | 27 | 0.007 | 12 | 0.904 | -172 |
| 700 | 0.931 | -178 | 0.86 | 25 | 0.007 | 23 | 0.911 | -173 |
| 750 | 0.937 | -179 | 0.77 | 22 | 0.008 | 37 | 0.916 | -173 |
| 800 | 0.942 | -179 | 0.69 | 20 | 0.008 | 44 | 0.928 | -174 |
| 850 | 0.948 | -180 | 0.62 | 17 | 0.009 | 53 | 0.933 | -174 |
| 900 | 0.946 | 180 | 0.56 | 15 | 0.010 | 61 | 0.936 | -175 |
| 950 | 0.948 | 179 | 0.51 | 13 | 0.011 | 65 | 0.940 | -176 |
| 1000 | 0.950 | 178 | 0.47 | 12 | 0.012 | 67 | 0.943 | -176 |
| 1050 | 0.950 | 178 | 0.43 | 10 | 0.013 | 71 | 0.945 | -177 |
| 1100 | 0.953 | 177 | 0.39 | 8 | 0.016 | 71 | 0.951 | -177 |
| 1150 | 0.953 | 176 | 0.36 | 7 | 0.016 | 72 | 0.951 | -178 |
| 1200 | 0.953 | 176 | 0.34 | 5 | 0.017 | 75 | 0.953 | -178 |
| 1250 | 0.952 | 175 | 0.31 | 4 | 0.019 | 75 | 0.958 | -179 |
| 1300 | 0.952 | 175 | 0.29 | 3 | 0.021 | 75 | 0.958 | -179 |
| 1350 | 0.951 | 174 | 0.27 | 1 | 0.022 | 75 | 0.960 | -180 |
| 1400 | 0.951 | 174 | 0.25 | 0 | 0.023 | 76 | 0.960 | 180 |
| 1450 | 0.949 | 173 | 0.23 | 0 | 0.024 | 76 | 0.959 | 180 |
| 1500 | 0.950 | 173 | 0.21 | 0 | 0.025 | 75 | 0.960 | 179 |

PD55008L

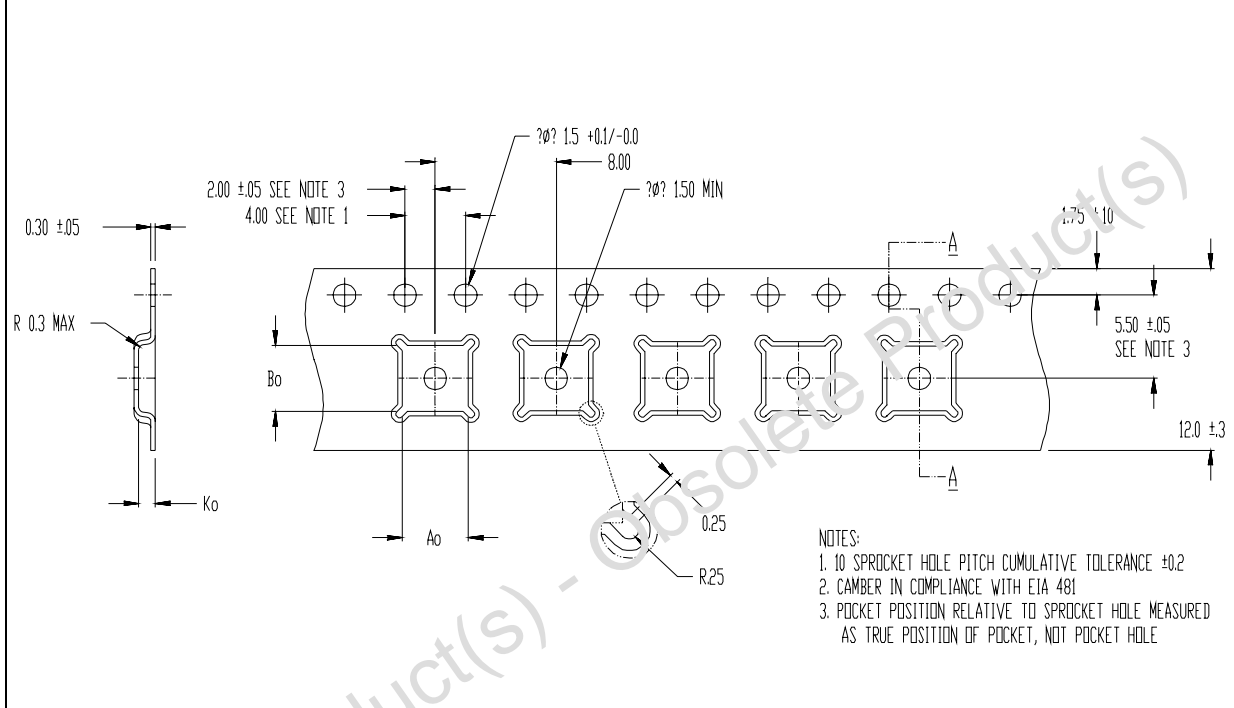
S-PARAMETER (PD55008L)

($V_{DS} = 12.5V$ $I_{DS} = 1.5 A$)

| FREQ (MHz) | $ S_{11} $ | $\angle S_{11}$ | $ S_{21} $ | $\angle S_{21}$ | $ S_{12} $ | $\angle S_{12}$ | $ S_{22} $ | $\angle S_{22}$ |
|---------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| 50 | 0.835 | -145 | 18.15 | 98 | 0.023 | 11 | 0.681 | -156 |
| 100 | 0.831 | -161 | 9.38 | 84 | 0.023 | -1 | 0.711 | -164 |
| 150 | 0.837 | -166 | 6.14 | 75 | 0.022 | -7 | 0.729 | -166 |
| 200 | 0.847 | -169 | 4.47 | 68 | 0.020 | -11 | 0.751 | -167 |
| 250 | 0.858 | -170 | 3.44 | 61 | 0.019 | -15 | 0.773 | -168 |
| 300 | 0.872 | -171 | 2.74 | 55 | 0.017 | -17 | 0.794 | -168 |
| 350 | 0.882 | -172 | 2.24 | 50 | 0.015 | -17 | 0.819 | -168 |
| 400 | 0.893 | -173 | 1.87 | 46 | 0.014 | -18 | 0.837 | -169 |
| 450 | 0.904 | -174 | 1.58 | 41 | 0.012 | -16 | 0.855 | -170 |
| 500 | 0.913 | -175 | 1.35 | 37 | 0.010 | -13 | 0.875 | -170 |
| 550 | 0.920 | -176 | 1.17 | 33 | 0.009 | -5 | 0.881 | -170 |
| 600 | 0.927 | -177 | 1.02 | 30 | 0.008 | | 0.890 | -172 |
| 650 | 0.931 | -177 | 0.89 | 27 | 0.007 | 13 | 0.905 | -172 |
| 700 | 0.935 | -178 | 0.79 | 24 | 0.007 | 28 | 0.914 | -173 |
| 750 | 0.940 | -179 | 0.70 | 22 | 0.008 | 41 | 0.919 | -173 |
| 800 | 0.944 | -180 | 0.63 | 19 | 0.008 | 48 | 0.930 | -174 |
| 850 | 0.948 | 180 | 0.57 | 17 | 0.009 | 55 | 0.934 | -175 |
| 900 | 0.948 | 179 | 0.51 | 15 | 0.010 | 61 | 0.936 | -175 |
| 950 | 0.947 | 179 | 0.47 | 13 | 0.011 | 65 | 0.943 | -176 |
| 1000 | 0.949 | 178 | 0.43 | 11 | 0.013 | 66 | 0.943 | -176 |
| 1050 | 0.949 | 177 | 0.39 | 10 | 0.014 | 70 | 0.947 | -177 |
| 1100 | 0.951 | 177 | 0.36 | 8 | 0.015 | 72 | 0.953 | -177 |
| 1150 | 0.951 | 176 | 0.33 | 7 | 0.016 | 72 | 0.955 | -178 |
| 1200 | 0.952 | 176 | 0.30 | 5 | 0.018 | 74 | 0.957 | -178 |
| 1250 | 0.951 | 175 | 0.28 | 4 | 0.019 | 73 | 0.960 | -179 |
| 1300 | 0.950 | 174 | 0.26 | 3 | 0.021 | 75 | 0.959 | -179 |
| 1350 | 0.951 | 174 | 0.24 | 2 | 0.021 | 75 | 0.961 | -180 |
| 1400 | 0.950 | 173 | 0.22 | 1 | 0.023 | 76 | 0.962 | -180 |
| 1450 | 0.948 | 173 | 0.21 | 1 | 0.024 | 76 | 0.960 | 180 |
| 1500 | 0.949 | 172 | 0.20 | 1 | 0.025 | 75 | 0.963 | 179 |

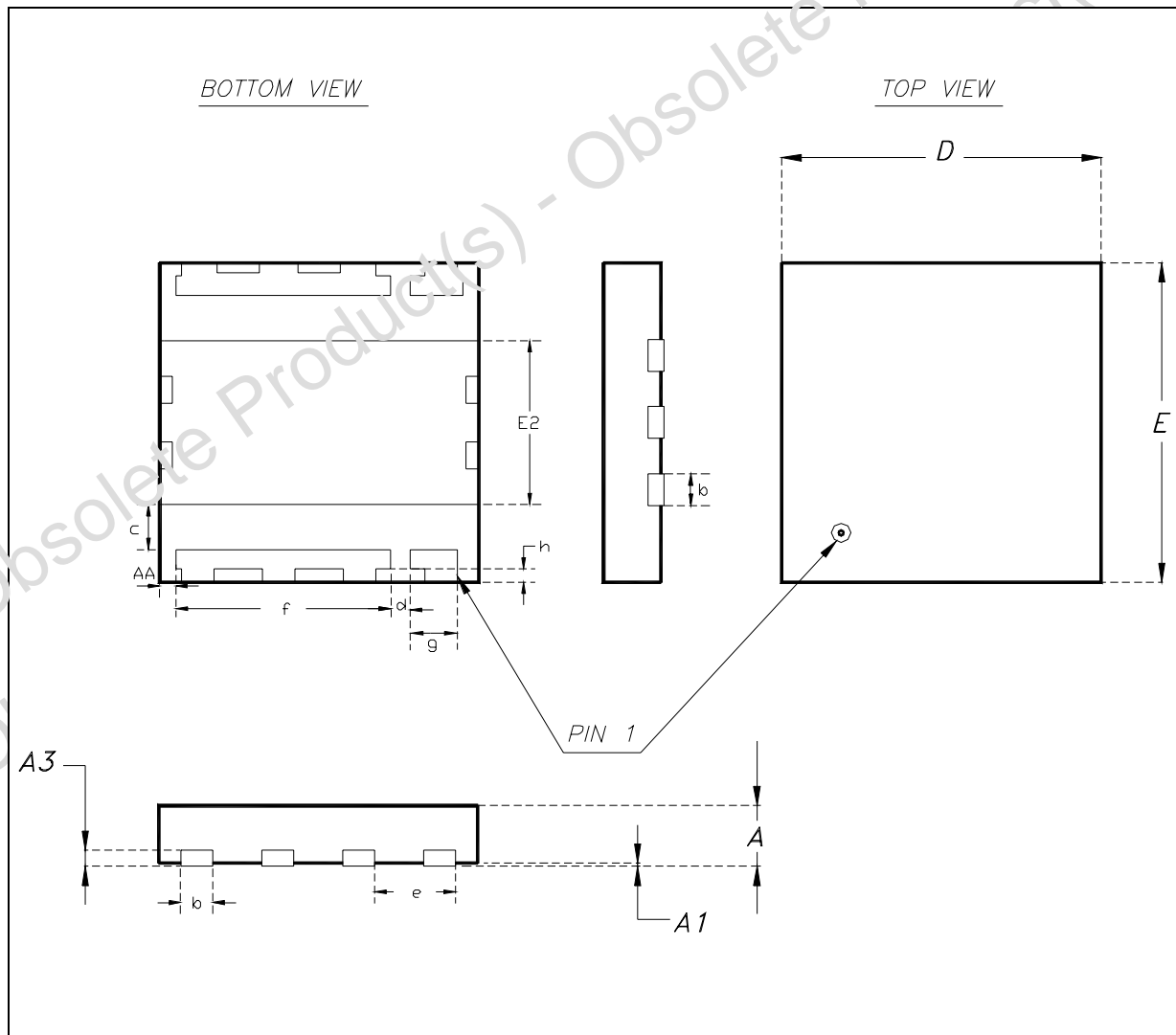
TAPE & REEL DIMENSIONS

| | mm | | |
|----|------|------|------|
| | MIN. | TYP. | MAX |
| Ao | 5.15 | 5.25 | 5.35 |
| Bo | 5.15 | 5.25 | 5.35 |
| Ko | 1.0 | 1.1 | 1.2 |



PowerFLAT™ MECHANICAL DATA

| DIM. | mm | | | Inch | | |
|------|------|------|------|-------|-------|-------|
| | MIN. | TYP. | MAX | MIN. | TYP. | MAX |
| A | | 0.90 | 1.00 | | 0.035 | 0.039 |
| A1 | | 0.02 | 0.05 | | 0.001 | 0.002 |
| A3 | | 0.24 | | | 0.009 | |
| AA | 0.15 | 0.25 | 0.35 | 0.006 | 0.01 | 0.014 |
| b | 0.43 | 0.51 | 0.58 | 0.017 | 0.020 | 0.023 |
| c | 0.64 | 0.71 | 0.79 | 0.025 | 0.028 | 0.031 |
| D | | 5.00 | | | 0.197 | |
| d | | 0.30 | | | 0.011 | |
| E | | 5.00 | | | 0.197 | |
| E2 | 2.49 | 2.57 | 2.64 | 0.098 | 0.101 | 0.104 |
| e | | 1.27 | | | 0.050 | |
| f | | 3.37 | | | 0.132 | |
| g | | 0.74 | | | 0.03 | |
| h | | 0.21 | | | 0.008 | |



Obsolete Product(s) - Obsolete Product(s)
Obsolete Product(s) - Obsolete Product(s)

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is registered trademark of STMicroelectronics
© 2003 STMicroelectronics - All Rights Reserved

All other names are the property of their respective owners.

STMicroelectronics GROUP OF COMPANIES
Australia - Brazil - Canada - China - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan -
Malaysia - Malta - Morocco - Singapore - Spain - Sweden - Switzerland - United Kingdom - U.S.A.
<http://www.st.com>