

General Description

It combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. It combines one N channel MOSFET and one P channel MOSFET.

Features

- Advance high cell density Trench technology
- Low $R_{DS(ON)}$ to minimize conductive loss
- Low Gate Charge for fast switching
- Dual DIE in one package

Application

- Power Management in Notebook Computer
- BLDC Motor driver

Ordering Information:

| | |
|---------------------------|-----------|
| Part NO. | ZMC88302N |
| Marking | ZMC88302 |
| Packing Information | REEL TAPE |
| Basic ordering unit (pcs) | 3000 |

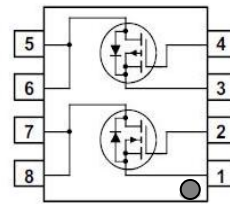
Thermal resistance

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|--|------------|------|------|------|-------|
| Thermal resistance, junction - case | R_{thJC} | - | - | 2.9 | ° C/W |
| Thermal resistance, junction - ambient | R_{thJA} | - | - | 53 | ° C/W |
| Soldering temperature, wavesoldering for 10s | T_{sold} | - | - | 265 | ° C |

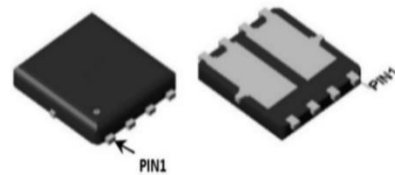
N Channel Absolute Maximum Ratings ($T_C = 25^\circ C$)

| Parameter | Symbol | Rating | Unit |
|--------------------------|---------------------------|--------|------|
| Drain-Source Voltage | V_{DS} | 30 | V |
| Gate-Source Voltage | V_{GS} | 20 | V |
| Continuous Drain Current | $I_D @ T_C = 25^\circ C$ | 23 | A |
| | $I_D @ T_C = 75^\circ C$ | 17.5 | A |
| | $I_D @ T_C = 100^\circ C$ | 14.5 | A |

Product Summary



$V_{DS1} = 30V$
 $V_{DS2} = -30V$
 $R_{DS(ON)1} = 10m\Omega$
 $R_{DS(ON)2} = 18m\Omega$
 $I_{D1} = 23A$
 $I_{D2} = -18A$



DFN5*6

| | | | |
|--------------------------------|----------------------------|------------|------------------|
| Pulsed Drain Current ④ | I_{DM} | 69 | A |
| Total Power Dissipation | $P_D@T_C=25^\circ\text{C}$ | 43 | W |
| Total Power Dissipation | $P_D@T_A=25^\circ\text{C}$ | 2.3 | W |
| Operating Junction Temperature | T_J | -55 to 150 | $^\circ\text{C}$ |
| Storage Temperature | T_{STG} | -55 to 150 | $^\circ\text{C}$ |
| Single Pulse Avalanche Energy | E_{AS} | 30 | mJ |

•P Channel Absolute Maximum Ratings ($T_C = 25^\circ\text{C}$)

| Parameter | Symbol | Rating | Unit |
|--------------------------------|-------------------------------|------------|------------------|
| Drain-Source Voltage | V_{DS} | -30 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Continuous Drain Current | $I_D@T_C = 25^\circ\text{C}$ | -18 | A |
| | $I_D@T_C = 75^\circ\text{C}$ | -13.6 | A |
| | $I_D@T_C = 100^\circ\text{C}$ | -11.3 | A |
| Pulsed Drain Current ④ | I_{DM} | -54 | A |
| Total Power Dissipation | $P_D@T_C=25^\circ\text{C}$ | 43 | W |
| Total Power Dissipation | $P_D@T_A=25^\circ\text{C}$ | 2.3 | W |
| Operating Junction Temperature | T_J | -55 to 150 | $^\circ\text{C}$ |
| Storage Temperature | T_{STG} | -55 to 150 | $^\circ\text{C}$ |
| Single Pulse Avalanche Energy | E_{AS} | 67 | mJ |

•N Channel Electronic Characteristics

| Parameter | Symbol | Condition | Min. | Typ | Max. | Unit |
|-----------------------------------|--------------|---|------|-----|-----------|------------------|
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS} = 0V, I_D = 250\mu\text{A}$ | 30 | | | V |
| Gate Threshold Voltage | $V_{GS(TH)}$ | $V_{GS} = V_{DS}, I_D = 250\mu\text{A}$ | 1.2 | | 2.5 | V |
| Drain-Source Leakage Current | I_{DSS} | $V_{DS} = 30V, V_{GS} = 0V$ | | | 1.0 | μA |
| Gate- Source Leakage Current | I_{GSS} | $V_{GS} = \pm 20V, V_{DS} = 0V$ | | | ± 100 | nA |
| Static Drain-source On Resistance | $R_{DS(ON)}$ | $V_{GS} = 10V, I_D = 12A$ | | 10 | 13 | $\text{m}\Omega$ |
| | | $V_{GS} = 4.5V, I_D = 10A$ | | 13 | 17 | $\text{m}\Omega$ |
| Forward Trans conductance | g_{FS} | $V_{DS} = 25V, I_D = 5A$ | | 9 | | s |
| Source-drain voltage | V_{SD} | $I_S = 23A$ | | | 1.28 | V |

•Dynamic Characteristics

| Parameter | Symbol | Condition | Min. | Typ | Max. | Unit |
|-----------|--------|-----------|------|-----|------|------|
|-----------|--------|-----------|------|-----|------|------|

| | | | | | | |
|------------------------------|------|---|---|-----|---|----|
| Input capacitance | Ciss | f = 1MHz V _{DS} =25V | - | 560 | - | pF |
| Output capacitance | Coss | | - | 81 | - | |
| Reverse transfer capacitance | Crss | | - | 49 | - | |
| Total gate charge | Qg | V _{DD} = 25V I _D = 5A V _{GS} = 10V | - | 10 | - | nC |
| Gate - Source charge | Qgs | | - | 1.6 | - | |
| Gate - Drain charge | Qgd | | - | 2.8 | - | |

•P Channel Electronic Characteristics

| Parameter | Symbol | Condition | Min. | Typ | Max. | Unit |
|-----------------------------------|---------------------|---|------|-----|------|------|
| Drain-Source Breakdown Voltage | BV _{DSS} | V _{GS} = 0V, I _D = -250uA | -30 | | | V |
| Gate Threshold Voltage | V _{GS(TH)} | V _{GS} = V _{DS} , I _D = -250uA | -1.2 | | -2.5 | V |
| Drain-Source Leakage Current | I _{DSS} | V _{DS} = -30V, V _{GS} = 0V | | | 1.0 | uA |
| Gate- Source Leakage Current | I _{GSS} | V _{GS} = ±20V, V _{DS} = 0V | | | ±100 | nA |
| Static Drain-source On Resistance | R _{DS(ON)} | V _{GS} = -10V, I _D = -9A | | 18 | 23 | mΩ |
| | | V _{GS} = -4.5V, I _D = -7A | | 22 | 28 | mΩ |
| Forward Transconductance | g _{FS} | V _{DS} = -10V, I _D = -5A | | 9 | | s |

•Dynamic Characteristics

| Parameter | Symbol | Condition | Min. | Typ | Max. | Unit |
|------------------------------|--------|---|------|------|------|------|
| Input capacitance | Ciss | f = 1MHz V _{DS} =25V | - | 1490 | - | pF |
| Output capacitance | Coss | | - | 141 | - | |
| Reverse transfer capacitance | Crss | | - | 105 | - | |
| Total gate charge | Qg | V _{DD} = 25V I _D = 6A V _{GS} = 10V | - | 25 | - | nC |
| Gate - Source charge | Qgs | | - | 3.9 | - | |
| Gate - Drain charge | Qgd | | - | 5.5 | - | |

•N Channel characteristics curve

Fig.1 Power Dissipation Derating Curve

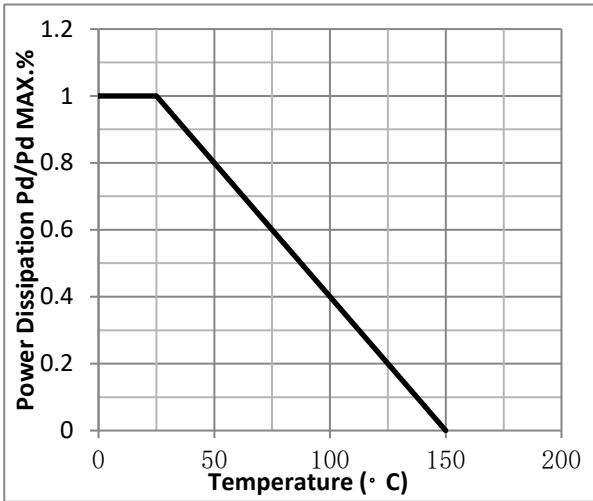


Fig.2 Typical output Characteristics

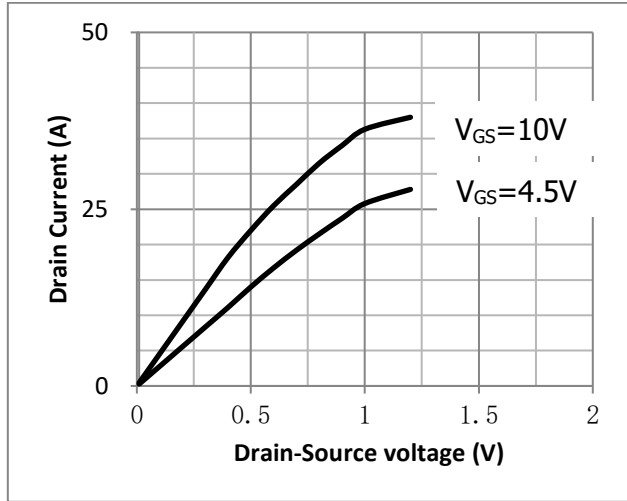


Fig.3 Threshold Voltage V.S Junction Temperature

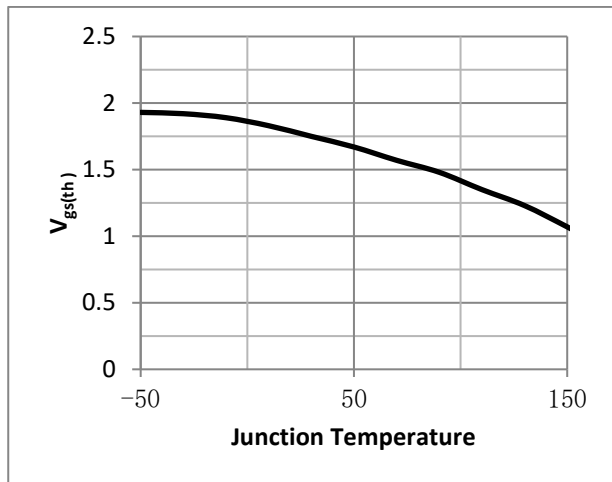


Fig.4 Resistance V.S Drain Current

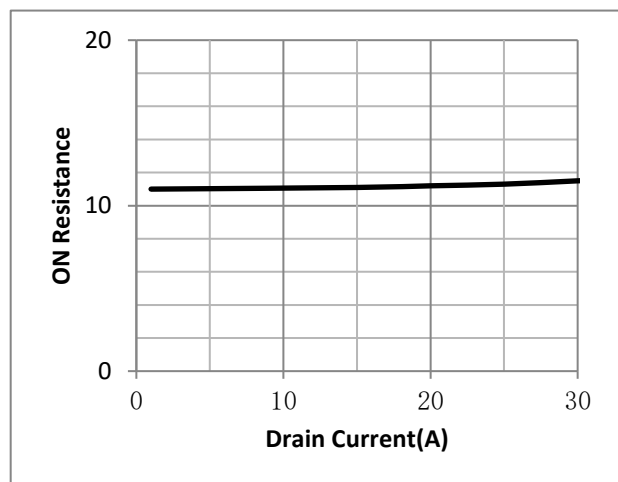


Fig.5 On-Resistance VS Gate Source Voltage

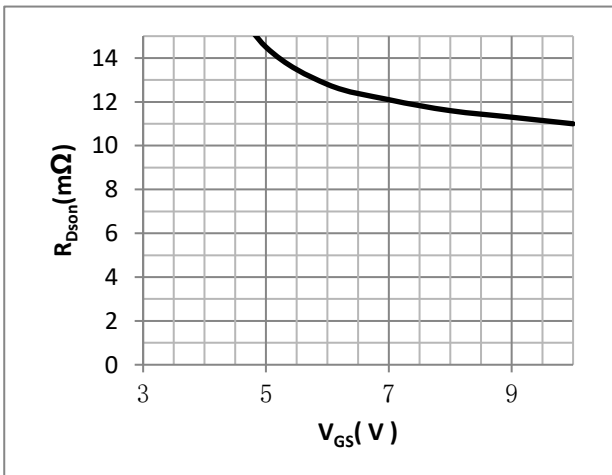
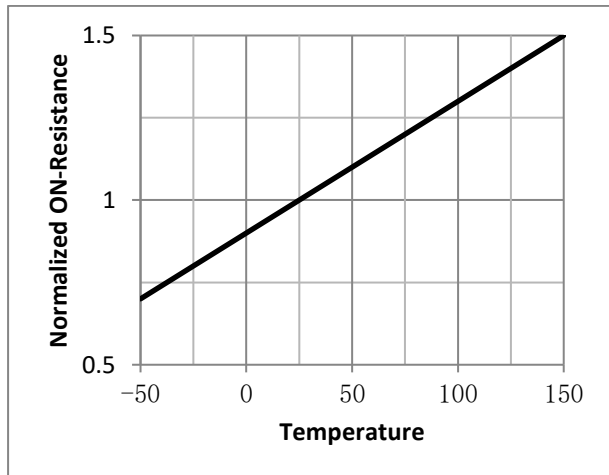


Fig.6 On-Resistance V.S Junction Temperature



•P Channel characteristics curve

Fig.1 Power Dissipation Derating Curve

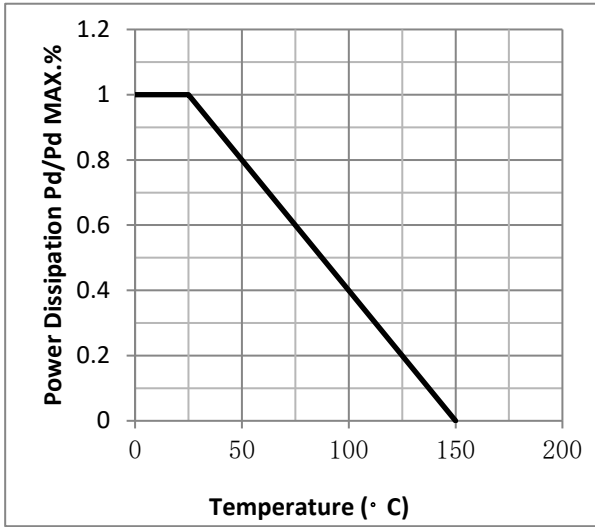


Fig.2 Typical output Characteristics

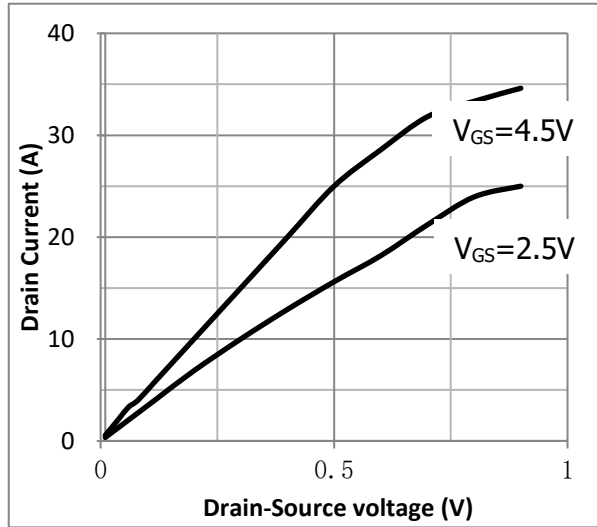


Fig.3 Threshold Voltage V.S Junction Temperature

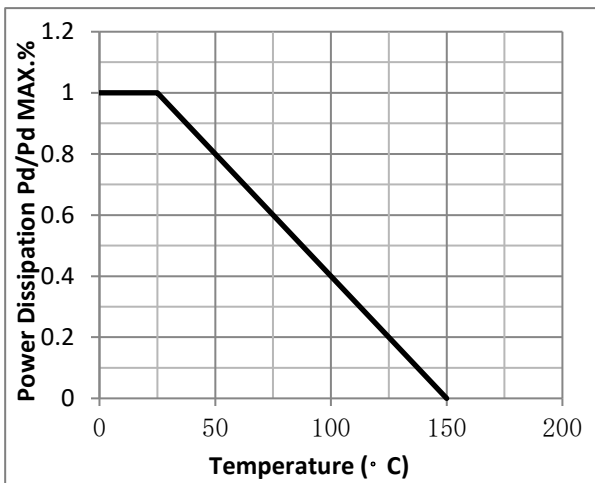


Fig.4 Resistance V.S Drain Current

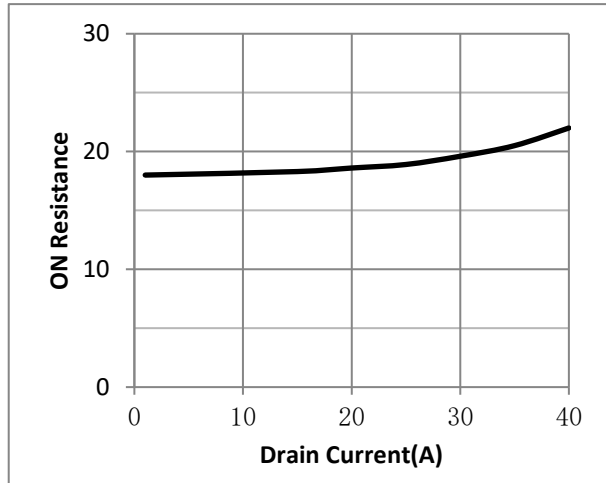


Fig.5 On-Resistance VS Gate Source Voltage

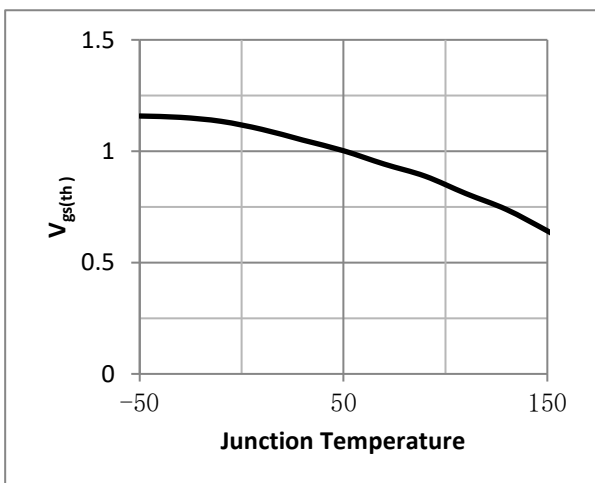
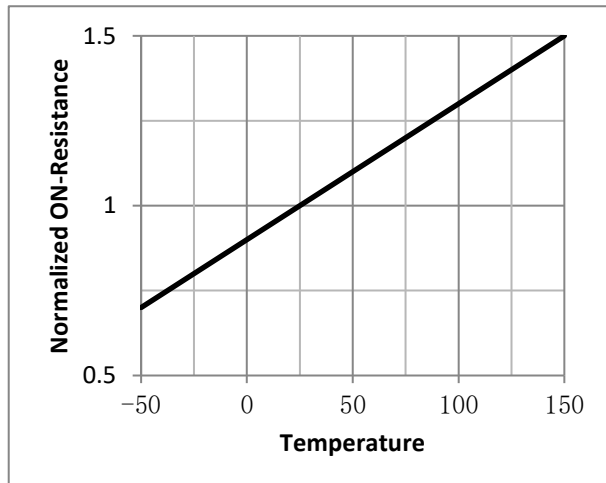


Fig.6 On-Resistance V.S Junction Temperature



•Test Circuit

Fig.1 Switching Time Measurement Circuit

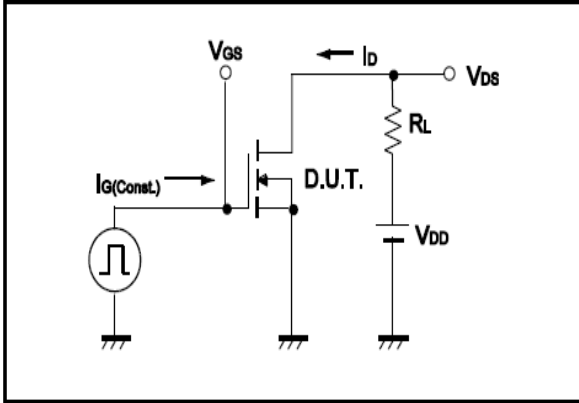


Fig.2 Gate Charge Waveform

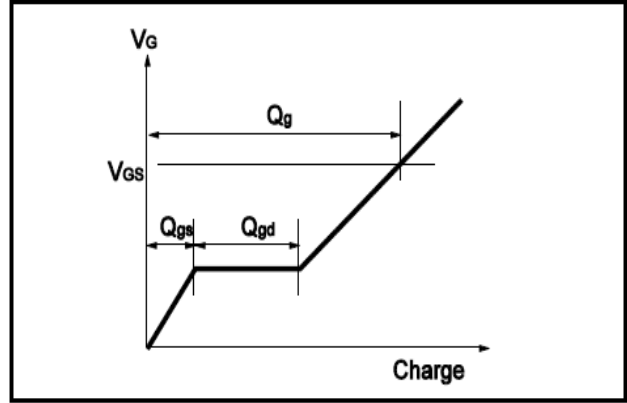


Fig.3 Switching Time Measurement Circuit

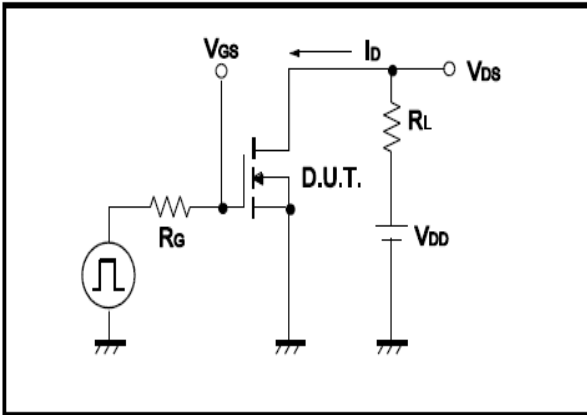


Fig.4 Gate Charge Waveform

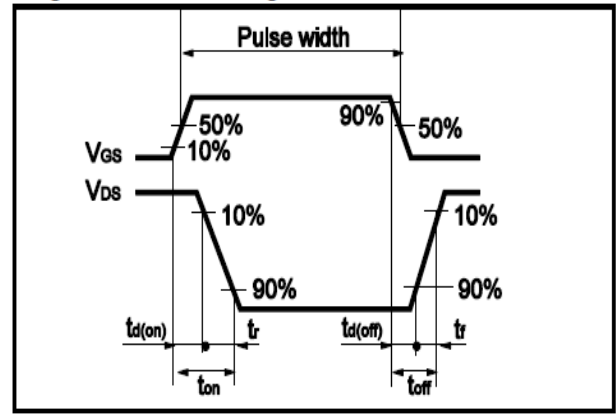


Fig.5 Avalanche Measurement Circuit

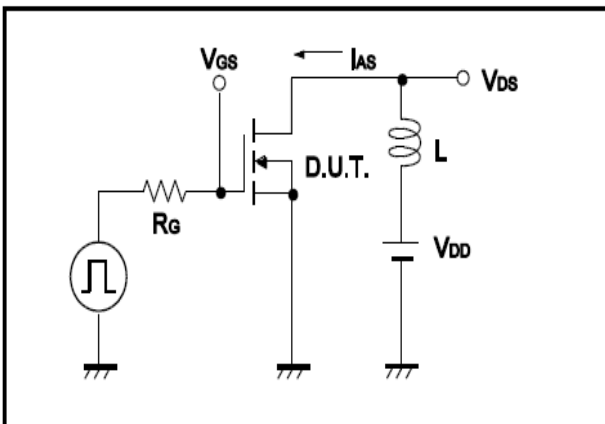
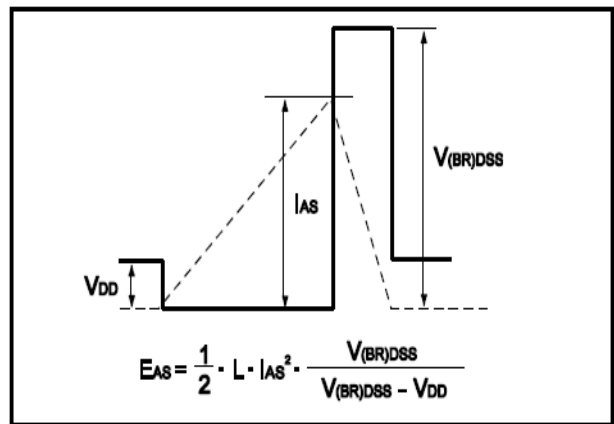
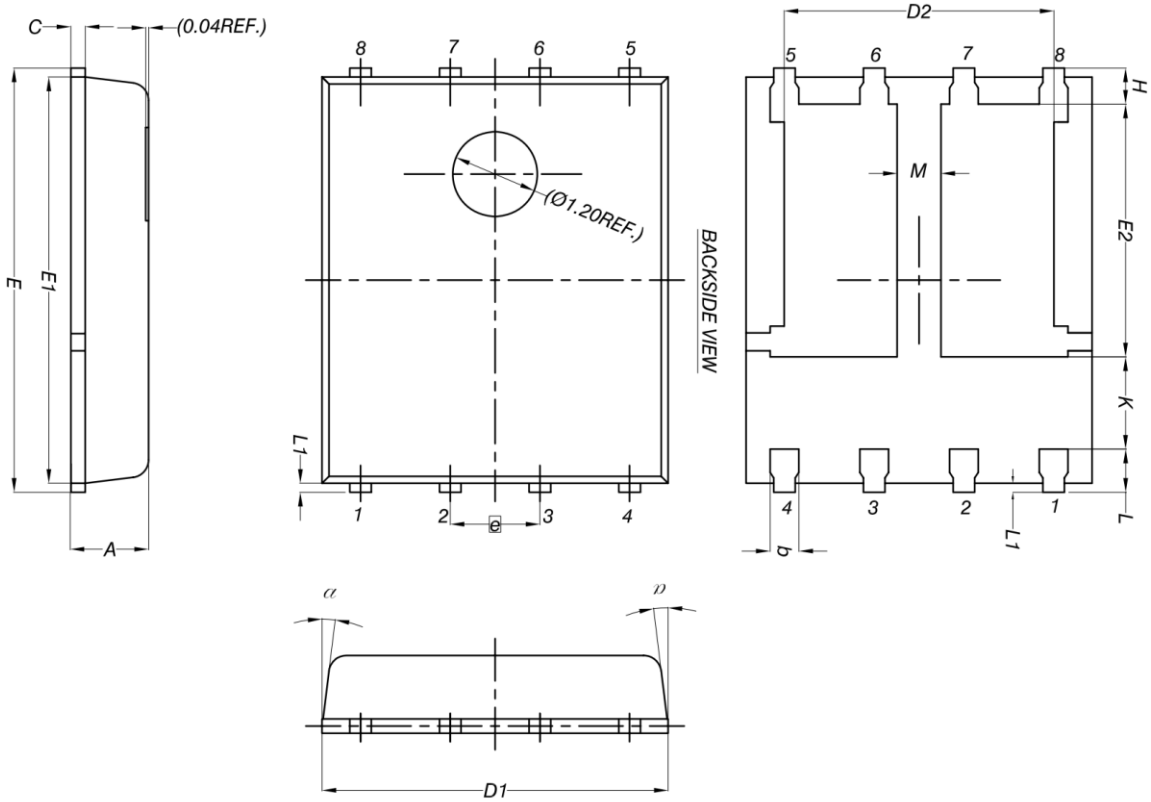


Fig.6 Avalanche Waveform





•Dimensions (DFN5x6)



| DIM. | MILLIMETERS | | |
|------|-------------|------|------|
| | MIN. | NOM. | MAX. |
| A | 0.90 | 1.00 | 1.10 |
| b | 0.33 | 0.41 | 0.51 |
| C | 0.20 | 0.25 | 0.30 |
| D1 | 4.80 | 4.90 | 5.00 |
| D2 | 3.61 | 3.81 | 3.96 |
| E | 5.90 | 6.00 | 6.10 |
| E1 | 5.70 | 5.75 | 5.80 |
| E2 | 3.38 | 3.58 | 3.78 |
| e | 1.27 BSC | | |
| H | 0.41 | 0.51 | 0.61 |
| K | 1.10 | - | - |
| L | 0.51 | 0.61 | 0.71 |
| L1 | 0.06 | 0.13 | 0.20 |
| M | 0.50 | - | - |
| α | 0° | - | 12° |

