

- ★ Green Device Available
- ★ Super Low Gate Charge
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology

Product Summary



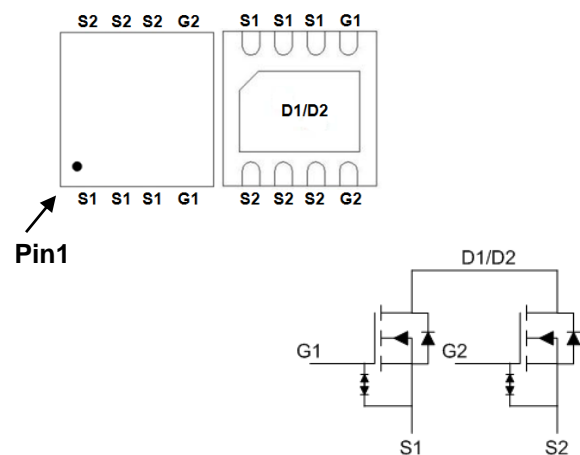
| BVDSS | RDSON | ID |
|-------|-------|-----|
| 12V | 4.3mΩ | 56A |

General Description

The FKCA1002 is the low RDSON trenched N-CH MOSFETs with robust ESD protection. This product is suitable for Lithium-ion battery pack applications.

The FKCA1002 meet the RoHS and Green Product requirement with full function reliability approved.

DFN3x3 Pin Configuration



Absolute Maximum Ratings

| Symbol | Parameter | Rating | Units |
|------------------------|---|------------|-------|
| V_{DS} | Drain-Source Voltage | 12 | V |
| V_{GS} | Gate-Source Voltage | ±8 | V |
| $I_D@T_C=25^{\circ}C$ | Continuous Drain Current, $V_{GS} @ 4.5V^1$ | 56 | A |
| $I_D@T_C=100^{\circ}C$ | Continuous Drain Current, $V_{GS} @ 4.5V^1$ | 35.6 | A |
| $I_D@T_A=25^{\circ}C$ | Continuous Drain Current, $V_{GS} @ 4.5V^1$ | 19 | A |
| $I_D@T_A=70^{\circ}C$ | Continuous Drain Current, $V_{GS} @ 4.5V^1$ | 15 | A |
| I_{DM} | Pulsed Drain Current ² | 100 | A |
| $P_D@T_C=25^{\circ}C$ | Total Power Dissipation ¹ | 31 | W |
| $P_D@T_A=25^{\circ}C$ | Total Power Dissipation ¹ | 3.6 | W |
| T_{STG} | Storage Temperature Range | -55 to 150 | °C |
| T_J | Operating Junction Temperature Range | -55 to 150 | °C |

Thermal Data

| Symbol | Parameter | Typ. | Max. | Unit |
|-----------------|--|------|------|------|
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient ¹ | --- | 35 | °C/W |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case ¹ | --- | 4 | °C/W |



N-Channel Electrical Characteristics (T_J=25 °C, unless otherwise noted)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---------------------|--|---|---|------|------|------|
| BV _{DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V , I _D =250uA | 12 | --- | --- | V |
| R _{DS(ON)} | Static Drain-Source On-Resistance ² | V _{GS} =4.5V , I _D =3A | 2.3 | 3.3 | 4.3 | mΩ |
| | | V _{GS} =4.0V , I _D =3A | 2.4 | 3.4 | 4.4 | |
| | | V _{GS} =3.1V , I _D =3A | 2.6 | 3.6 | 4.7 | |
| | | V _{GS} =2.5V , I _D =3A | 3 | 4 | 5.6 | |
| | | V _{GS} =1.8V , I _D =3A | 4 | 5.4 | 7.6 | |
| V _{GS(th)} | Gate Threshold Voltage | V _{GS} =V _{DS} , I _D =250uA | 0.4 | 0.6 | 1.0 | V |
| I _{DSS} | Drain-Source Leakage Current | V _{DS} =12V , V _{GS} =0V , T _J =25°C | --- | --- | 1 | uA |
| | | V _{DS} =12V , V _{GS} =0V , T _J =55°C | --- | --- | 5 | |
| I _{GSS} | Gate-Source Leakage Current | V _{GS} =±8V , V _{DS} =0V | --- | --- | ±10 | uA |
| g _{fs} | Forward Transconductance | V _{DS} =5V , I _D =3A | --- | 42 | --- | S |
| Q _g | Total Gate Charge (4.5V) | V _{DS} =10V , I _D =3A | --- | 38 | --- | nC |
| | Total Gate Charge (3.9V) | | --- | 33 | --- | |
| Q _{gs} | Gate-Source Charge | | --- | 4.5 | --- | |
| Q _{gd} | Gate-Drain Charge | | --- | 12 | --- | |
| T _{d(on)} | Turn-On Delay Time | | V _{DD} =10V , V _{GS} =4.5V , R _G =6Ω I _D =3A | --- | 22 | |
| T _r | Rise Time | --- | | 41 | --- | |
| T _{d(off)} | Turn-Off Delay Time | --- | | 77 | --- | |
| T _f | Fall Time | --- | | 21 | --- | |
| C _{iss} | Input Capacitance | V _{DS} =10V , V _{GS} =0V , f=1MHz | --- | 3165 | --- | pF |
| C _{oss} | Output Capacitance | | --- | 380 | --- | |
| C _{rss} | Reverse Transfer Capacitance | | --- | 325 | --- | |

Diode Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-----------------|--|---|------|------|------|------|
| I _S | Continuous Source Current ¹ | V _G =V _D =0V , Force Current | --- | --- | 30 | A |
| I _{SM} | Pulsed Source Current ² | | --- | --- | 100 | A |
| V _{SD} | Diode Forward Voltage ² | V _{GS} =0V , I _S =3A , T _J =25°C | --- | --- | 1.2 | V |

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper, t ≤10s.
- 2.The data tested by pulsed , pulse width ≤ 10us , duty cycle ≤ 1%

Typical Characteristics

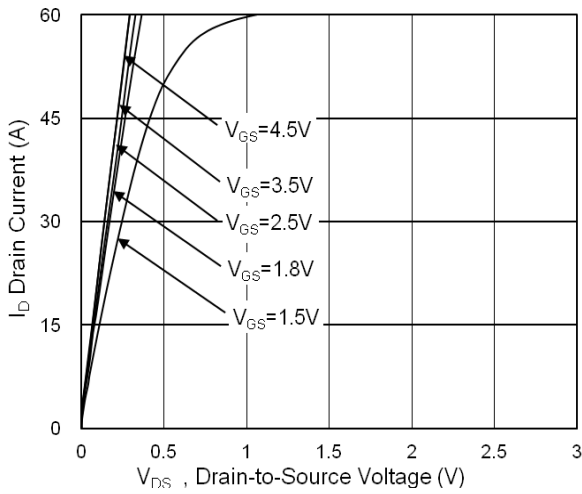


Fig.1 Typical Output Characteristics

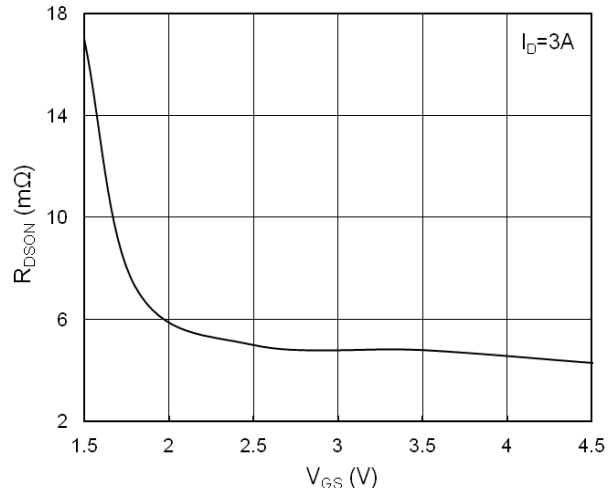


Fig.2 On-Resistance vs G-S Voltage

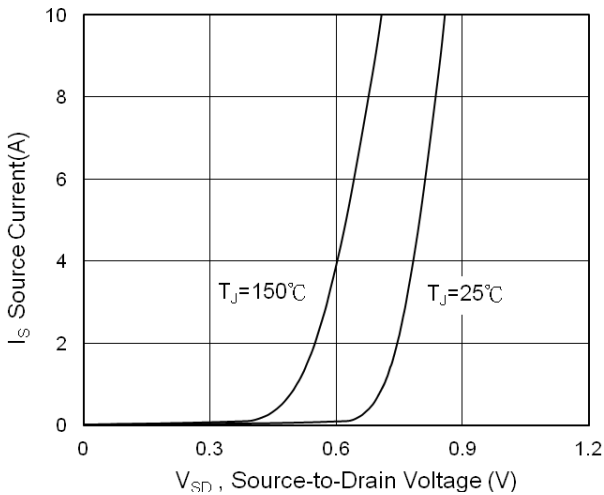


Fig.3 Source Drain Forward Characteristics

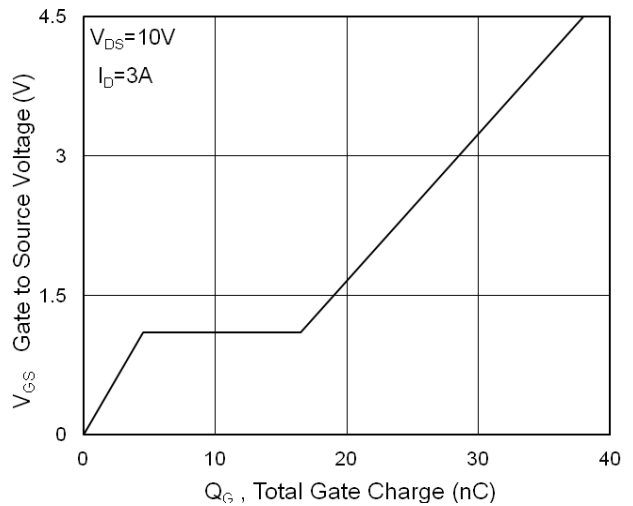


Fig.4 Gate-Charge Characteristics

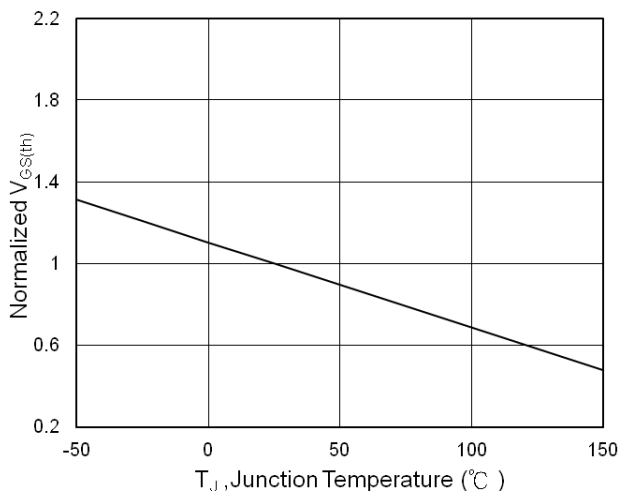


Fig.5 $V_{GS(th)}$ vs T_J

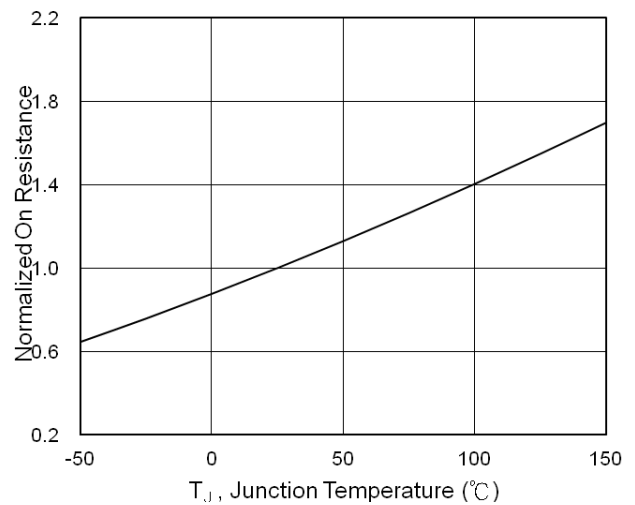


Fig.6 Normalized $R_{DS(on)}$ vs T_J

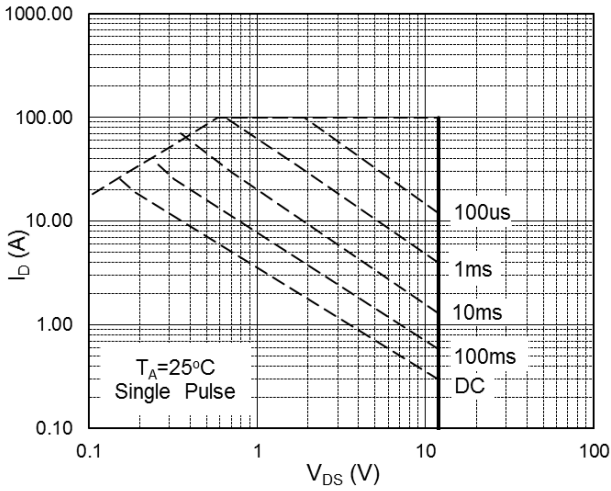


Fig.7 Safe Operating Area

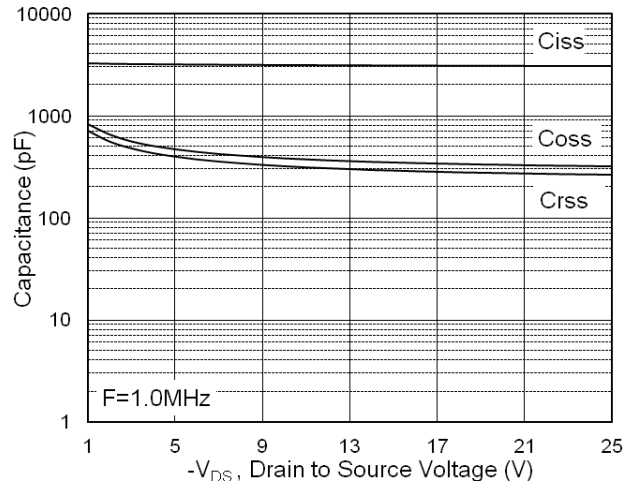


Fig.8 Capacitance

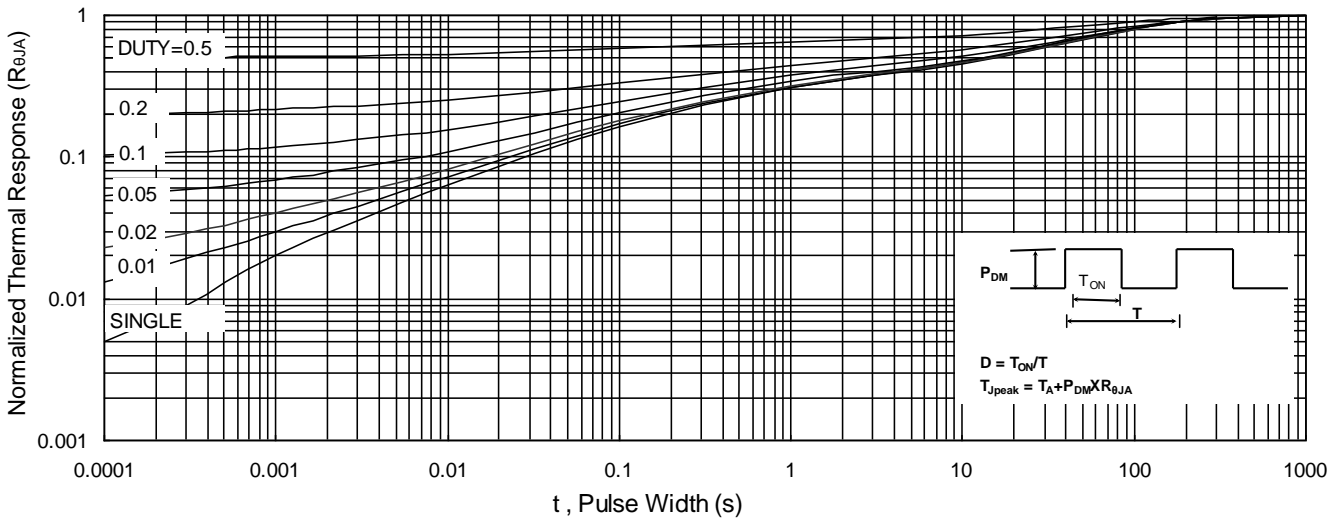


Fig.9 Normalized Maximum Transient Thermal Impedance

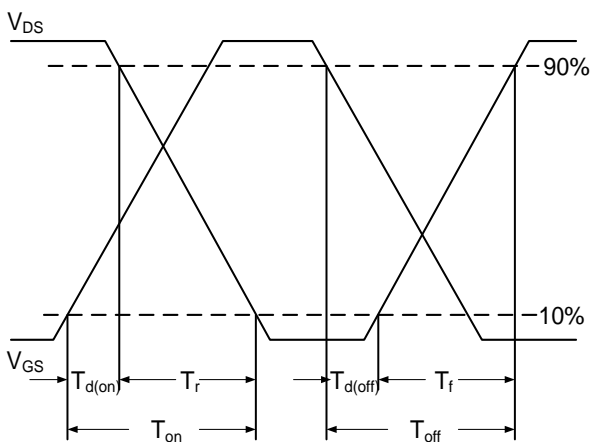


Fig.10 Switching Time Waveform

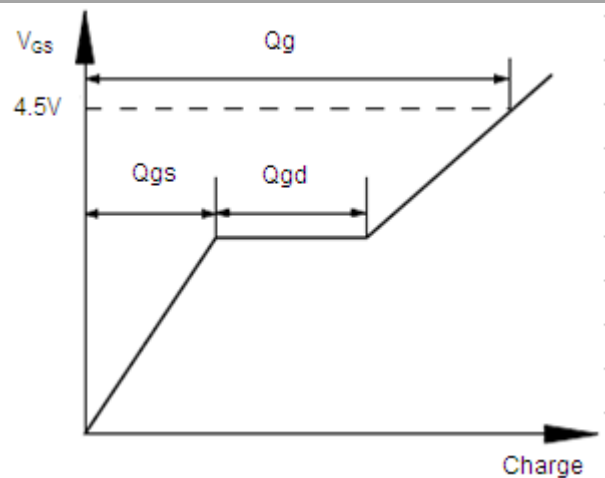
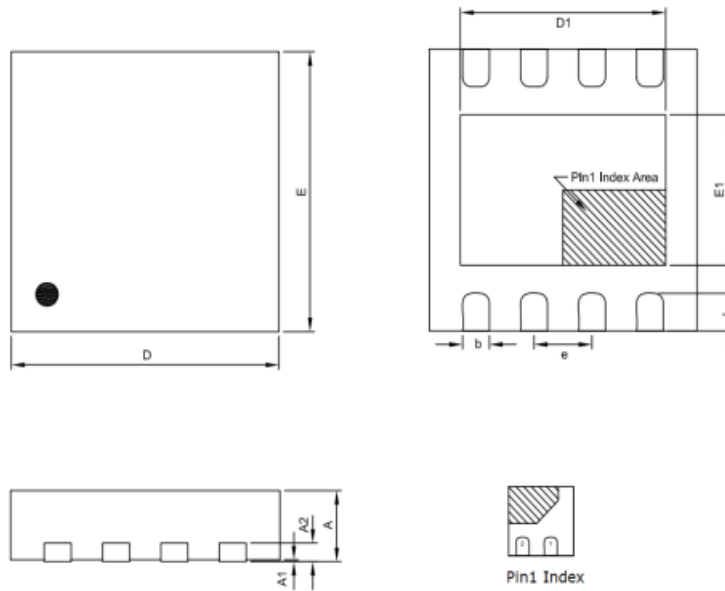


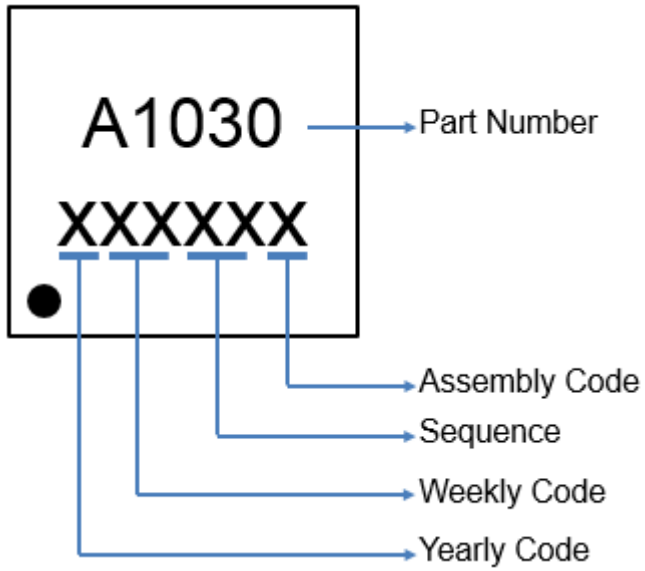
Fig.11 Gate Charge Waveform

DFN3x3 Package Outline Dimensions



| SYMBOLS | MILLIMETERS | | | INCHES | | |
|---------|-------------|------|------|--------|--------|--------|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 0.70 | 0.75 | 0.80 | 0.0276 | 0.0295 | 0.0315 |
| A1 | 0.00 | -- | 0.05 | 0.000 | -- | 0.002 |
| A2 | 0.19 | 0.20 | 0.21 | 0.0075 | 0.0079 | 0.0083 |
| D | 2.90 | 3.00 | 3.10 | 0.114 | 0.118 | 0.122 |
| E | 2.90 | 3.00 | 3.10 | 0.114 | 0.118 | 0.122 |
| D1 | 2.25 | 2.30 | 2.35 | 0.0886 | 0.0906 | 0.0925 |
| E1 | 1.55 | 1.6 | 1.65 | 0.061 | 0.063 | 0.065 |
| L | 0.35 | 0.40 | 0.45 | 0.0138 | 0.0177 | 0.0207 |
| b | 0.25 | 0.30 | 0.35 | 0.0098 | 0.0118 | 0.0138 |
| e | -- | 0.65 | -- | -- | 0.0256 | -- |

Marking Instruction



DFN3x3 Tape and Reel Data

