# KMD6D0DN40Q

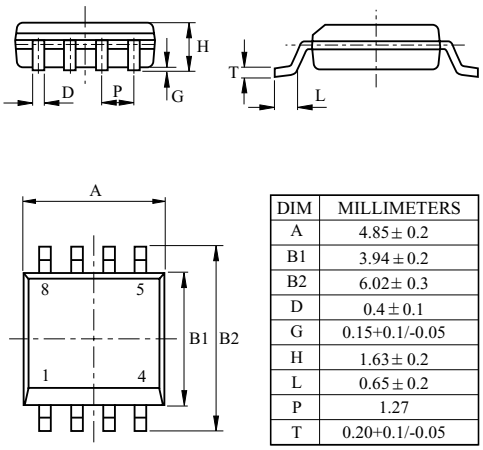
**Dual N-Ch Trench MOSFET**

## GENERAL DESCRIPTION

This Trench MOSFET has better characteristics, such as fast switching time, low on resistance, low gate charge and excellent avalanche characteristics. It is mainly suitable for DC/DC Converters.

## FEATURES

- $V_{DSS}$=40V, $I_D$=6A.
- Drain-Source ON Resistance.
  $R_{DS(ON)}$=38mΩ (Max.) @$V_{GS}$=10V
  $R_{DS(ON)}$=50mΩ (Max.) @$V_{GS}$=4.5V
- Super High Dense Cell Design
- Very fast switching




| DIM | MILLIMETERS |
|---|---|
| A | 4.85± 0.2 |
| B1 | 3.94± 0.2 |
| B2 | 6.02± 0.3 |
| D | 0.4± 0.1 |
| G | 0.15+0.1/-0.05 |
| H | 1.63± 0.2 |
| L | 0.65± 0.2 |
| P | 1.27 |
| T | 0.20+0.1/-0.05 |

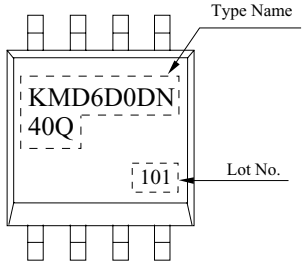
FLP-8

## MAXIMUM RATING (Ta=25℃ Unless otherwise noted)

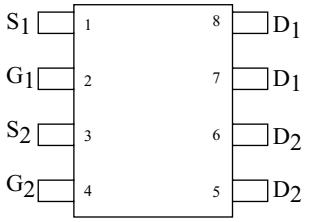
| CHARACTERISTIC | | SYMBOL | RATING | UNIT |
|---|---|---|---|---|
| Drain Source Voltage | | $V_{DSS}$ | 40 | V |
| Gate Source Voltage | | $V_{GSS}$ | ±12 | V |
| Drain Current | $T_a$=25℃ | $I_D$ * | 6 | A |
| | Pulsed(Note1) | $I_{DP}$ | 24 | A |
| Peak Diode Recovery dv/dt (Note 2) | | dv/dt | 4.5 | V/ns |
| Peak Diode Recovery di/dt | | di/dt | 200 | A/us |
| Single pulsed Avalanche Energy (Note 3) | | $E_{AS}$ | 66 | mJ |
| Repetitive Avalanche Energy (Note 1) | | $E_{AR}$ | 2.7 | mJ |
| Maximum Junction Temperature | | $T_j$ | -50~150 | ℃ |
| Storage Temperature Range | | $T_{stg}$ | -50~150 | ℃ |
| Thermal Resistance, Junction to Ambient | | $R_{thJA}$* | 62.5 | ℃/W |

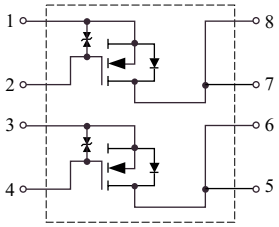
* : Surface Mounted on FR4 Board (25mm×25mm, 1.5t, t≤10sec)

Marking




PIN CONNECTION (TOP VIEW)



**ELECTRICAL CHARACTERISTICS** (Tj=25℃) **UNLESS OTHERWISE NOTED**

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| **Static** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $I_D$=250 μA, $V_{GS}$=0V | 40 | - | - | V |
| Drain Cut-off Current | $I_{DSS}$ | $V_{DS}$=40V, $V_{GS}$=0V | - | - | 1 | μA |
| Gate Leakage Current | $I_{GSS}$ | $V_{GS}$=±12V, $V_{DS}$=0V | - | - | ±10 | μA |
| Gate Threshold Voltage | $V_{th}$ | $V_{DS}$=$V_{GS}$, $I_D$=250 μA | 1.0 | 2.0 | 2.5 | V |
| Drain-Source ON Resistance | $R_{DS(ON)}$ | $V_{GS}$=10.0V, $I_D$=6A | - | 27 | 38 | mΩ |
| | | $V_{GS}$=4.5V, $I_D$=5A | - | 35 | 50 | |
| Forward Transconductance | $g_{fs}$ | $V_{DS}$=10V, $I_D$=6A(Note4, 5) | - | 10 | - | S |
| **Dynamic** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$=15V, f=1MHz, $V_{GS}$=0V | - | 460 | - | pF |
| Ouput Capacitance | $C_{oss}$ | | - | 80 | - | |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 50 | - | |
| Total Gate Charge | $Q_g$ | $V_{DS}$=20V, $V_{GS}$=10V, $I_D$=6A (Note4, 5) | - | 8.0 | - | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 1.5 | - | |
| Gate-Drain Charge | $Q_{gd}$ | | - | 2.0 | - | |
| Total Gate Charge | $Q_g$ | $V_{DS}$=20V, $V_{GS}$=5V, $I_D$=6A (Note4, 5) | - | 4.1 | - | nC |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD}$=20V, $V_{GS}$=10V<br>$I_D$=6A, $R_G$=6Ω (Note4, 5) | - | 12 | - | ns |
| Turn-On Rise Time | $t_r$ | | - | 8 | - | |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 35 | - | |
| Turn-Off Fall Time | $t_f$ | | - | 6 | - | |
| **Source-Drain Diode Ratings** | | | | | | |
| Source-Drain Forward Voltage | $V_{SDF}$ | $I_{DR}$=6A, $V_{GS}$=0V | - | 0.87 | 1.2 | V |

Note1) Repetivity rating : Pulse width Limited by juntion temperature.
Note2) $I_S$ ≤6A, dI/dt≤100A/μs, $V_{DD}$≤$BV_{DSS}$, Starting Tj = 25℃.
Note3) L = 1mH, $I_{AS}$ = 6A, $V_{DD}$ = 32V, Rg = 25Ω, Starting Tj = 25℃.
Note4) Pulse test : Pulse width ≤ 300μs , Duty cycle ≤ 2%
Note5) Essentially independenl of operating temperature.

Fig1. $I_D$ - $V_{DS}$

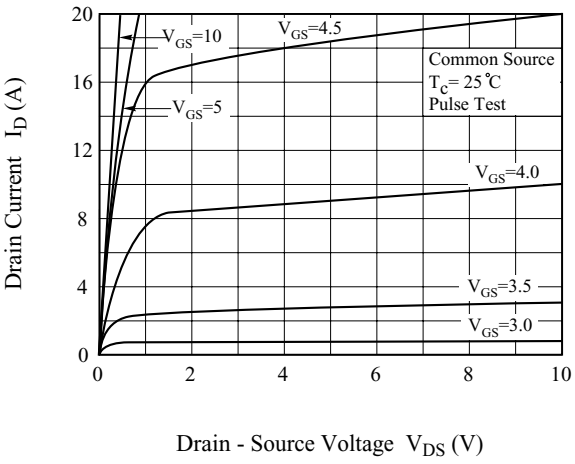



Fig2. $R_{DS(on)}$ - $I_D$

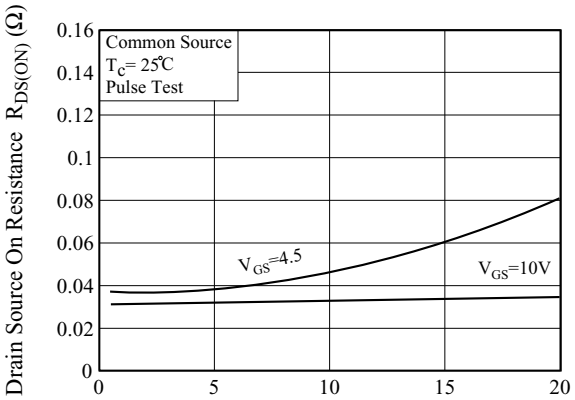



Fig3. $I_D$ - $V_{GS}$

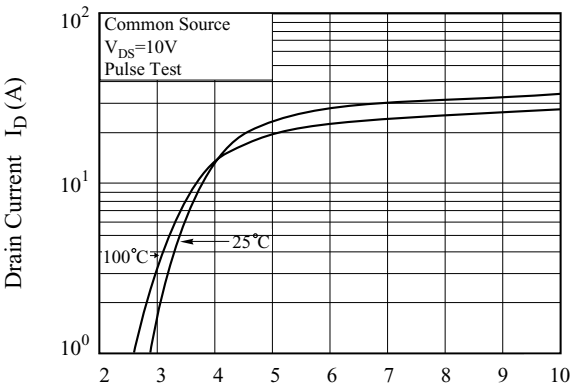



Fig4. $R_{DS(on)}$ - $T_j$

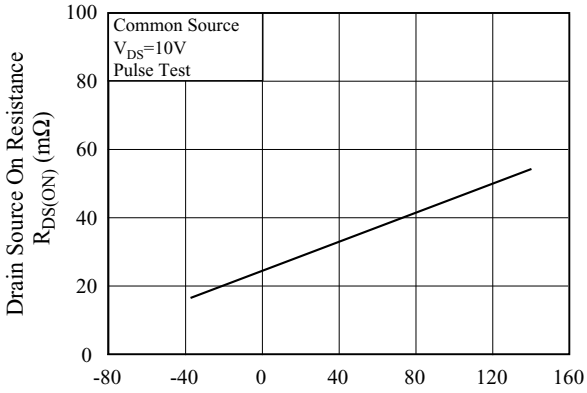



Fig5. $V_{th}$ - $T_j$

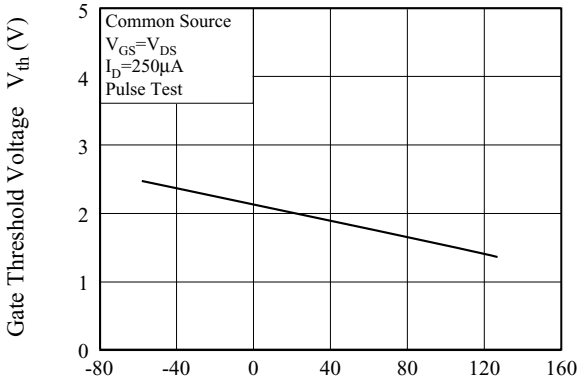



Fig6. $I_{DR}$ - $V_{SDF}$

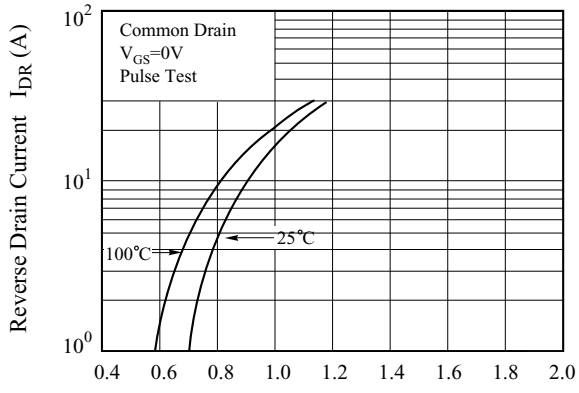


Fig7. Qg - $V_{GS}$

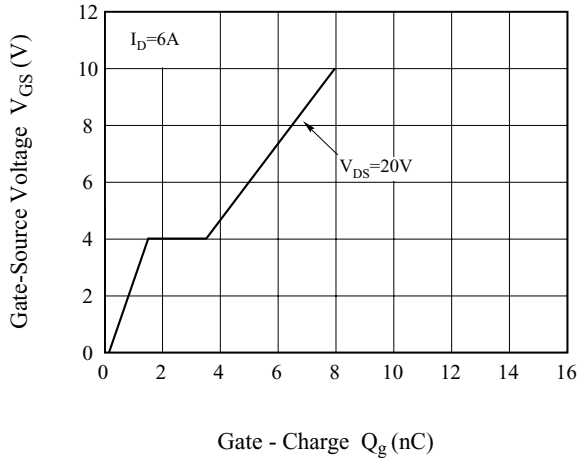



Fig8. Safe Operation Area

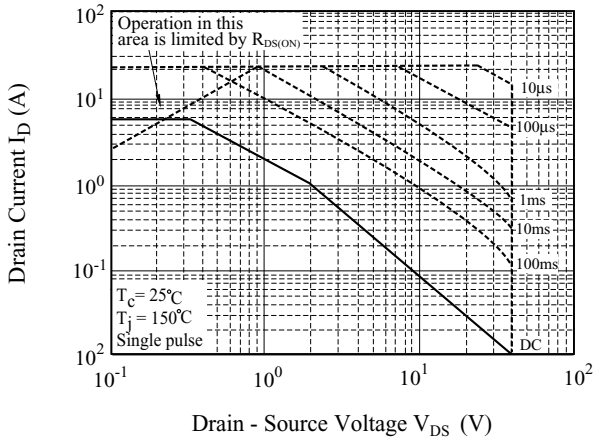



Fig9. Transient Thermal Response Curve

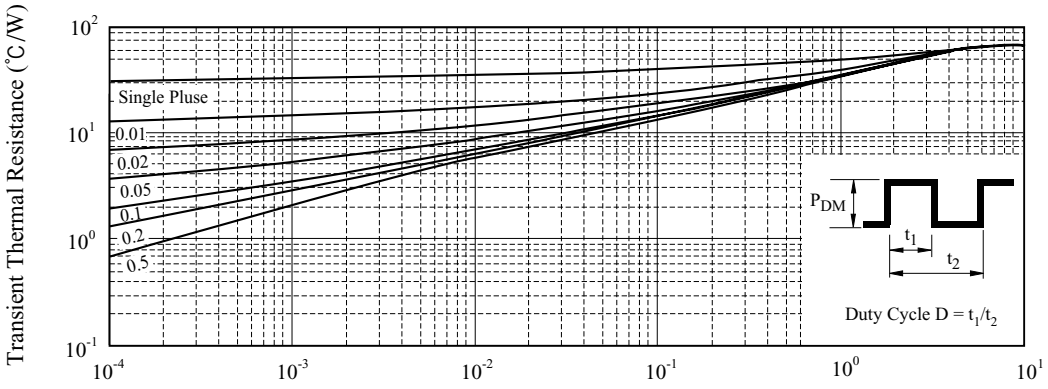


Fig. 10 Gate Charge

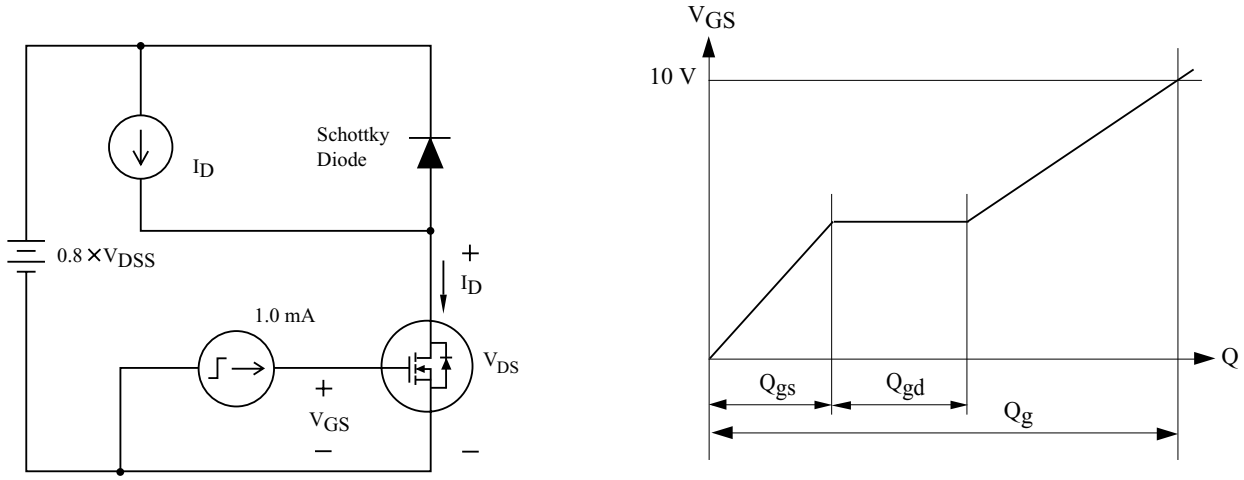



Fig. 11 Resistive Load Switching