

### Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)TYP}$ | $I_D$ |
|---------------|-----------------|-------|
| 40V           | 28mΩ@10V        | 5A    |
|               | 44mΩ@4.5V       |       |

### Feature

- Trench Technology Power MOSFET
- Low  $R_{DS(ON)}$
- Low Gate Charge

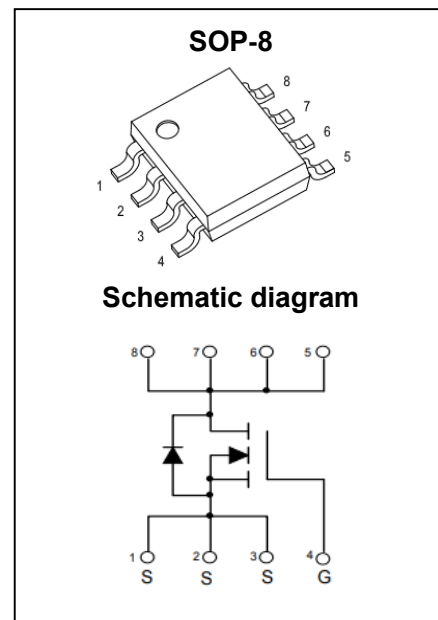
### Application

- Load Switch
- DC/DC Converter

### MARKING:



Q05N04 = Device Code  
 XX = Date Code



### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

| Parameter                                                | Symbol          | Value     | Unit               |
|----------------------------------------------------------|-----------------|-----------|--------------------|
| Drain - Source Voltage                                   | $V_{DS}$        | 40        | V                  |
| Gate - Source Voltage                                    | $V_{GS}$        | $\pm 20$  | V                  |
| Continuous Drain Current <sup>1,5</sup>                  | $I_D$           | 5         | A                  |
| Pulsed Drain Current <sup>2</sup>                        | $I_{DM}$        | 20        | A                  |
| Power Dissipation <sup>4,5</sup>                         | $P_D$           | 2         | W                  |
| Thermal Resistance from Junction to Ambient <sup>5</sup> | $R_{\theta JA}$ | 62.5      | $^\circ\text{C/W}$ |
| Junction Temperature                                     | $T_J$           | 150       | $^\circ\text{C}$   |
| Storage Temperature                                      | $T_{STG}$       | -55~ +150 | $^\circ\text{C}$   |

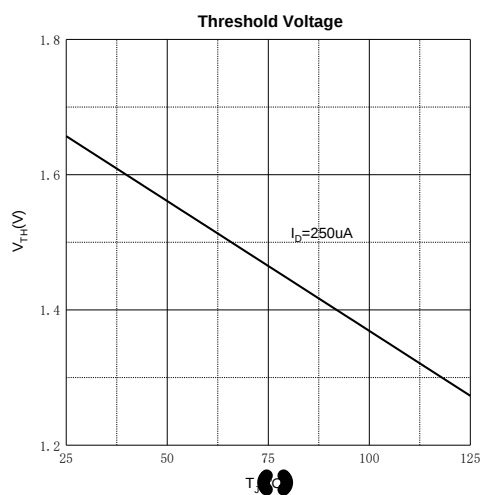
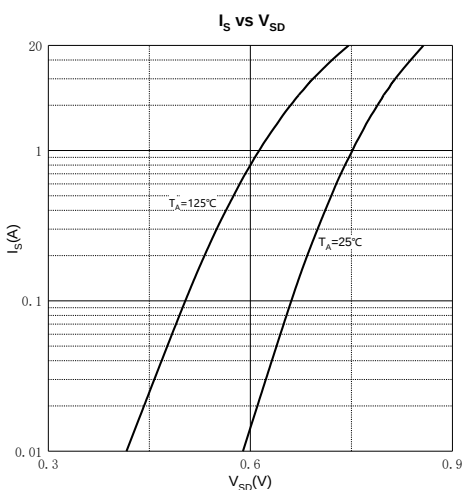
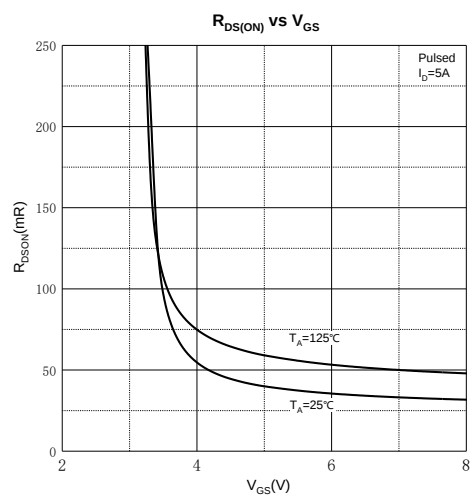
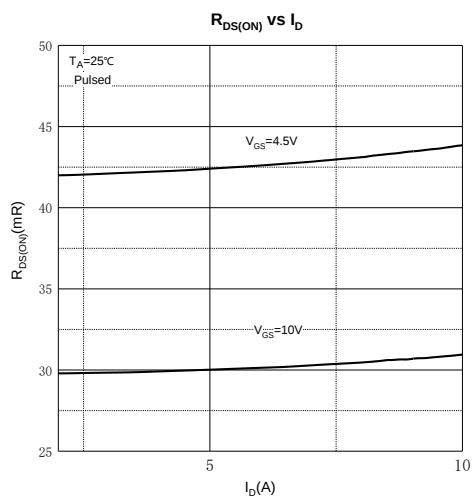
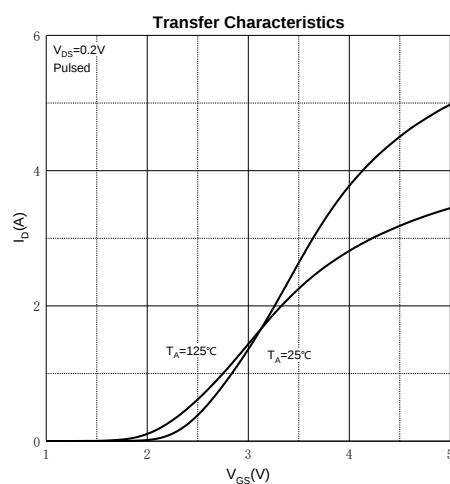
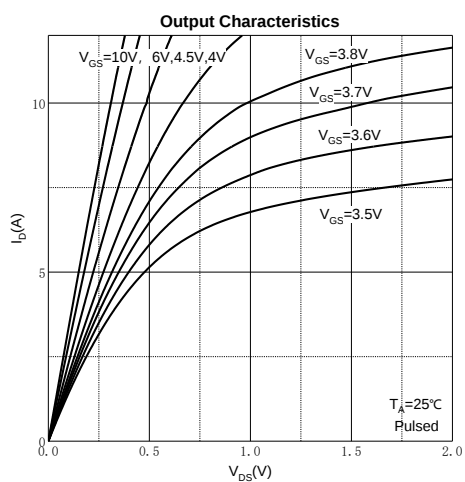
**MOSFET ELECTRICAL CHARACTERISTICS ( $T_J = 25^\circ\text{C}$  unless otherwise noted)**

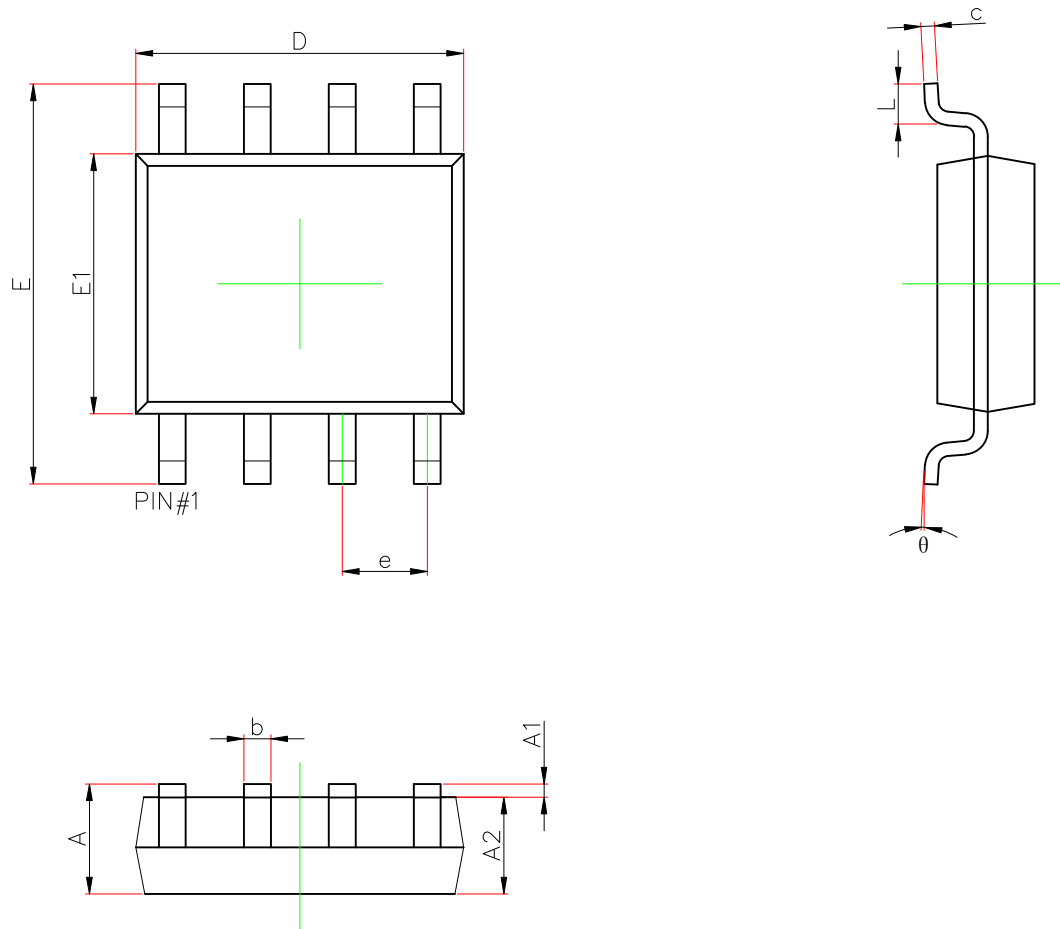
| Parameter                            | Symbol        | Test Condition                                                    | Min | Type | Max       | Unit       |
|--------------------------------------|---------------|-------------------------------------------------------------------|-----|------|-----------|------------|
| Off Characteristics                  |               |                                                                   |     |      |           |            |
| Drain - Source Breakdown Voltage     | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = 250\mu A$                                     | 40  |      |           | V          |
| Zero Gate Voltage Drain Current      | $I_{DSS}$     | $V_{DS} = 40V, V_{GS} = 0V$                                       |     |      | 1         | $\mu A$    |
| Gate - Body Leakage Current          | $I_{GSS}$     | $V_{GS} = \pm 20V, V_{DS} = 0V$                                   |     |      | $\pm 100$ | nA         |
| On Characteristics <sup>3</sup>      |               |                                                                   |     |      |           |            |
| Gate Threshold Voltage               | $V_{GS(th)}$  | $V_{DS} = V_{GS}, I_D = 250\mu A$                                 | 1   | 1.6  | 2.5       | V          |
| Drain-source On-resistance           | $R_{DS(on)}$  | $V_{GS} = 10V, I_D = 5A$                                          |     | 28   | 45        | m $\Omega$ |
|                                      |               | $V_{GS} = 4.5V, I_D = 5A$                                         |     | 44   | 55        |            |
| Forward Transconductance             | $g_{FS}$      | $V_{DS} = 5V, I_D = 5A$                                           |     | 22   |           | S          |
| Dynamic Characteristics              |               |                                                                   |     |      |           |            |
| Input Capacitance                    | $C_{iss}$     | $V_{DS} = 20V, V_{GS} = 0V, f = 1MHz$                             |     | 367  |           | pF         |
| Output Capacitance                   | $C_{oss}$     |                                                                   |     | 51   |           |            |
| Reverse Transfer Capacitance         | $C_{rss}$     |                                                                   |     | 41   |           |            |
| Gate Resistance                      | $R_g$         | $V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$                              |     | 1.4  |           | $\Omega$   |
| Switching Characteristics            |               |                                                                   |     |      |           |            |
| Total Gate Charge                    | $Q_g$         | $V_{DS} = 20V, V_{GS} = 10V, I_D = 5A$                            |     | 9.3  |           | nC         |
| Gate-source Charge                   | $Q_{gs}$      |                                                                   |     | 2.1  |           |            |
| Gate-drain Charge                    | $Q_{gd}$      |                                                                   |     | 1.9  |           |            |
| Turn-on Delay Time                   | $t_{d(on)}$   | $V_{DD} = 15V, V_{GS} = 10V,$<br>$R_L = 2.6\Omega, R_G = 3\Omega$ |     | 4.5  |           | ns         |
| Turn-on Rise Time                    | $t_r$         |                                                                   |     | 2.4  |           |            |
| Turn-off Delay Time                  | $t_{d(off)}$  |                                                                   |     | 14.8 |           |            |
| Turn-off Fall Time                   | $t_f$         |                                                                   |     | 2.5  |           |            |
| Source - Drain Diode Characteristics |               |                                                                   |     |      |           |            |
| Diode Forward Voltage <sup>3</sup>   | $V_{SD}$      | $V_{GS} = 0V, I_S = 1A$                                           |     |      | 1.2       | V          |

Notes :

- 1.The maximum current rating is limited by package.
- 2.Pulse Test : Pulse Width  $\leq 10\mu s$ , duty cycle  $\leq 1\%$ .
- 3.Pulse Test : Pulse Width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
- 4.The power dissipation  $P_D$  is limited by  $T_{J(MAX)} = 150^\circ\text{C}$ .
- 5.Device mounted on  $1in^2$  FR-4 board with 2oz. Copper, in a still air environment with  $T_A = 25^\circ\text{C}$ .

## Typical Characteristics



**SOP-8 Package Information**


| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 1.350                     | 1.750 | 0.053                | 0.069 |
| A1     | 0.100                     | 0.250 | 0.004                | 0.010 |
| A2     | 1.350                     | 1.550 | 0.053                | 0.061 |
| b      | 0.330                     | 0.510 | 0.013                | 0.020 |
| c      | 0.156                     | 0.250 | 0.006                | 0.010 |
| D      | 4.700                     | 5.100 | 0.185                | 0.201 |
| e      | 1.270(BSC)                |       | 0.050(BSC)           |       |
| E      | 5.800                     | 6.200 | 0.228                | 0.244 |
| E1     | 3.700                     | 4.100 | 0.146                | 0.161 |
| L      | 0.400                     | 1.270 | 0.016                | 0.05  |
| θ      | 0°                        | 8°    | 0°                   | 8°    |