

## General Description

The MY50P06NE5 uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a load switch or in PWM applications.

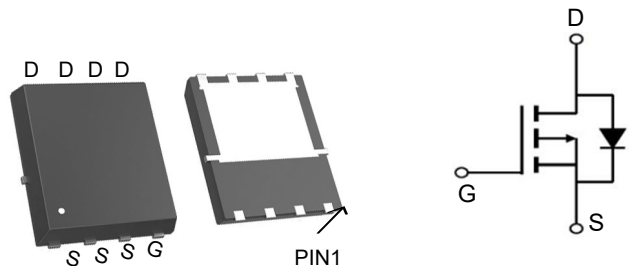


## Features

|                                     |     |            |
|-------------------------------------|-----|------------|
| $V_{DSS}$                           | -60 | V          |
| $I_D$                               | -50 | A          |
| $R_{DS(ON)}$ (at $V_{GS} = -10V$ )  | 14  | m $\Omega$ |
| $R_{DS(ON)}$ (at $V_{GS} = -4.5V$ ) | 16  | m $\Omega$ |

## Application

- PWM applications
- Load switch
- Power management



## Package Marking and Ordering Information

| Product ID | Pack       | Marking | Qty(PCS) |
|------------|------------|---------|----------|
| MY50P06NE5 | PDFN5*6-8L | 017FPD  | 5000     |

## Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

| Parameter                                         | Symbol                  | Limit      | Unit               |
|---------------------------------------------------|-------------------------|------------|--------------------|
| Drain-Source Voltage                              | $V_{DS}$                | -60        | V                  |
| Gate-Source Voltage                               | $V_{GS}$                | $\pm 20$   | V                  |
| Drain Current-Continuous@ Current-Pulsed (Note 1) | $I_D(25^\circ\text{C})$ | -50        | A                  |
|                                                   | $I_D(70^\circ\text{C})$ | -30        | A                  |
|                                                   | $I_{DM}$                | -60        | A                  |
| Maximum Power Dissipation                         | $P_D$                   | 60         | W                  |
| Operating Junction and Storage Temperature Range  | $T_J, T_{STG}$          | -55 To 175 | $^\circ\text{C}$   |
| Thermal Resistance, Junction-to-Ambient (Note 2)  | $R_{\theta JA}$         | 25         | $^\circ\text{C/W}$ |

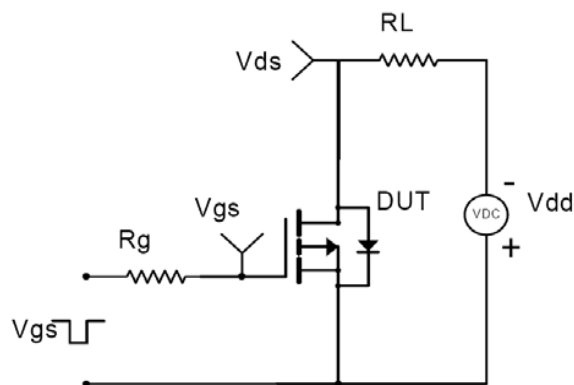
**Electrical Characteristics ( $T_A=25^\circ\text{C}$ , unless otherwise noted)**

| Parameter                          | Symbol       | Condition                                               | Min | Typ   | Max       | Unit       |
|------------------------------------|--------------|---------------------------------------------------------|-----|-------|-----------|------------|
| Drain-Source Breakdown Voltage     | $BV_{DSS}$   | $V_{GS}=0V, I_D=-250\mu A$                              | -60 |       |           | V          |
| Zero Gate Voltage Drain Current    | $I_{DSS}$    | $V_{DS}=-48V, V_{GS}=0V$                                |     |       | -1        | $\mu A$    |
| Gate-Body Leakage Current          | $I_{GSS}$    | $V_{GS}=\pm 20V, V_{DS}=0V$                             |     |       | $\pm 100$ | nA         |
| Gate Threshold Voltage             | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=-250\mu A$                          | -1  | -1.8  | -2.5      | V          |
| Drain-Source On-State Resistance   | $R_{DS(on)}$ | $V_{GS}=-10V, I_D=-20A$                                 |     | 14    | 17        | m $\Omega$ |
|                                    |              | $V_{GS}=-4.5V, I_D=-20A$                                |     | 16    | 20        | m $\Omega$ |
| Forward Transconductance           | $g_{FS}$     | $V_{DS}=-5V, I_D=-20A$                                  | 5   |       |           | S          |
| Input Capacitance                  | $C_{iss}$    | $V_{DS}=-30V, V_{GS}=0V,$<br>$F=1.0MHz$                 |     | 4130  |           | PF         |
| Output Capacitance                 | $C_{oss}$    |                                                         |     | 420   |           | PF         |
| Reverse Transfer Capacitance       | $C_{rss}$    |                                                         |     | 145   |           | PF         |
| Turn-on Delay Time                 | $t_{d(on)}$  | $V_{DS}=-30V, V_{GS}=-10V, R_{GEN}=3\Omega$<br>$I_D=1A$ |     | 14    |           | nS         |
| Turn-on Rise Time                  | $t_r$        |                                                         |     | 20    |           | nS         |
| Turn-Off Delay Time                | $t_{d(off)}$ |                                                         |     | 40    |           | nS         |
| Turn-Off Fall Time                 | $t_f$        |                                                         |     | 19    |           | nS         |
| Total Gate Charge                  | $Q_g$        | $V_{DS}=-30V, I_D=-20A, V_{GS}=-10V$                    |     | 48    |           | nC         |
| Gate-Source Charge                 | $Q_{gs}$     |                                                         |     | 11    |           | nC         |
| Gate-Drain Charge                  | $Q_{gd}$     |                                                         |     | 10    |           | nC         |
| Body Diode Reverse Recovery Time   | $T_{rr}$     | $I_F=-20A, dI/dt=100A/\mu s$                            |     | 40    |           | nS         |
| Body Diode Reverse Recovery Charge | $Q_{rr}$     |                                                         |     | 56    |           | nC         |
| Diode Forward Voltage (Note 3)     | $V_{SD}$     | $V_{GS}=0V, I_S=-1A$                                    |     | -0.72 | -1        | V          |

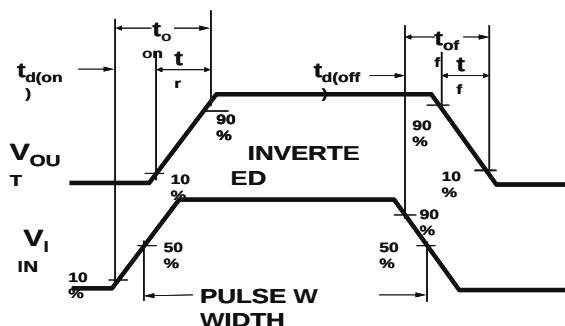
**NOTES:**

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on 1in<sup>2</sup> FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production testing.

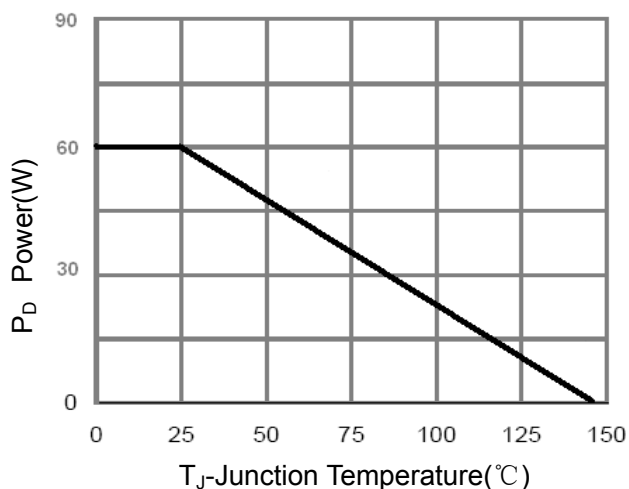
## Typical Characteristics



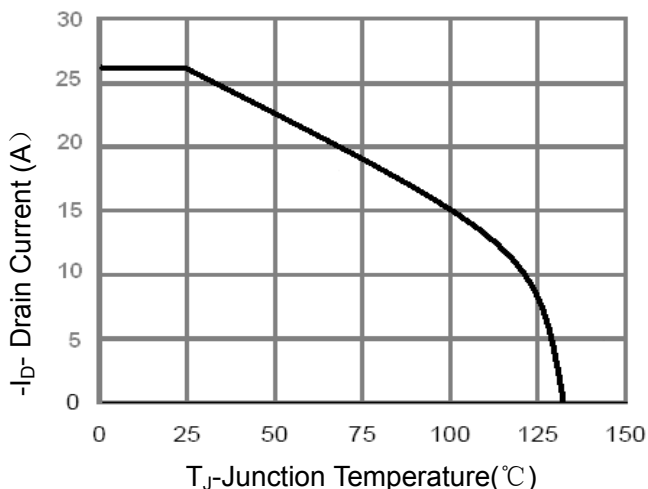
**Figure 1: Switching Test Circuit**



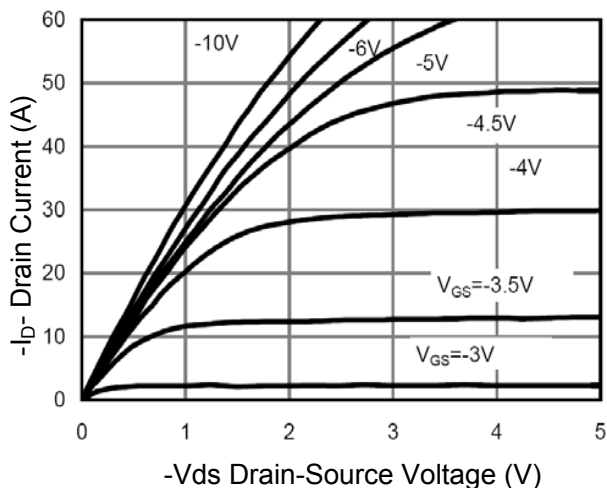
**Figure 2: Switching Waveforms**



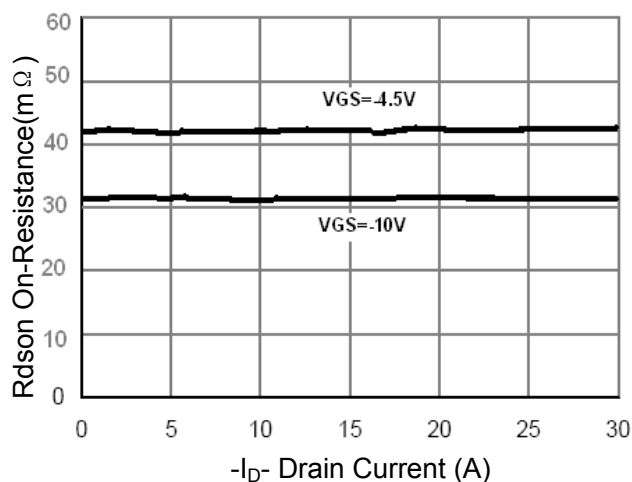
**Figure 3 Power Dissipation**



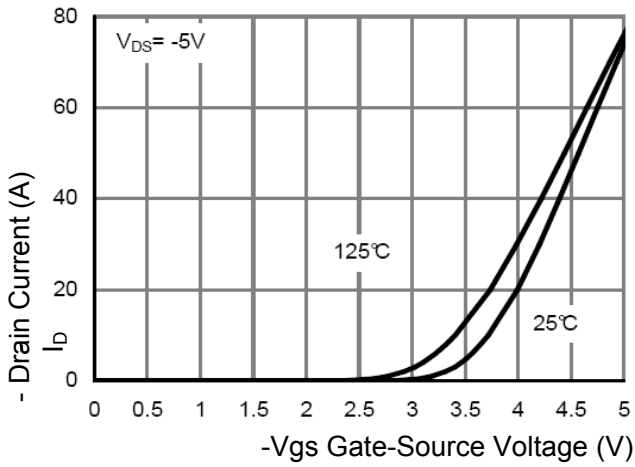
**Figure 4 Drain Current**



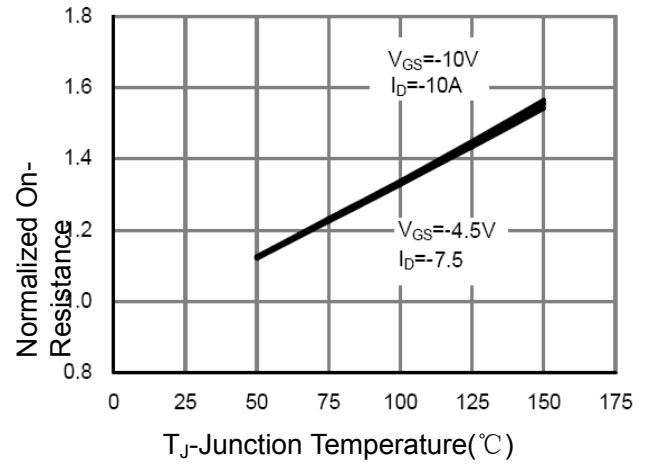
**Figure 5 Output CHARACTERISTICS**



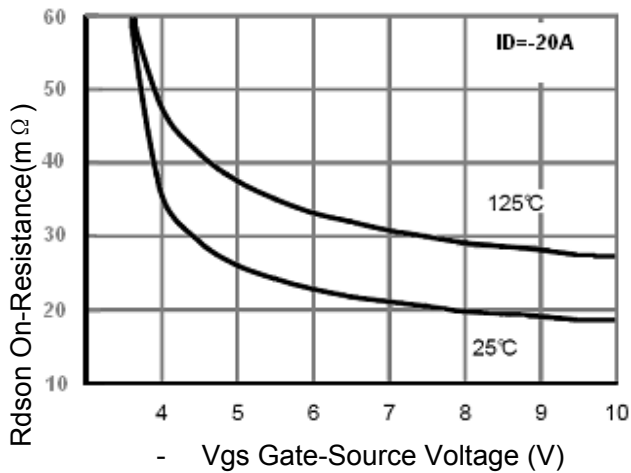
**Figure 6 Drain-Source On-Resistance**



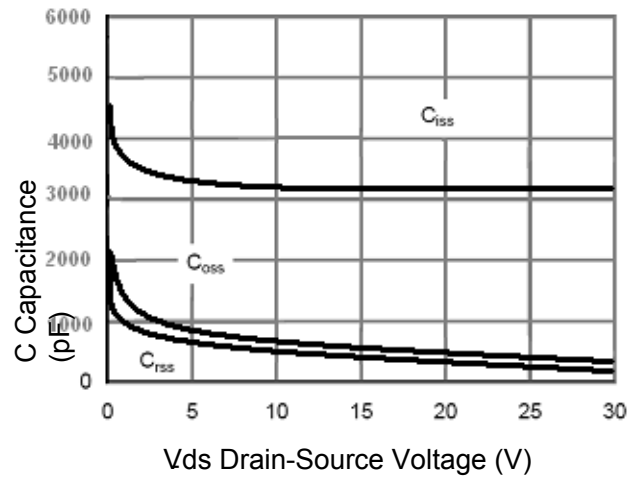
**Figure 7 Transfer Characteristics**



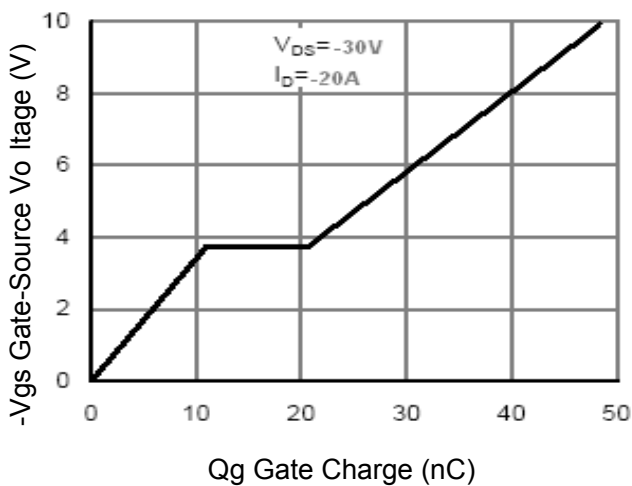
**Figure 8 Drain-Source On-Resistance**



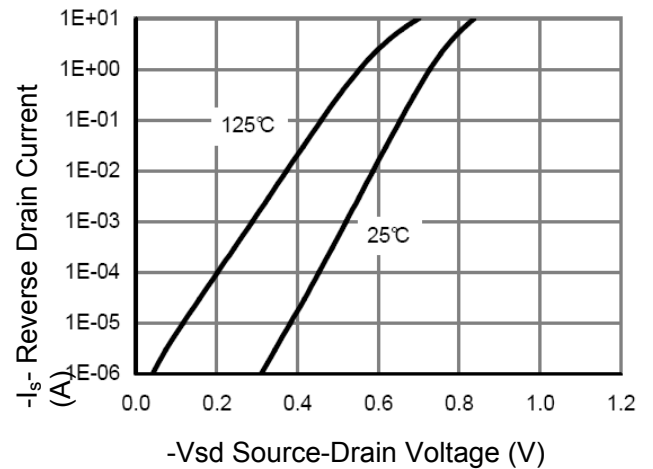
**Figure 9 Rdson vs Vgs**



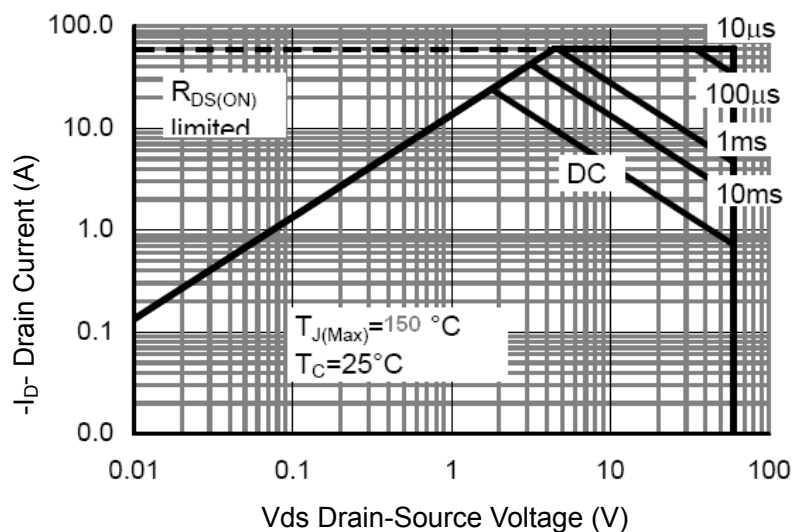
**Figure 10 Capacitance vs Vds**



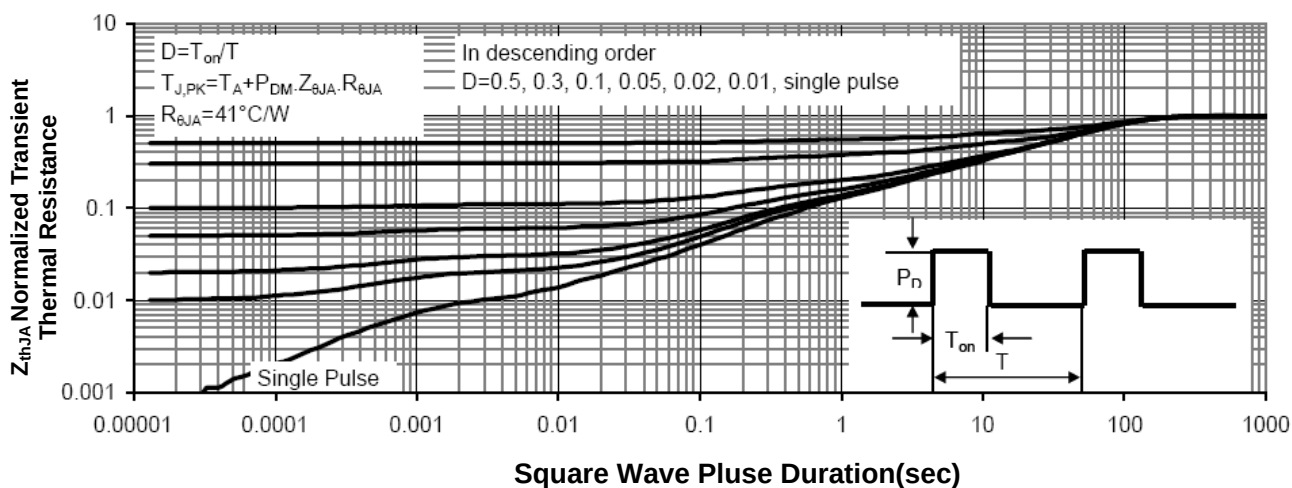
**Figure 11 Gate Charge**



**Figure 12 Source- Drain Diode Forward**

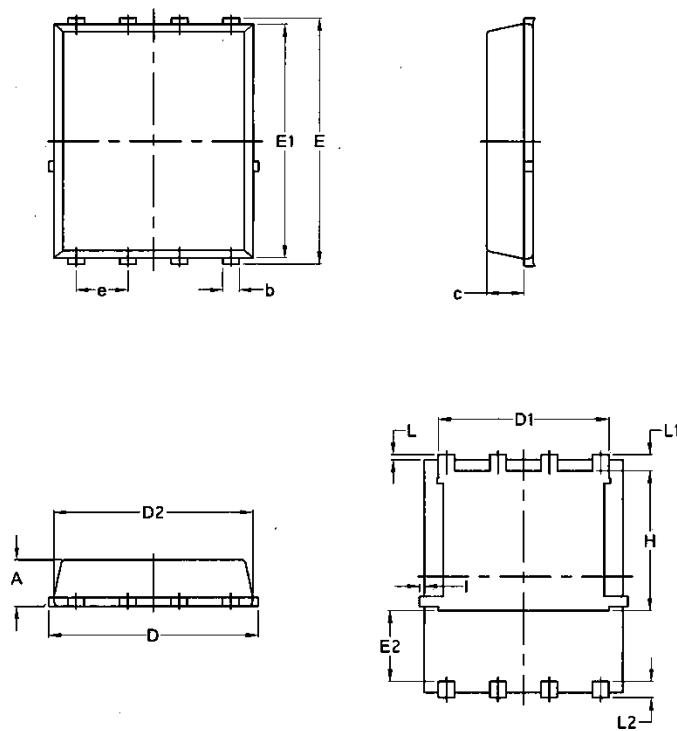


**Figure 13 Safe Operation Area**



**Figure 14 Normalized Maximum Transient Thermal Impedance**

**Package Mechanical Data-DFN5\*6-8L-JQ Single**



| Symbol | Common   |        |          |        |
|--------|----------|--------|----------|--------|
|        | mm       |        | Inch     |        |
|        | Mim      | Max    | Min      | Max    |
| A      | 1.03     | 1.17   | 0.0406   | 0.0461 |
| b      | 0.34     | 0.48   | 0.0134   | 0.0189 |
| c      | 0.824    | 0.0970 | 0.0324   | 0.082  |
| D      | 4.80     | 5.40   | 0.1890   | 0.2126 |
| D1     | 4.11     | 4.31   | 0.1618   | 0.1697 |
| D2     | 4.80     | 5.00   | 0.1890   | 0.1969 |
| E      | 5.95     | 6.15   | 0.2343   | 0.2421 |
| E1     | 5.65     | 5.85   | 0.2224   | 0.2303 |
| E2     | 1.60     | /      | 0.0630   | /      |
| e      | 1.27 BSC |        | 0.05 BSC |        |
| L      | 0.05     | 0.25   | 0.0020   | 0.0098 |
| L1     | 0.38     | 0.50   | 0.0150   | 0.0197 |
| L2     | 0.38     | 0.50   | 0.0150   | 0.0197 |
| H      | 3.30     | 3.50   | 0.1299   | 0.1378 |
| I      | /        | 0.18   | /        | 0.0070 |