

## General Description

The 70P10 is the highest performance trench P-Ch MOSFET with extreme high cell density, which provide excellent  $R_{DS(on)}$  and gate charge for most of the small power switching and load switch applications.

The 70P10 meet the RoHS and Green Product requirement with full function reliability approved.

## Features

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

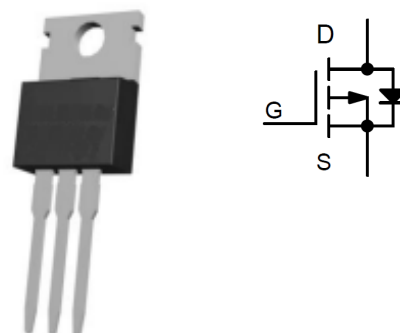
## Product Summary

| $BV_{DSS}$ | $R_{DS(on)}$ | $I_D$ |
|------------|--------------|-------|
| -100V      | 18m $\Omega$ | -70A  |

## Applications

- Inverters

## TO-220AB Pin Configuration



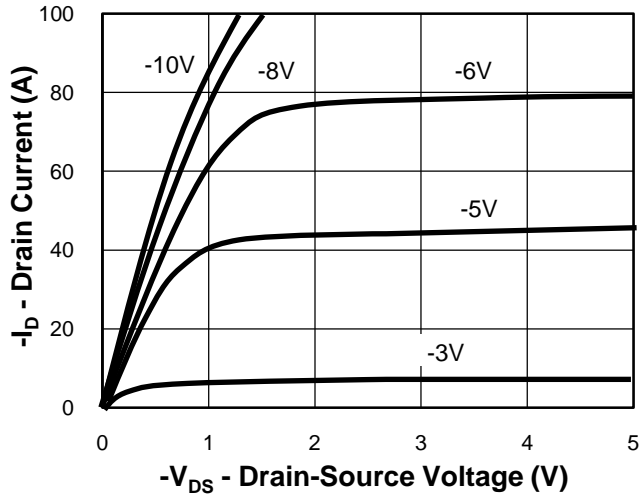
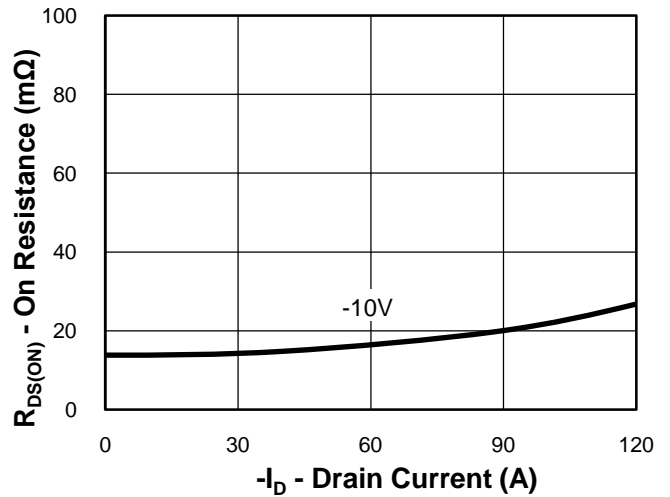
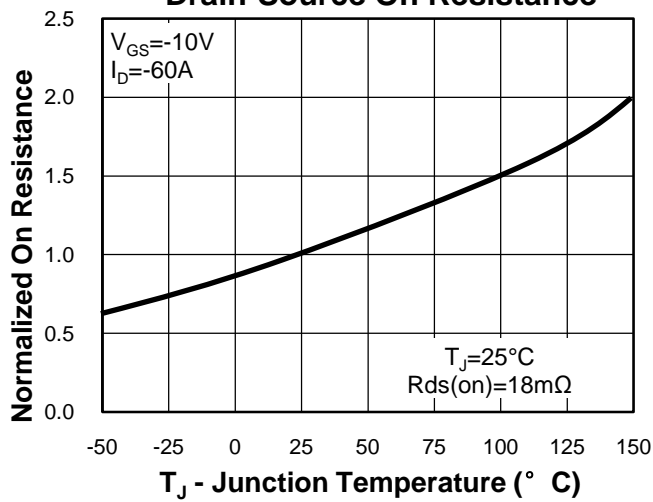
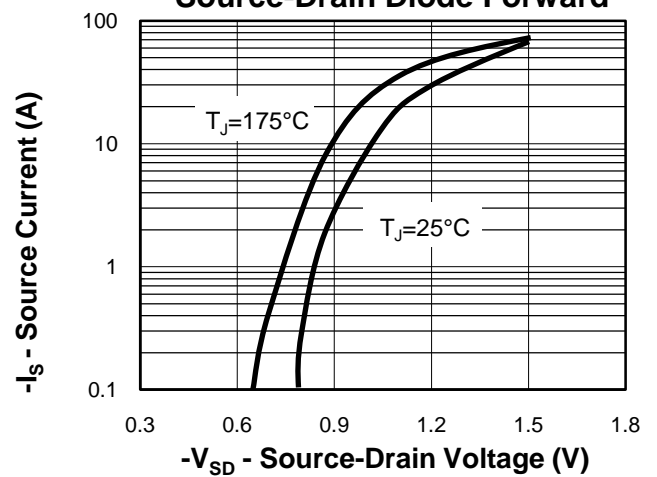
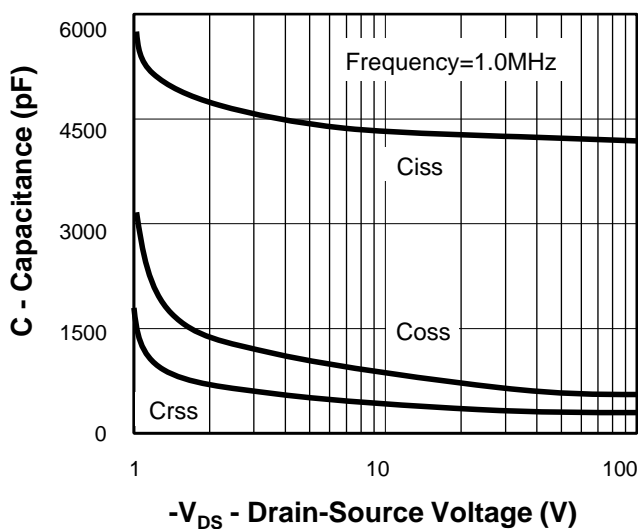
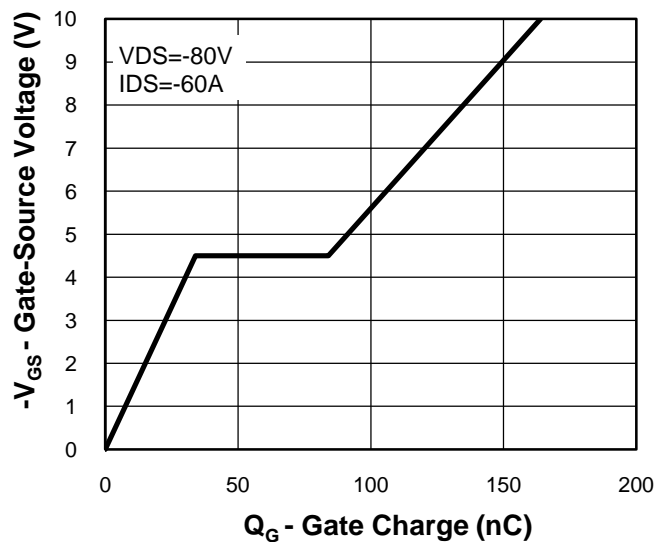
## Absolute Maximum Ratings

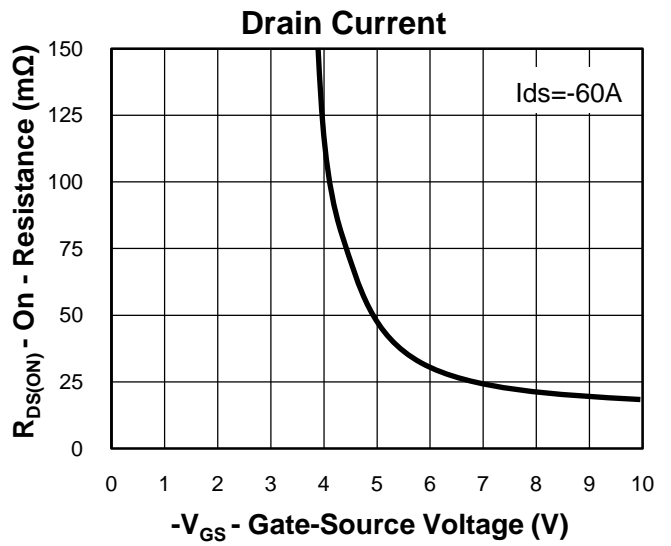
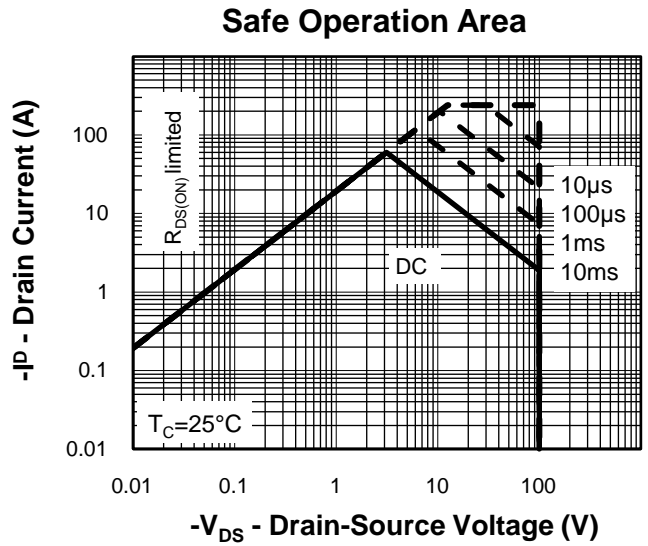
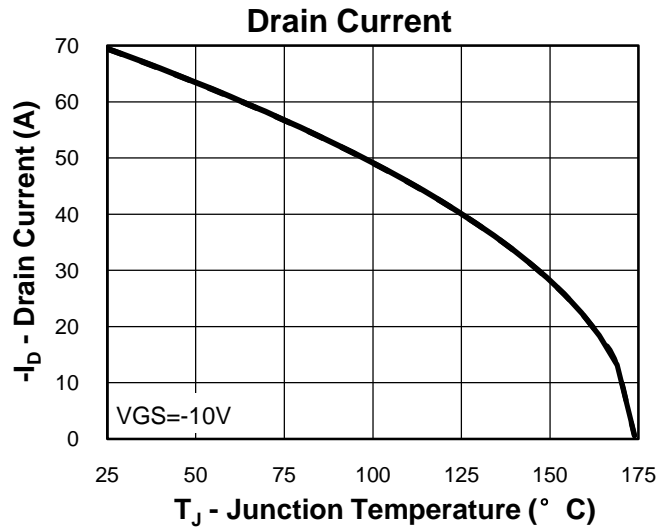
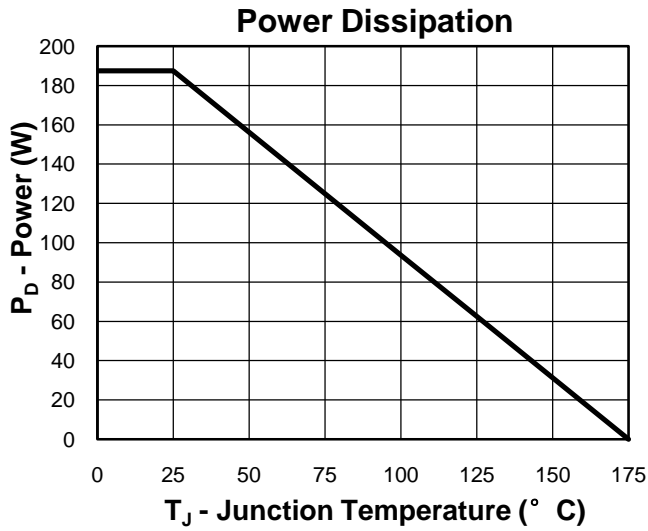
| Symbol   | Parameter  | Rating                         | Unit               |
|--|--|--------------------------------|--------------------|
| <b>Common Ratings</b> ( $T_C=25^\circ\text{C}$ Unless Otherwise Noted) |  |                                |                    |
| $V_{DSS}$  | Drain-Source Voltage                             | -100                           | V                  |
| $V_{GSS}$  | Gate-Source Voltage                              | $\pm 25$                       |                    |
| $T_J$  | Maximum Junction Temperature                     | 175                            | $^\circ\text{C}$   |
| $T_{STG}$  | Storage Temperature Range                        | -55 to 175                     | $^\circ\text{C}$   |
| $I_S$  | Diode Continuous Forward Current                 | $T_C=25^\circ\text{C}$<br>-70  | A                  |
| <b>Mounted on Large Heat Sink</b>                                      |  |                                |                    |
| $I_{DP}^{(1)}$   | 300 $\mu\text{s}$ Pulse Drain Current Tested     | $T_C=25^\circ\text{C}$<br>-240 | A                  |
| $I_D^{(2)}$  | Continuous Drain Current( $V_{GS}=-10\text{V}$ ) | $T_C=25^\circ\text{C}$<br>-70  | A                  |
|  |  | $T_C=100^\circ\text{C}$<br>-45 |                    |
| $P_D$  | Maximum Power Dissipation                        | $T_C=25^\circ\text{C}$<br>190  | W                  |
|  |  | $T_C=100^\circ\text{C}$<br>95  |                    |
| $R_{\theta JC}$  | Thermal Resistance-Junction to Case              | 0.8                            | $^\circ\text{C/W}$ |
| $R_{\theta JA}$  | Thermal Resistance-Junction to Ambient           | 62.5                           | $^\circ\text{C/W}$ |
| <b>Drain-Source Avalanche Ratings</b>                                  |  |                                |                    |
| $E_{AS}^{(3)}$   | Avalanche Energy, Single Pulsed                  | 400                            | mJ                 |

**Electrical Characteristics** ( $T_C=25^\circ\text{C}$  Unless Otherwise Noted)

| Symbol  | Parameter                        | Test Condition   | Min. | Typ. | Max.      | Unit       |
|---|----------------------------------|--|------|------|-----------|------------|
| <b>Static Characteristics</b>                   |                                  |  |      |      |           |            |
| $BV_{DSS}$                                      | Drain-Source Breakdown Voltage   | $V_{GS}=0V, I_{DS}=-250\mu A$                              | -100 |      |           | V          |
| $I_{DSS}$                                       | Zero Gate Voltage Drain Current  | $V_{DS}=-100V, V_{GS}=0V$                                  |      |      | -1        | $\mu A$    |
|   |                                  | $T_J=125^\circ\text{C}$                                    |      |      | -30       |            |
| $V_{GS(th)}$                                    | Gate Threshold Voltage           | $V_{DS}=V_{GS}, I_{DS}=-250\mu A$                          | -2   |      | -4        | V          |
| $I_{GSS}$                                       | Gate Leakage Current             | $V_{GS}=\pm 25V, V_{DS}=0V$                                |      |      | $\pm 100$ | nA         |
| $R_{DS(ON)}^{④}$                                | Drain-Source On-state Resistance | $V_{GS}=-10V, I_{DS}=-60A$                                 |      | 18   | 25        | m $\Omega$ |
| <b>Diode Characteristics</b>                    |                                  |  |      |      |           |            |
| $V_{SD}^{④}$                                    | Diode Forward Voltage            | $I_{SD}=-30A, V_{GS}=0V$                                   |      |      | -1.5      | V          |
| $t_{rr}$  | Reverse Recovery Time            | $I_{SD}=-60A, dI_{SD}/dt=100A/\mu s$                       |      | 175  |           | ns         |
| $Q_{rr}$  | Reverse Recovery Charge          |  |      | 620  |           | nC         |
| <b>Dynamic Characteristics</b> <sup>⑤</sup>     |                                  |  |      |      |           |            |
| $R_G$   | Gate Resistance                  | $V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$                      |      | 2    |           | $\Omega$   |
| $C_{iss}$                                       | Input Capacitance                | $V_{GS}=0V,$<br>$V_{DS}=-50V,$<br>Frequency=1.0MHz         |      | 4200 |           | pF         |
| $C_{oss}$                                       | Output Capacitance               |  |      | 615  |           |            |
| $C_{rss}$                                       | Reverse Transfer Capacitance     |  |      | 380  |           |            |
| $t_{d(ON)}$                                     | Turn-on Delay Time               | $V_{DD}=-50V, I_{DS}=-60A,$<br>$V_{GEN}=-10V, R_G=6\Omega$ |      | 27   |           | ns         |
| $t_r$   | Turn-on Rise Time                |  |      | 83   |           |            |
| $t_{d(OFF)}$                                    | Turn-off Delay Time              |  |      | 145  |           |            |
| $t_f$   | Turn-off Fall Time               |  |      | 40   |           |            |
| <b>Gate Charge Characteristics</b> <sup>⑤</sup> |                                  |  |      |      |           |            |
| $Q_g$   | Total Gate Charge                | $V_{DS}=-80V, V_{GS}=-10V,$<br>$I_{DS}=-60A$               |      | 164  |           | nC         |
| $Q_{gs}$  | Gate-Source Charge               |  |      | 34   |           |            |
| $Q_{gd}$  | Gate-Drain Charge                |  |      | 50   |           |            |

- Notes:
- ① Pulse width limited by safe operating area.
  - ② Calculated continuous current based on maximum allowable junction temperature.
  - ③ Limited by  $T_{Jmax}$ ,  $I_{AS}=-40A$ ,  $V_{DD}=-60V$ ,  $R_G=50\Omega$ , Starting  $T_J=25^\circ\text{C}$ .
  - ④ Pulse test; Pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
  - ⑤ Guaranteed by design, not subject to production testing.

**Typical Characteristics**
**Output Characteristics**

**Drain-Source On Resistance**

**Drain-Source On Resistance**

**Source-Drain Diode Forward**

**Capacitance**

**Gate Charge**


**Typical Characteristics**

**Thermal Transient Impedance**
