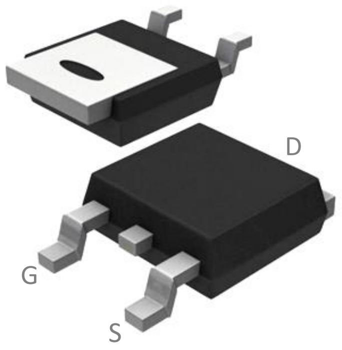
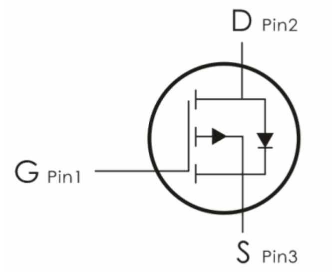
## Description：

This P-Channel MOSFET uses advanced trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge.

It can be used in a wide variety of applications.





## Features：

1) $V_{DS}$=-30V,$I_D$=-25A,$R_{DS(ON)}$<35mΩ @$V_{GS}$=-10V
2) Low gate charge.
3) Green device available.
4) Advanced high cell denity trench technology for ultra $R_{DS(ON)}$.
5) Excellent package for good heat dissipation.

## Absolute Maximum Ratings： (T$_C$=25℃ unless otherwise noted)

| Symbol | Parameter | Ratings | Units |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | -30 | V |
| $V_{GS}$ | Gate-Source Voltage | ±20 | V |
| $I_D$ | Continuous Drain Current | -25 | A |
| | Continuous Drain Current-TC=100℃ | -19 | |
| | Pulsed Drain Current[1] | -60 | |
| $E_{AS}$ | Single Pulse Avalanche Energy | 30 | mJ |
| $P_D$ | Power Dissipation | 40 | W |
| $T_J$, $T_{STG}$ | Operating and Storage Junction Temperature Range | -55 to +150 | ℃ |

## Thermal Characteristics：

| Symbol | Parameter | Max | Units |
|---|---|---|---|
| $R_{\theta JC}$ | Thermal Resistance,Junction to Case | 2.6 | ℃/W |
| $R_{\theta JA}$ | Thermal Resistance,Junction to Ambient | - | |

## Package Marking and Ordering Information：

| Part NO. | Marking | Package |
|---|---|---|
| DC033PG | C033P | TO-252 |

## Electrical Characteristics： (T$_C$=25℃ unless otherwise noted)

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| **Off Characteristics** | | | | | | |
| **$BV_{DSS}$** | Drain-Sourtce Breakdown Voltage | $V_{GS}$=0V,$I_D$=250μA | -30 | --- | --- | V |
| **$I_{DSS}$** | Zero Gate Voltage Drain Current | $V_{GS}$=0V, $V_{DS}$=-30V, TJ=25℃ | --- | --- | -1 | μA |
| **$I_{GSS}$** | Gate-Source Leakage Current | $V_{GS}$=±20V, $V_{DS}$=0A | --- | --- | ±100 | nA |
| **On Characteristics** | | | | | | |
| **$V_{GS(th)}$** | GATE-Source Threshold Voltage | $V_{GS}$=$V_{DS}$, $I_D$=250μA | -1.0 | -1.6 | -2.5 | V |
| **$R_{DS(ON)}$** | Drain-Source On Resistance | $V_{GS}$=-10V,$I_D$=-8A | --- | --- | 35 | mΩ |
| | | $V_{GS}$=-4.5V,$I_D$=-5A | --- | --- | 60 | |
| **$G_{FS}$** | Forward Transconductance | $V_{DS}$ =--5V, $I_D$=-18A | --- | 18 | --- | S |
| **Dynamic Characteristics** | | | | | | |
| **$C_{iss}$** | Input Capacitance | $V_{DS}$=-15V, $V_{GS}$=0V, f=1MHz | --- | 660 | --- | pF |
| **$C_{oss}$** | Output Capacitance | | --- | 100 | --- | |
| **$C_{rss}$** | Reverse Transfer Capacitance | | --- | 65 | --- | |
| **Switching Characteristics** | | | | | | |
| **$t_{d(on)}$** | Turn-On Delay Time$^{2,3}$ | $V_{DS}$=-15V, $I_D$=-4A,<br>$R_{GEN}$=3Ω, $V_{GS}$=-10V | --- | 7.5 | --- | ns |
| **$t_r$** | Rise Time$^{2,3}$ | | --- | 5.6 | --- | ns |
| **$t_{d(off)}$** | Turn-Off Delay Time$^{2,3}$ | | --- | 19 | --- | ns |
| **$t_f$** | Fall Time$^{2,3}$ | | --- | 6 | --- | ns |
| **$Q_g$** | Total Gate Charge$^{2,3}$ | $V_{GS}$=-10V, $V_{DS}$=-15V,<br>$I_D$=-6.5A | --- | 9.2 | --- | nC |
| **$Q_{gs}$** | Gate-Source Charge$^{2,3}$ | | --- | 1.6 | --- | nC |
| **$Q_{gd}$** | Gate-Drain “Miller” Charge$^{2,3}$ | | --- | 2.2 | --- | nC |
| **Drain-Source Diode Characteristics** | | | | | | |
| **$V_{SD}$** | Source-Drain Diode Forward Voltage$^2$ | $V_{GS}$=0V,$I_S$=-1A, $T_J$=25℃ | --- | --- | -1.2 | V |

## Notes:

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.

2. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.

3. Essentially independent of operating temperature.

## Typical Characteristics：

($T_C$=25℃ unless otherwise noted)

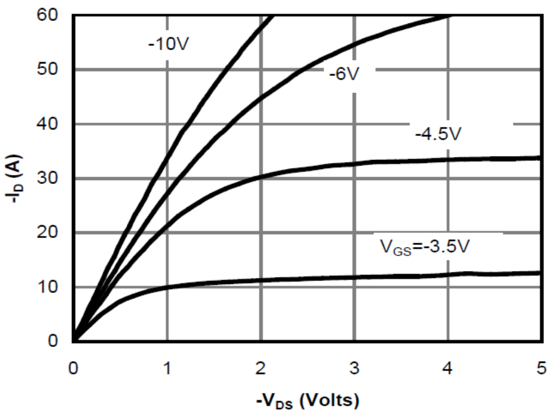


**Figure 1: On-Region Characteristics**

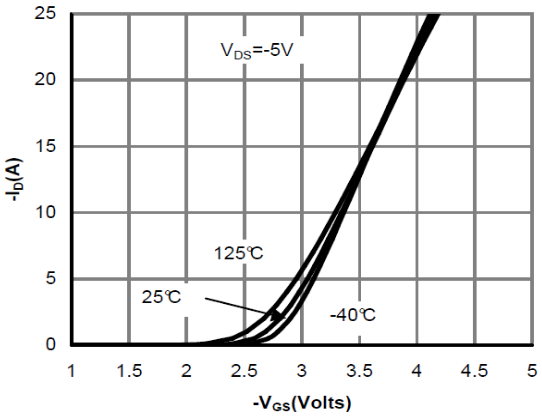


**Figure 2: Transfer Characteristics**

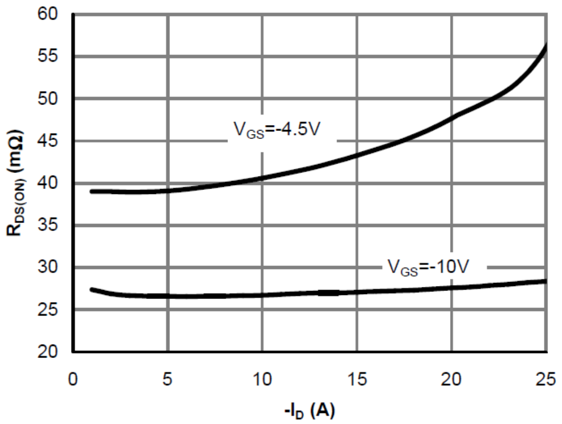


**Figure 3: On-Resistance vs. Drain Current and Gate Voltage**

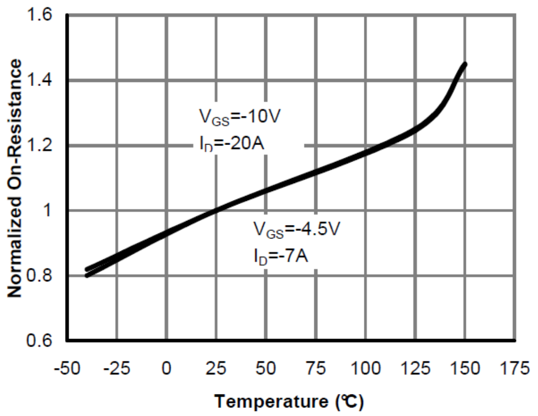


**Figure 4: On-Resistance vs. Junction Temperature**

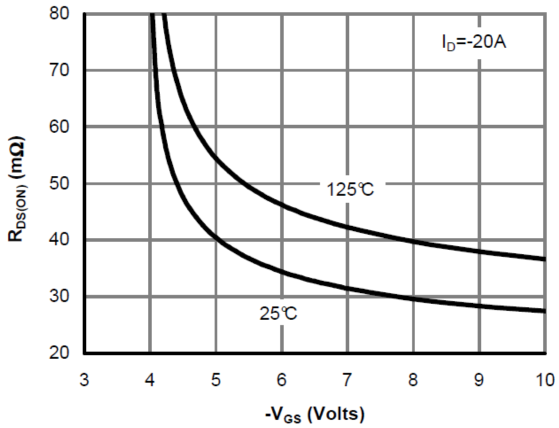


**Figure 5: On-Resistance vs. Gate-Source Voltage**

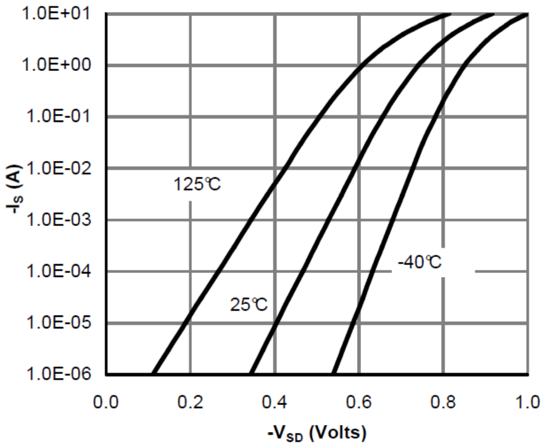


**Figure 6: Body-Diode Characteristics**

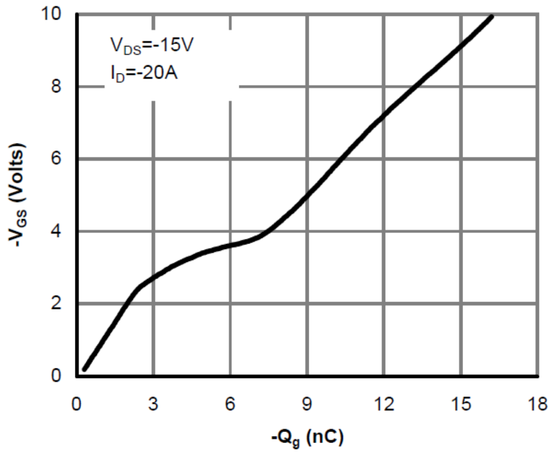


Figure 7: Gate-Charge Characteristics

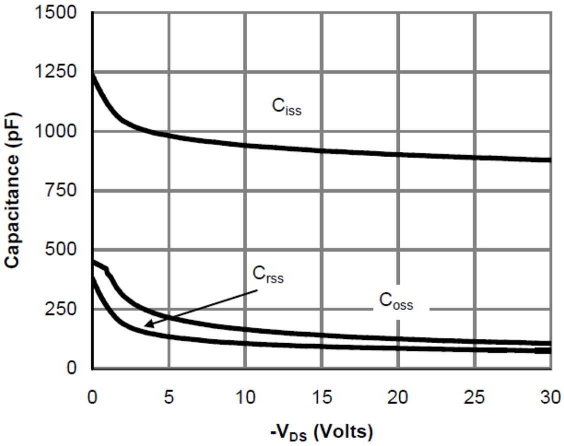


Figure 8: Capacitance Characteristics

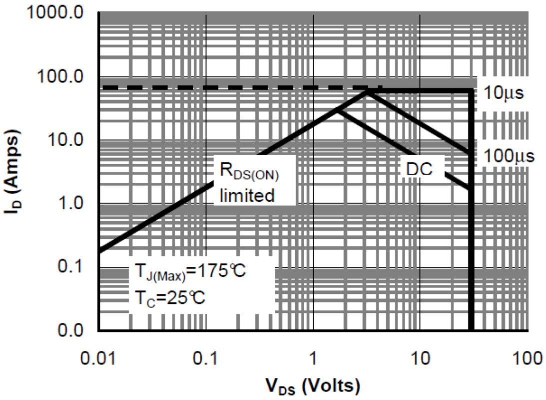


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

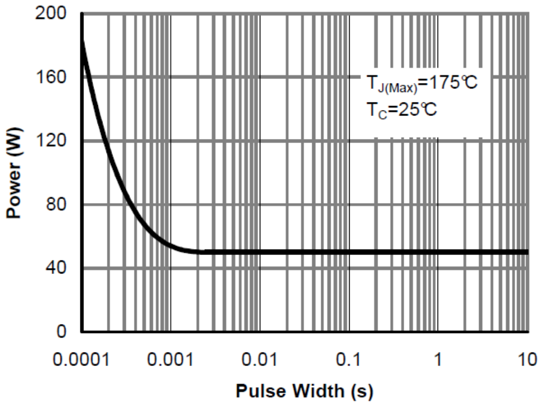


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

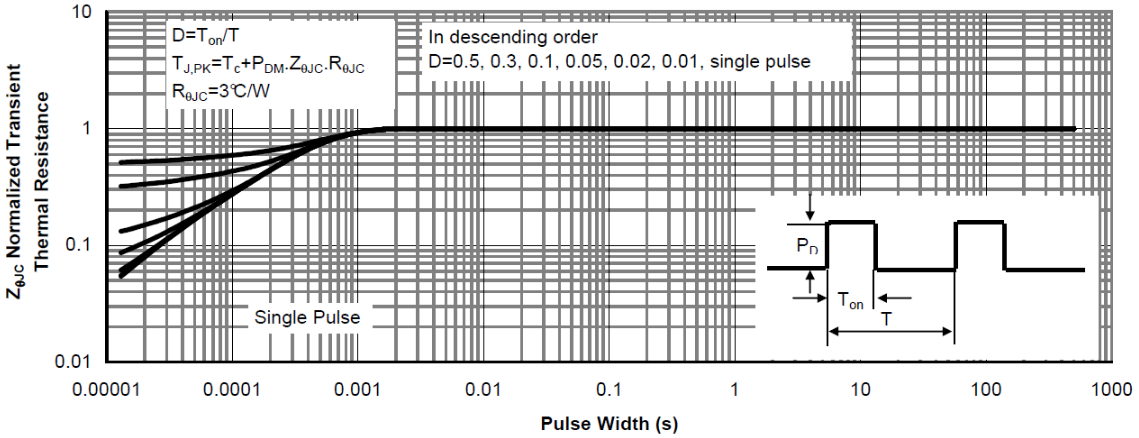


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)