

## Description:

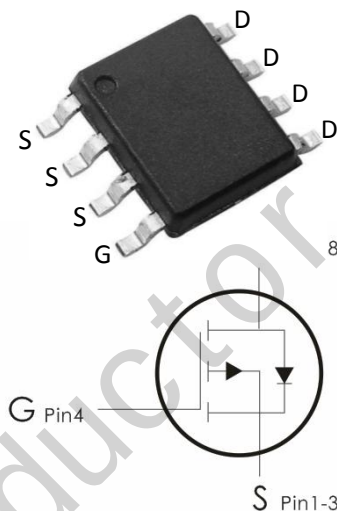
This P-Channel MOSFET uses advanced trench technology and

design to provide excellent  $R_{DS(on)}$  with low gate charge.

It can be used in a wide variety of applications.

## Features:

- 1)  $V_{DS}=-40V, I_D=-12A, R_{DS(on)}<13m\Omega @V_{GS}=-10V$
- 2) Low gate charge.
- 3) Green device available.
- 4) Advanced high cell density trench technology for ultra low  $R_{DS(on)}$ .
- 5) Excellent package for good heat dissipation.



## Absolute Maximum Ratings: ( $T_C=25^\circ C$ unless otherwise noted)

| Symbol         | Parameter                                        | Ratings     | Units      |
|----------------|--------------------------------------------------|-------------|------------|
| $V_{DS}$       | Drain-Source Voltage                             | -40         | V          |
| $V_{GS}$       | Gate-Source Voltage                              | $\pm 20$    | V          |
| $I_D$          | Continuous Drain Current- $T_C=25^\circ C$       | -12         | A          |
|                | Continuous Drain Current- $T_C=100^\circ C$      | -7.8        |            |
| $I_{DM}$       | Drain Current-Pulsed <sup>1</sup>                | -48         | A          |
| $P_D$          | Power Dissipation                                | 3.5         | W          |
| $T_J, T_{STG}$ | Operating and Storage Junction Temperature Range | -55 to +150 | $^\circ C$ |

## Thermal Characteristics:

| Symbol          | Parameter                               | Max | Units        |
|-----------------|-----------------------------------------|-----|--------------|
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | 36  | $^\circ C/W$ |

## Package Marking and Ordering Information:

| Part NO.     | Marking | Package |
|--------------|---------|---------|
| IRF7240TRPBF | 4485    | SOP-8   |

Electrical Characteristics: ( $T_C=25^{\circ}\text{C}$  unless otherwise noted)

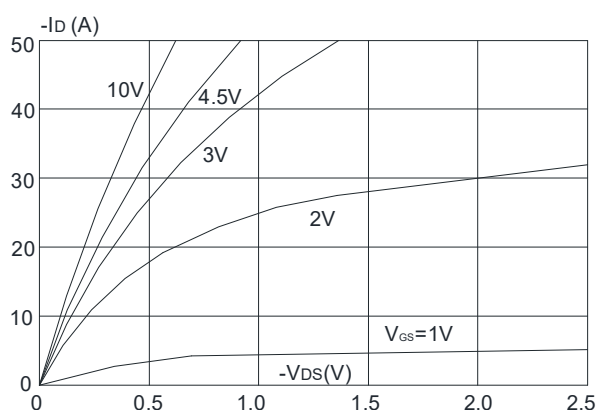
| Symbol                             | Parameter                                                | Conditions                                                                                    | Min | Typ  | Max   | Units |
|------------------------------------|----------------------------------------------------------|-----------------------------------------------------------------------------------------------|-----|------|-------|-------|
| Off Characteristics                |                                                          |                                                                                               |     |      |       |       |
| BV <sub>DSS</sub>                  | Drain-Source Breakdown Voltage                           | V <sub>GS</sub> =0V, I <sub>D</sub> =250 μ A                                                  | -40 | ---  | ---   | V     |
| I <sub>DSS</sub>                   | Zero Gate Voltage Drain Current                          | V <sub>GS</sub> =0V, V <sub>DS</sub> =-40V                                                    | --- | ---  | -1    | μ A   |
| I <sub>GSS</sub>                   | Gate-Source Leakage Current                              | V <sub>GS</sub> = ± 20V, V <sub>DS</sub> =0A                                                  | --- | ---  | ± 100 | nA    |
| On Characteristics                 |                                                          |                                                                                               |     |      |       |       |
| V <sub>GS(th)</sub>                | GATE-Source Threshold Voltage                            | V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250 μ A                                    | -1  | -1.7 | -2.5  | V     |
| R <sub>DS(ON)</sub>                | Drain-Source On Resistance <sup>2</sup>                  | V <sub>GS</sub> =-10V, I <sub>D</sub> =-12A                                                   | --- | 10   | 13    | m Ω   |
|                                    |                                                          | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-10A                                                  | --- | 15.5 | 22    |       |
| Dynamic Characteristics            |                                                          |                                                                                               |     |      |       |       |
| C <sub>iss</sub>                   | Input Capacitance                                        | V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V, f=1MHz                                            | --- | 3799 | ---   | pF    |
| C <sub>oss</sub>                   | Output Capacitance                                       |                                                                                               | --- | 328  | ---   |       |
| C <sub>rss</sub>                   | Reverse Transfer Capacitance                             |                                                                                               | --- | 288  | ---   |       |
| Switching Characteristics          |                                                          |                                                                                               |     |      |       |       |
| t <sub>d(on)</sub>                 | Turn-On Delay Time                                       | V <sub>DD</sub> =-20V, V <sub>GS</sub> =-10V<br>I <sub>D</sub> =-12A, R <sub>GEN</sub> =2.5 Ω | --- | 9    | ---   | ns    |
| t <sub>r</sub>                     | Rise Time                                                |                                                                                               | --- | 20   | ---   | ns    |
| t <sub>d(off)</sub>                | Turn-Off Delay Time                                      |                                                                                               | --- | 52   | ---   | ns    |
| t <sub>f</sub>                     | Fall Time                                                |                                                                                               | --- | 28   | ---   | ns    |
| Q <sub>g</sub>                     | Total Gate Charge                                        | V <sub>DS</sub> =-20V , V <sub>GS</sub> =-10V ,<br>I <sub>D</sub> =-12A                       | --- | 41   | ---   | nC    |
| Q <sub>gs</sub>                    | Gate-Source Charge                                       |                                                                                               | --- | 7.2  | ---   | nC    |
| Q <sub>gd</sub>                    | Gate-Drain “Miller” Charge                               |                                                                                               | --- | 8.4  | ---   | nC    |
| Drain-Source Diode Characteristics |                                                          |                                                                                               |     |      |       |       |
| V <sub>SD</sub>                    | Diode Forward Voltage                                    | V <sub>GS</sub> =0V, I <sub>S</sub> =-12A                                                     | --- | -0.8 | -1.2  | V     |
| I <sub>S</sub>                     | Maximum Continuous Drain to Source Diode Forward Current | V <sub>G</sub> =V <sub>D</sub> =0V                                                            | --- | ---  | -12   | A     |
| I <sub>SM</sub>                    | Max. Pulsed Forward Current <sup>t</sup>                 | V <sub>G</sub> =V <sub>D</sub> =0V                                                            | --- | ---  | -48   | A     |

|                       |                         |                                                |     |    |     |    |
|-----------------------|-------------------------|------------------------------------------------|-----|----|-----|----|
| <b>T<sub>rr</sub></b> | Reverse Recovery Time   | $V_{GS}=0V, I_S = -12A,$<br>$di/dt=100A/\mu s$ | --- | 39 | --- | ns |
| <b>Q<sub>rr</sub></b> | Reverse Recovery Charge |                                                | --- | 42 | --- | nc |

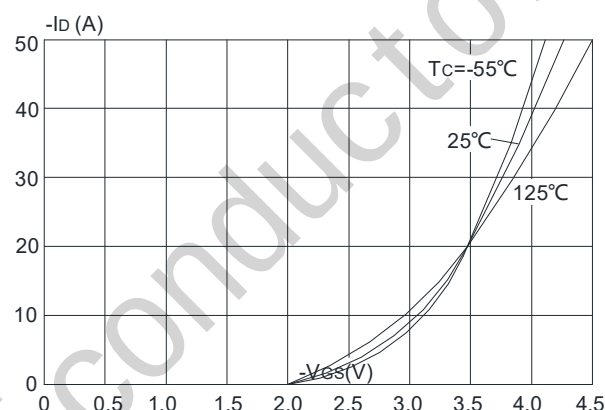
### Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. Pulse Test: Pulse Width $\leq 300\mu s$ , Duty Cycles $\leq 2\%$

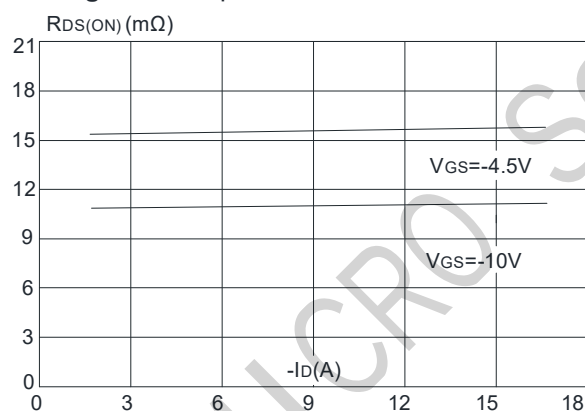
### Typical Characteristics: ( $T_c=25^\circ C$ unless otherwise noted)



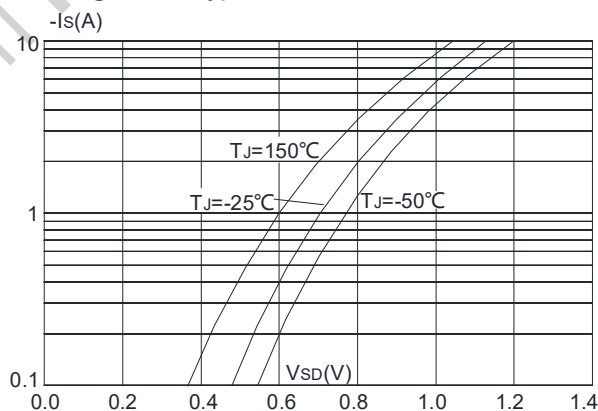
**Figure 1:** Output Characteristics



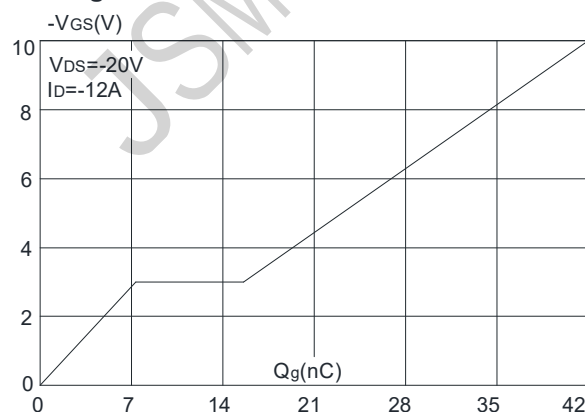
**Figure 2:** Typical Transfer Characteristics



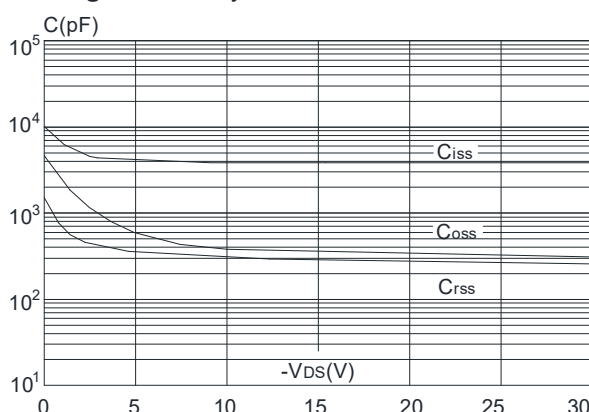
**Figure 3:** On-resistance vs. Drain Current



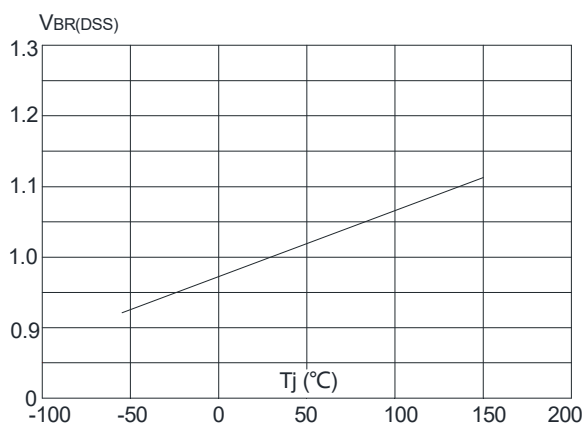
**Figure 4:** Body Diode Characteristics



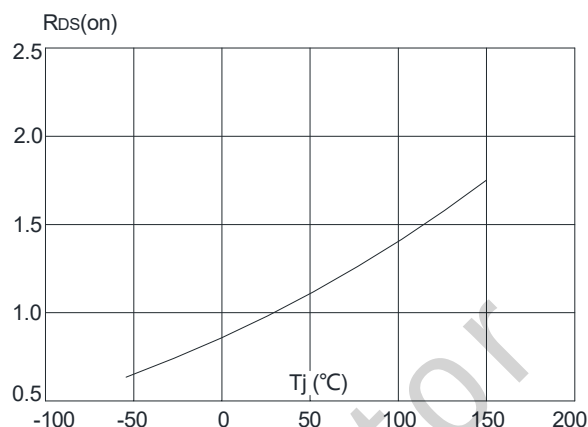
**Figure 5:** Gate Charge Characteristics



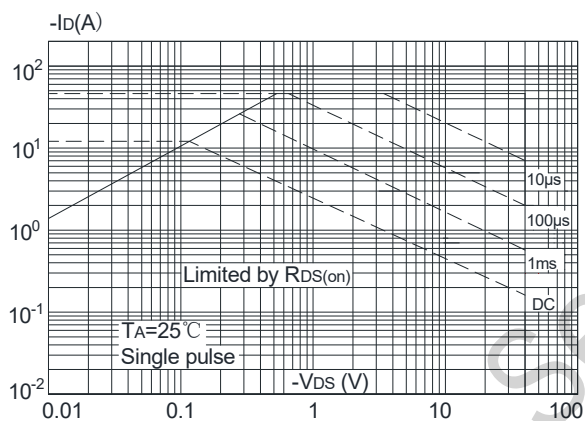
**Figure 6:** Capacitance Characteristics



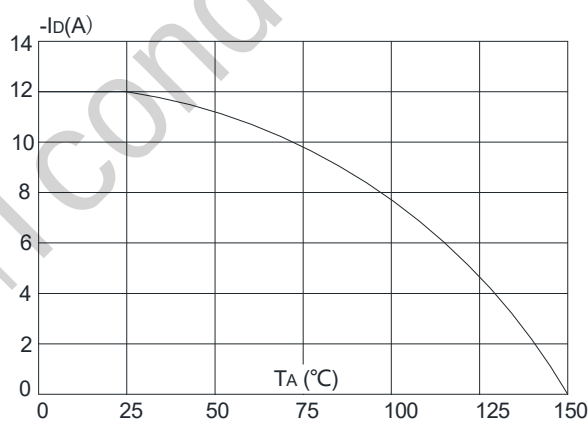
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



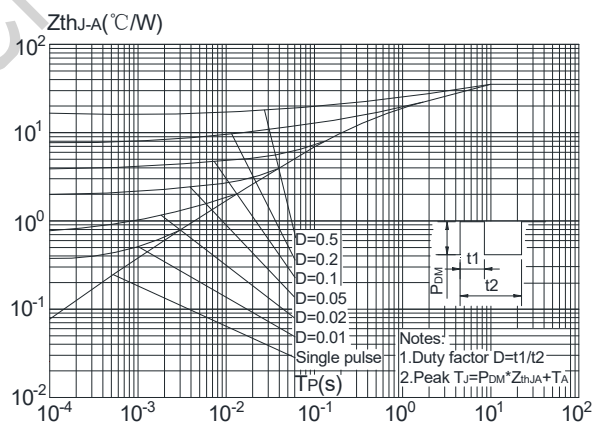
**Figure 8:** Normalized on Resistance vs. Junction Temperature



**Figure 9:** Maximum Safe Operating Area

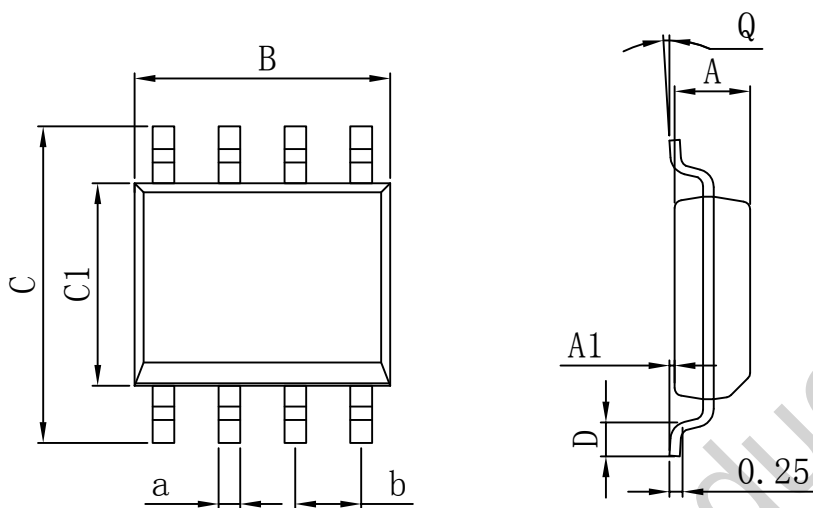


**Figure 10:** Maximum Continuous Drain Current vs. Ambient Temperature



**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

SOP8



| Dimensions In Millimeters |       |       |          |           |       |
|---------------------------|-------|-------|----------|-----------|-------|
| Symbol :                  | Min : | Max : | Symbol : | Min :     | Max : |
| A                         | 1.225 | 1.570 | D        | 0.400     | 0.950 |
| A1                        | 0.100 | 0.250 | Q        | 0°        | 8°    |
| B                         | 4.800 | 5.100 | a        | 0.420 TYP |       |
| C                         | 5.800 | 6.250 | b        | 1.270 TYP |       |
| C1                        | 3.800 | 4.000 |          |           |       |