

## Silicon P-Channel Power MOSFET

### Description

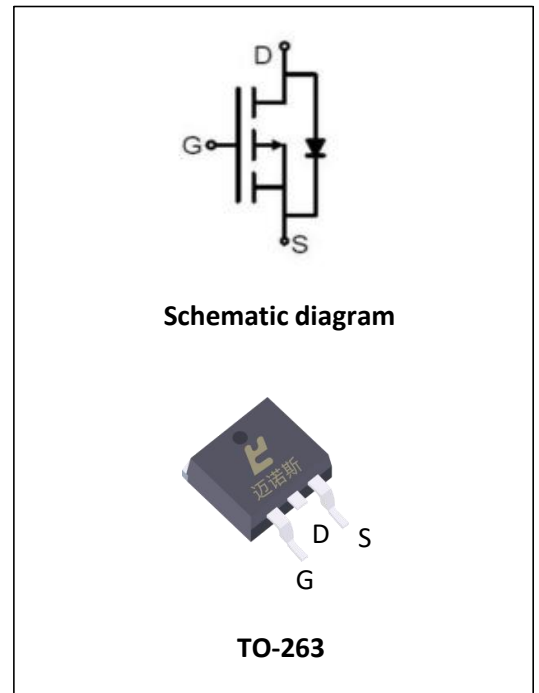
The IRF5210STRL uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge. It can be used in a wide variety of applications.

### General Features

- ①  $V_{DS}=-100V$ ,  $I_D=-40A$
- ② Low ON Resistance
- ③ Low Reverse transfer capacitance
- ④ 100% Single Pulse avalanche energy Test

### Application

- ① Power switching application
- ② Adapter and charger



### Package Marking And Ordering Information:

Ordering Codes	Package	Product Code	Packing
IRF5210STRL	TO-263	IRF5210S	Reel

### ABSOLUTE RATINGS (at $T_C=25^{\circ}C$ unless otherwise specified)

Symbol	Parameter	Value	Units
$V_{DSS}$	Drain-to-Source Breakdown Voltage	-100	V
$I_D$	Drain Current (continuous) at $T_C=25^{\circ}C$	-40	A
$I_{DM}$	Drain Current (pulsed)	-120	A
$V_{GS}$	Gate to Source Voltage	+/-20	V
$P_{tot}$	Total Dissipation at $T_C=25^{\circ}C$	180	W
$T_j$	Max. Operating Junction Temperature	175	$^{\circ}C$
$E_{AS}$	Single Pulse Avalanche Energy	700	mJ

### Thermal characteristics

Symbol	Parameter	Typ	Units
$R_{\theta JC}$	Junction-to-Case	2.5	$^{\circ}C/W$

**Electrical Characteristics (at  $T_c=25^\circ\text{C}$  unless otherwise specified)**

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
$V_{DS}$	Drain-source Voltage	$V_{GS}=0V, I_D=-250\mu A$	-100	--	--	V
$R_{DS(on)}$	Static Drain-to-Source on-Resistance	$V_{GS}=-10V, I_D=-15A$	--	35	40	m $\Omega$
$V_{GS(th)}$	Gated Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.0	-1.5	-2.4	V
$I_{DSS}$	Drain to Source leakage Current	$V_{DS}=-100V, V_{GS}=0V$	--	--	-1.0	$\mu A$
$I_{GSS(F)}$	Gated Body Forward Leakage	$V_{GS}=+20V$	--	--	100	nA
$I_{GSS(R)}$	Gated Body Reverse Leakage	$V_{GS}=-20V$	--	--	-100	nA
$C_{iss}$	Input Capacitance	$V_{GS}=0V, V_{DS}=-25V, f=1.0\text{MHZ}$	--	2315	--	pF
$C_{oss}$	Output Capacitance		--	190	--	pF
$C_{rss}$	Reverse Transfer Capacitance		--	11	--	pF

**Switching Characteristics**

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
$t_{d(on)}$	Turn-on Delay Time	$V_{DD}=-20V, I_D=-15A, R_G=10\Omega$	--	28	--	nS
$t_r$	Turn-on Rise Time		--	21	--	nS
$t_{d(off)}$	Turn-off Delay Time		--	62	--	nS
$t_f$	Turn-off Fall Time		--	32	--	nS
$Q_g$	Total Gate Charge	$V_{DS}=-20V, I_D=-15A, V_{GS}=-10V$	--	40	--	nC
$Q_{gs}$	Gate-Source Charge		--	9.2	--	nC
$Q_{gd}$	Gate-Drain Charge		--	14	--	nC

**Source-Drain Diode Characteristics**

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
$I_{SD}$	S-D Current(Body Diode)		--	--	-40	A
$I_{SDM}$	Pulsed S-D Current(Body Diode)		--	--	-140	A
$V_{SD}$	Diode Forward Voltage	$V_{GS}=0V, I_{DS}=-40A$	--	--	-1.5	V
$t_{rr}$	Reverse Recovery Time	$T_J=25^\circ\text{C}, I_F=-40A, di/dt=100A/us$	--	--	555	nS
$Q_{rr}$	Reverse Recovery Charge		--	--	4550	$\mu C$
*Pulse Test: Pulse Width $\leq 300\mu s$ , Duty Cycle $\leq 2\%$						

Characteristics Curves

Figure 1 Output Characteristics

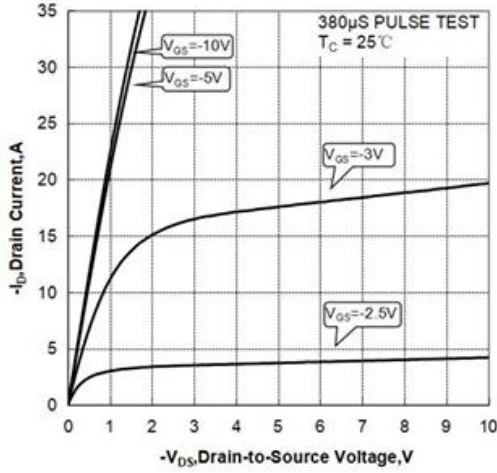


Figure 2 Transfer Characteristics

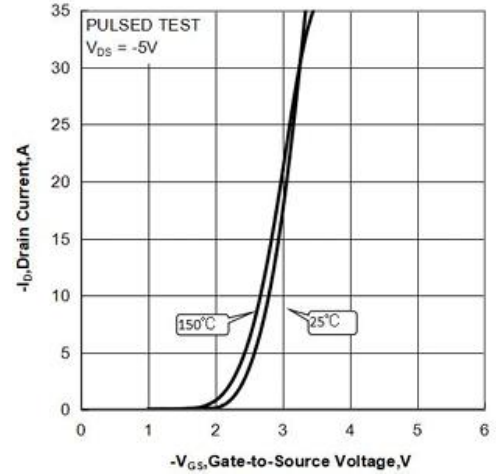


Figure 3 On-Resistance vs. ID

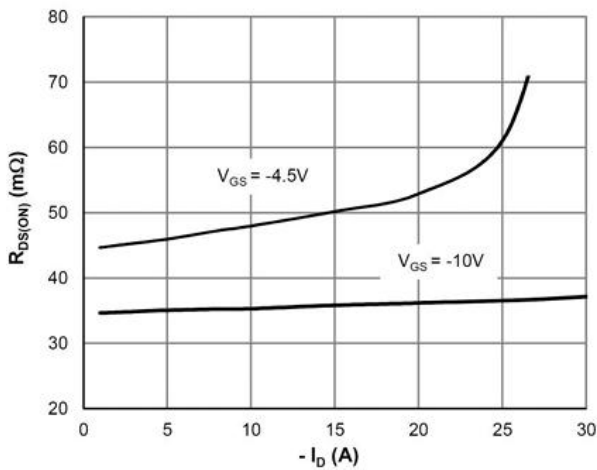


Figure 4 On-Resistance vs. Junction Temperature

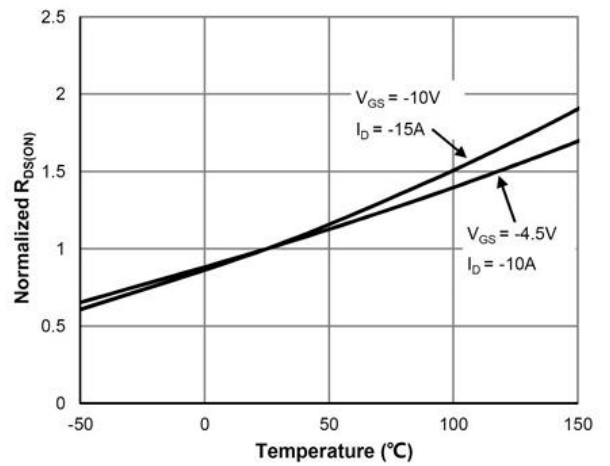


Figure 5 BV vs Junction Temperature

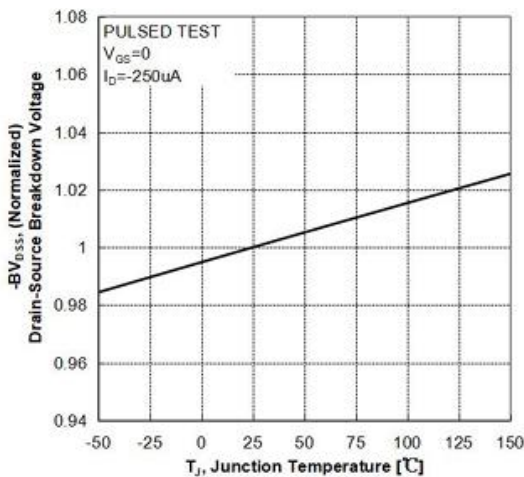


Figure 6 Vth vs Junction Temperature

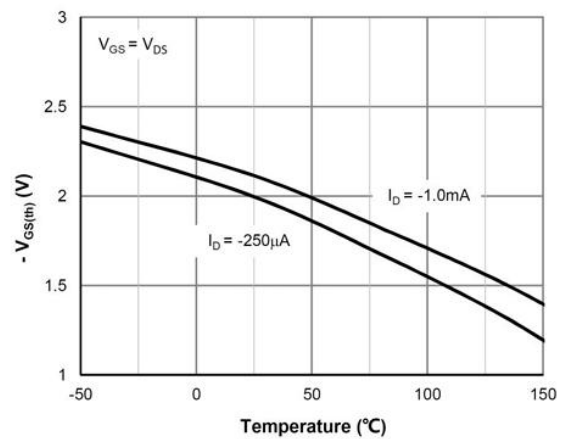


Figure 7 Gate-Charge Characteristics

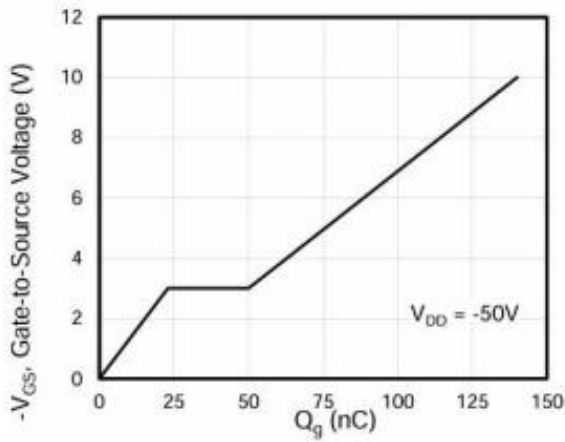


Figure 8 Capacitance Characteristics

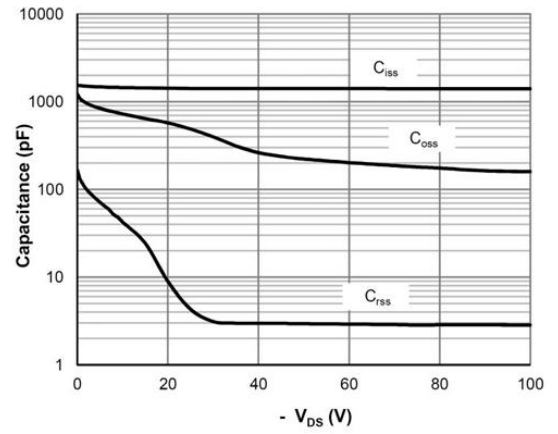


Figure 9 Body Diode Forward Voltage

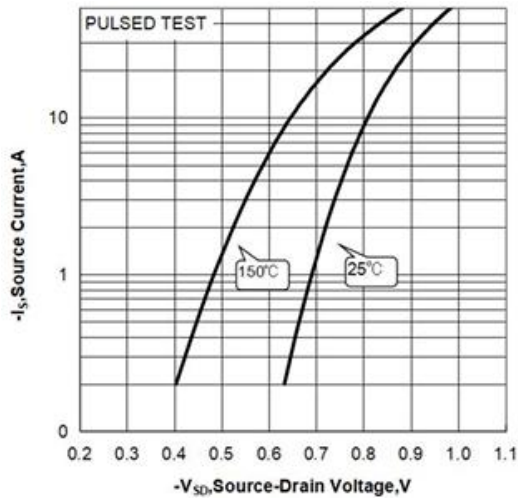


Figure 10 Maximum Safe Operating Area

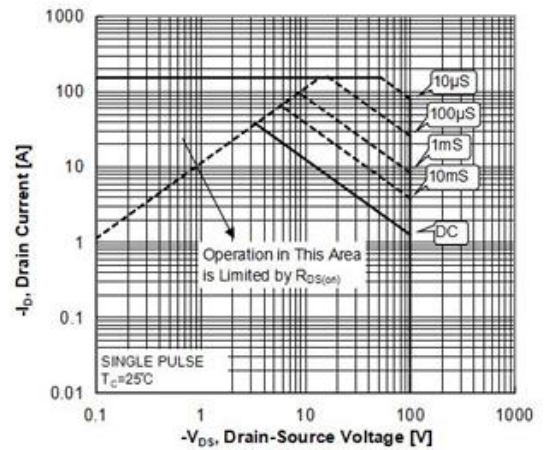
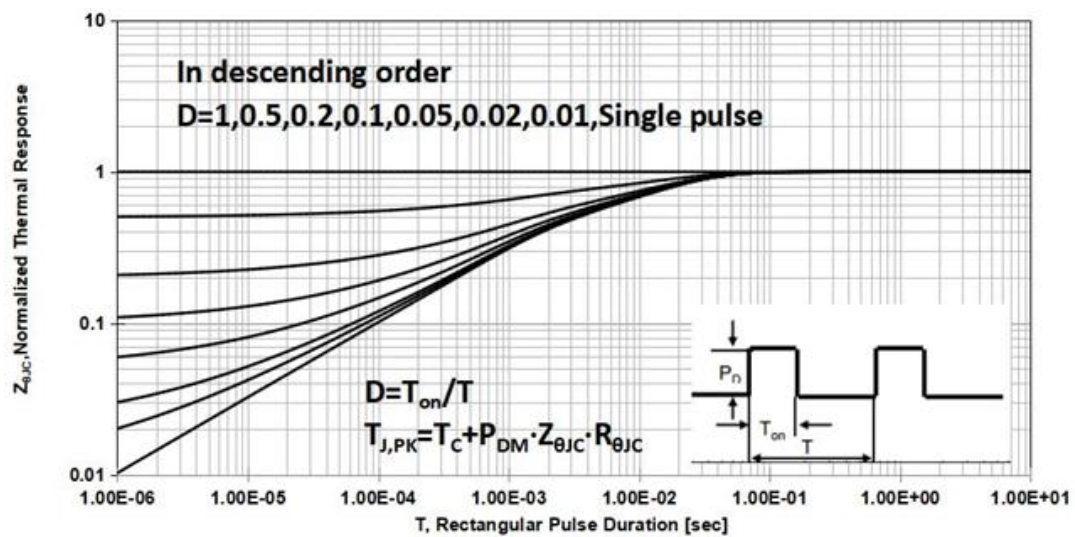
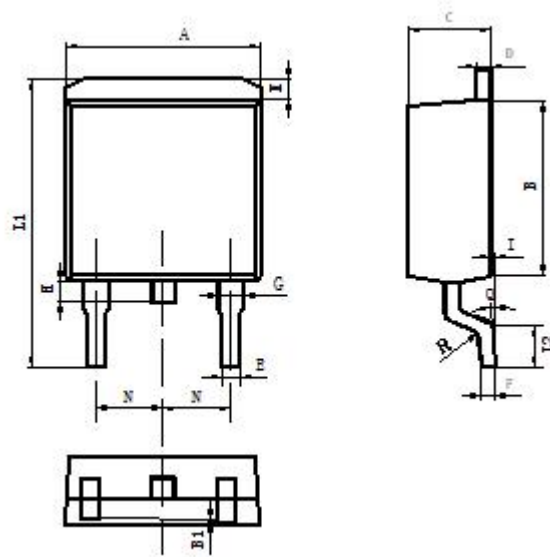


Figure 11 Transient Thermal Impedance



Package Description



Symbol	Values(mm)	
	MIN	MAX
A	9.80	10.40
B	8.90	9.50
B1	0	0.10
C	4.40	4.80
D	1.16	1.37
E	0.70	0.95
F	0.30	0.60
G	1.07	1.47
H	1.30	1.80
K	0.95	1.37
L1	14.50	16.50
L2	1.60	2.30
I	0	0.2
Q	0°	8°
R	0.4	
N	2.39	2.69

TO-263 Package

**NOTE:**

1. Exceeding the maximum ratings of the device in performance may cause damage to the device, even the permanent failure, which may affect the dependability of the machine. Please do not exceed the absolute maximum ratings of the device when circuit designing.
2. When installing the heat sink, please pay attention to the torsional moment and the smoothness of the heat sink.
3. MOSFETs is the device which is sensitive to the static electricity, it is necessary to protect the device from being damaged by the static electricity when using it.
4. Shenzhen Minos reserves the right to make changes in this specification sheet and is subject to change without prior notice.

**CONTACT:**

**深圳市迈诺斯科技有限公司（总部）**

地址：深圳市福田区华富街道田面社区深南中路4026号田面城市大厦16D

邮编：518025

电话：0755-83273777