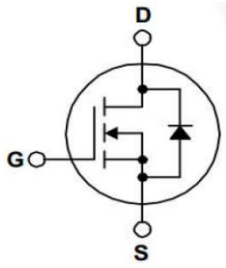
迈诺斯科技

IRF9640STRL

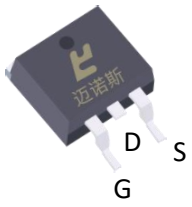
-200V P-Channel Power MOSFET

Description

IRF9640STRL, the silicon P-channel Enhanced MOSFETs, is obtained by advanced MOSFET technology which reduce the conduction loss, improve switching performance and enhance the avalanche energy. The transistor is suitable device for SMPS, high speed switching and general purpose applications.



Schematic diagram



TO-263

FEATURES

① V_{DS}=-200V, I_D=-11A
② Fast switching
③ 100% avalanche tested
④ Improved dv/dt capability

APPLICATIONS

① Switch Mode Power Supply (SMPS)
② Uninterruptible Power Supply (UPS)
③ Power Factor Correction (PFC)

Package Marking And Ordering Information

Ordering Codes	Package	Product Code	Packing
IRF9640STRL	TO-263	IRF9640S	Reel

Absolute Maximum Ratings TC = 25ºC, unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage (VGS = 0V)	V_{DSS}	-200	V
Continuous Drain Current	I_D	-11	A
Pulsed Drain Current (note1)	I_{DM}	-44	A
Gate-Source Voltage	V_{GSS}	±20	V
Single Pulse Avalanche Energy (note2)	E_{AS}	165	mJ
Avalanche Current (note1)	I_{AS}	-11	A
Power Dissipation (TC = 25℃)	P_D	78	W
Linear Derating Factor		0.6	W/℃
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55~+150	ºC

Thermal characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	R_{thJC}	1.6	K/W
Thermal Resistance, Junction-to-Ambient	R_{thJA}	50	

Electrical Characteristics(at T_C = 25°C, unless otherwise specified)

Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	-200	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -200V, V_{GS} = 0V, TJ = 25ºC	--	--	5	μA
Gate-Source Leakage	I_{GSS}	V_{GS} = ±20V	--	--	±120	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = -250μA	-2	--	-4	V
Drain-Source On-Resistance (Note3)	$R_{DS(on)}$	V_{GS} = -10V, I_D = -6.6A	--	0.34	0.42	Ω
Dynamic						
Input Capacitance	Ciss	V_{GS} = 0V, V_{DS} =-25V, f = 1.0MHz	--	1200	---	pF
Output Capacitance	Coss		--	370	--	
Reverse Transfer Capacitance	Crss		--	81	--	
Total Gate Charge	Qg	V_{DD}=-100V, I_D=-13.5A, V_{GS} = -10V	--	52	68	nC
Gate-Source Charge	Qgs		--	9	--	
Gate-Drain Charge	Qgd		--	25	--	
Turn-on Delay Time	td(on)	V_{DD} = -160V, I_D=-13.5A, R_G = 25 Ω	--	28	56	ns
Turn-on Rise Time	tr		--	74	148	
Turn-off Delay Time	td(off)		--	260	520	
Turn-off Fall Time	tf		--	120	240	

Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	T_C = 25 ºC	--	--	-11	A
Pulsed Diode Forward Current	I_{SM}		--	--	-44	
Body Diode Voltage	V_{SD}	T_J = 25ºC, I_{SD} = -11A, V_{GS} = 0V	--	--	-5	V
Reverse Recovery Time	t_{rr}	V_{GS} = 0V, I_S = -11A, di_F/dt =100A /µs	--	250	300	ns
Reverse Recovery Charge	Q_{rr}		--	2.9	3.6	µC

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. I_{AS} =-11A, V_{DD} = 25V, R_G = 25 Ω, Starting T_J = 25 ºC
3. Pulse Test: Pulse width ≤ 300µs, Duty Cycle ≤ 1%

Characteristics Curves

Figure 1. Output Characteristics

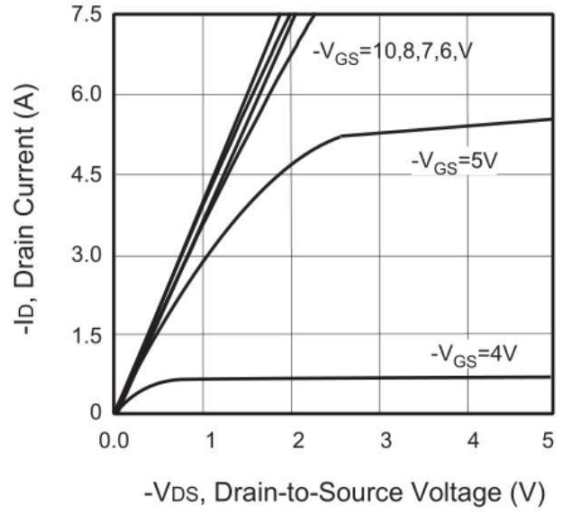


Figure 2. Transfer Characteristics

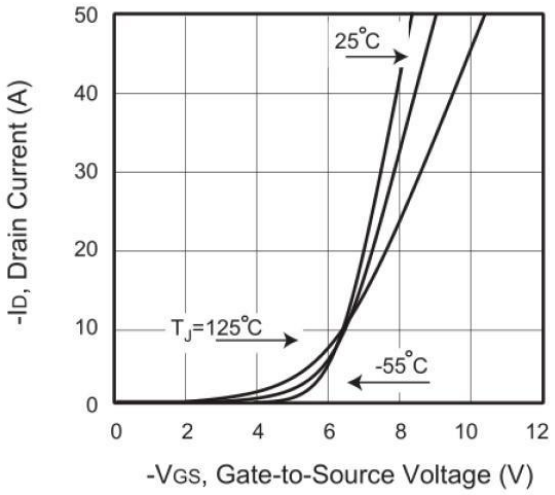


Figure 3. Capacitance

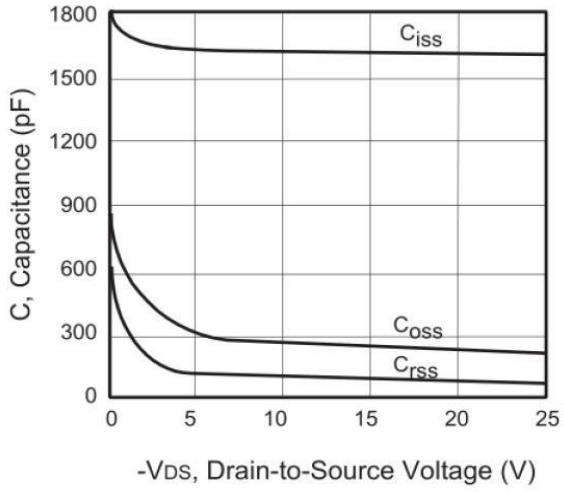


Figure 4. On-Resistance Variation with Temperature

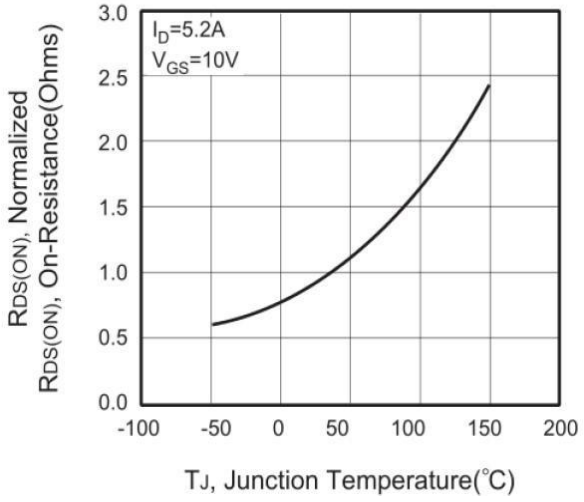


Figure 5. Gate Threshold Variation with Temperature

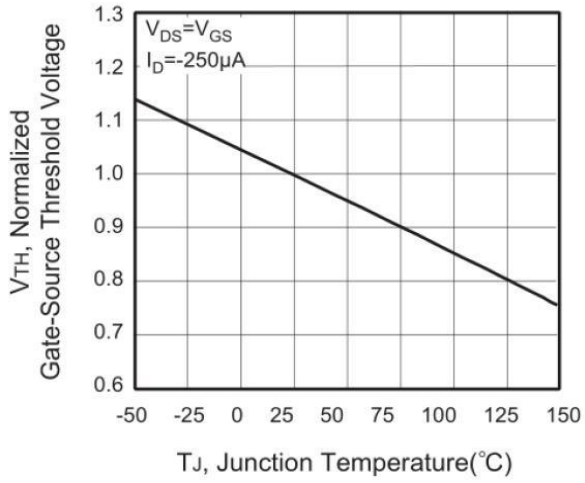


Figure 6. Body Diode Forward Voltage Variation with Source Current

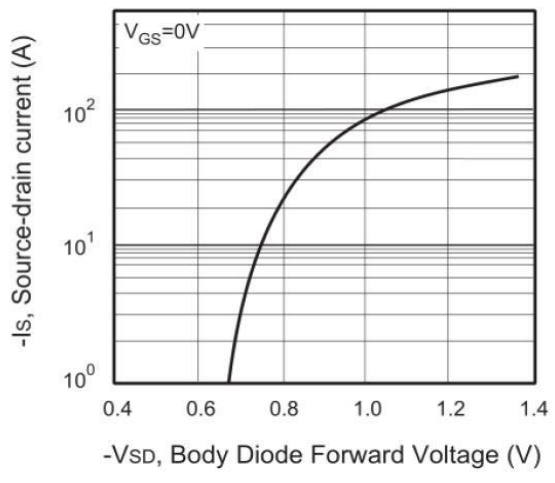


Figure 7. Gate Charge

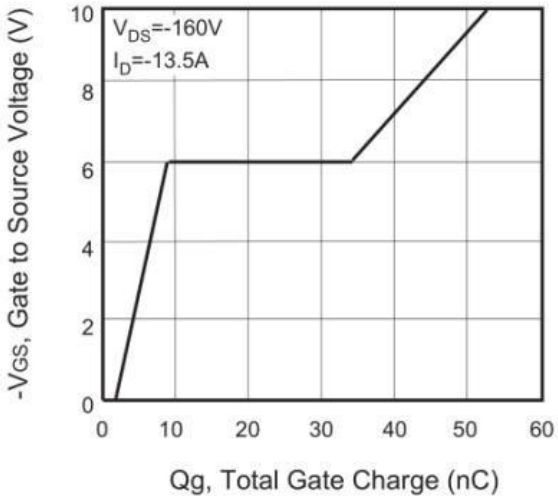


Figure 8. Maximum Safe Operating Area

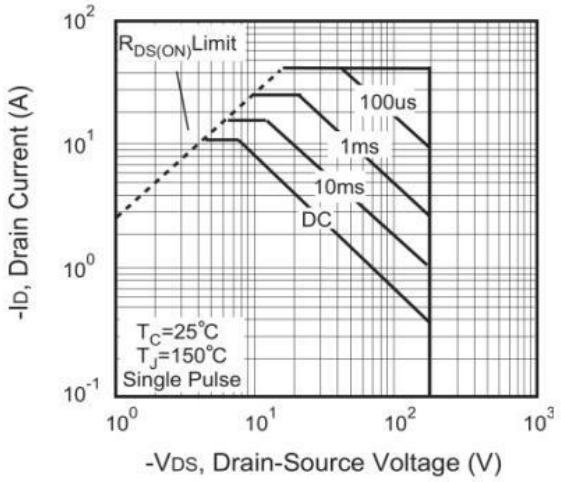


Figure 9. Switching Test Circuit

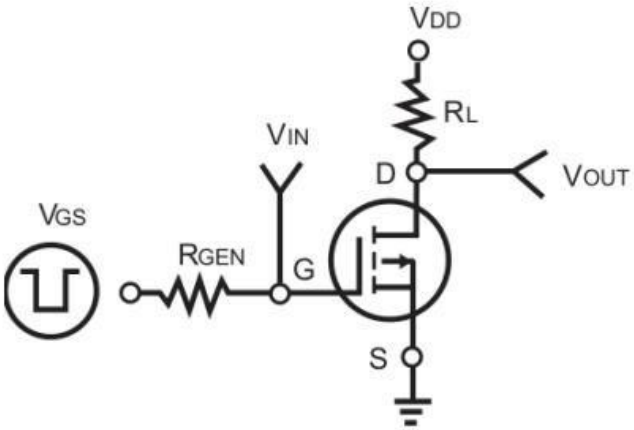


Figure 10. Switching Waveforms

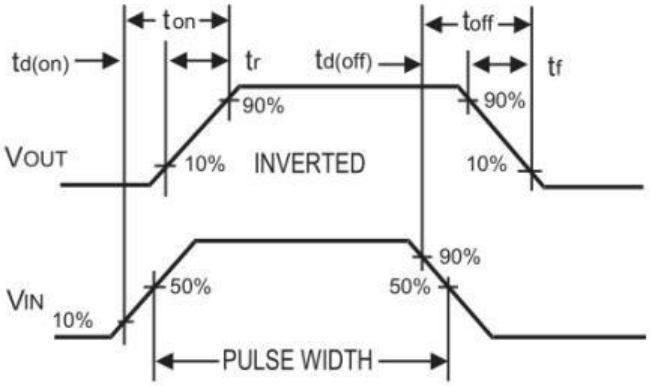
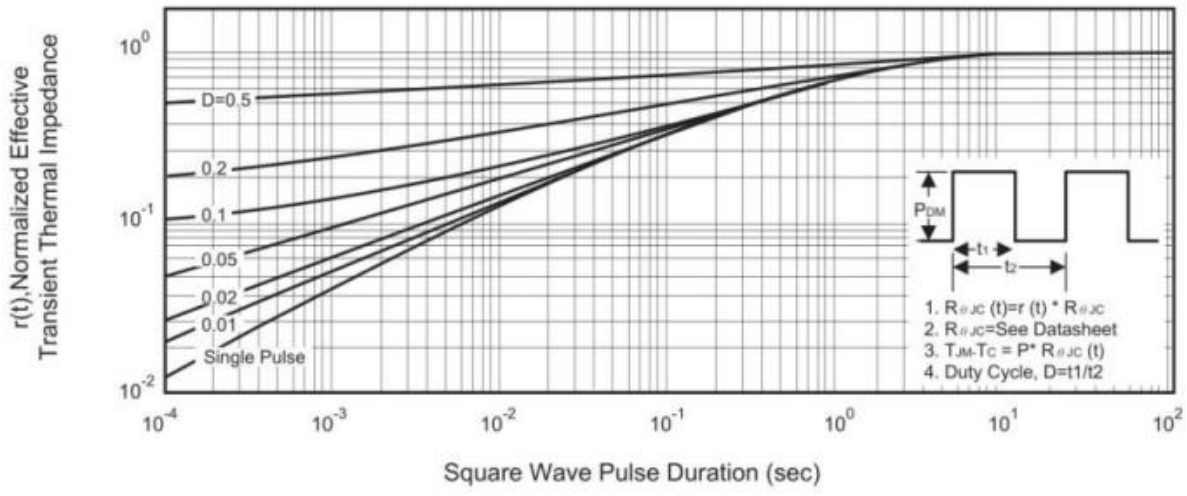
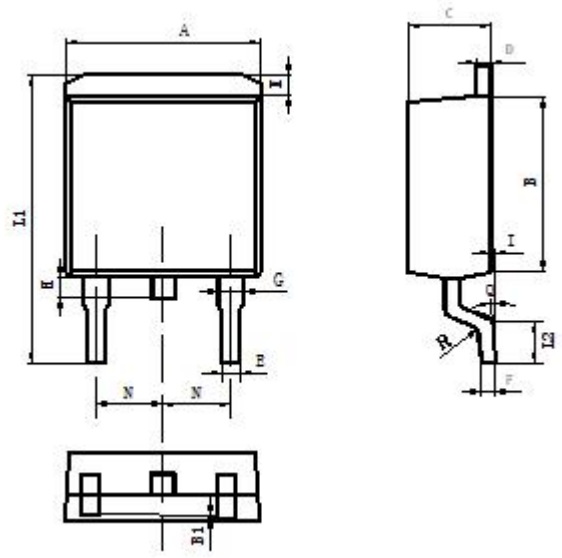


Figure 11. Normalized Thermal Transient Impedance Curve



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.

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