

100V N-Channel Power MOSFET

DESCRIPTION

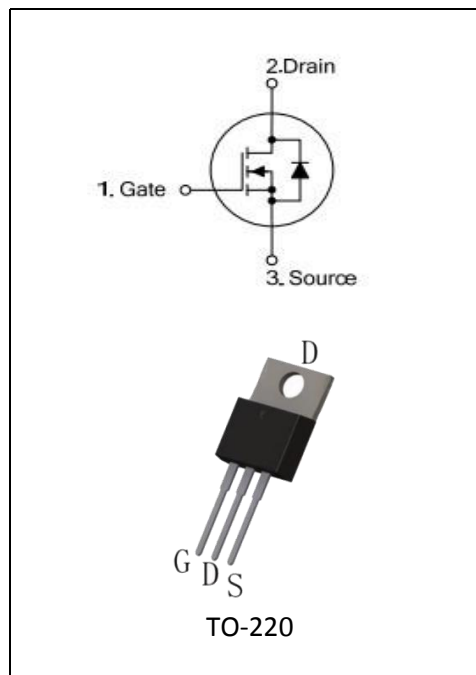
The IRF540N uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

Application

- ① Power switching application
- ② Hard switched and High frequency circuits
- ③ Uninterruptible power supply

KEY CHARACTERISTICS

- ① $V_{DS} = 100V, I_D = 35A$
 $R_{DS(ON)} < 30m\Omega @ V_{GS} = 10V$
- ② High density cell design for lower R_{dson}
- ③ Fully characterized avalanche voltage and current
- ④ Good stability and uniformity with high EAS
- ⑤ Excellent package for good heat dissipation



Package Marking And Ordering Information:

Ordering Codes	Package	Product Code	Packing
IRF540N	TO-220	IRF540N	Reel

Absolute Maximum Ratings (TA=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	35	A
Drain Current-Pulsed (Note 1)	I_{DM}	100	A
Maximum Power Dissipation ($T_c = 25^\circ C$)	P_D	70	W
Single pulse avalanche energy (Note 2)	EAS	96	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 175	$^\circ C$

Thermal Characteristic

Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	3.5	$^\circ C/W$
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Electrical Characteristics (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BVDSS	VGS=0V ID=250μA	100	-	-	V
Zero Gate Voltage Drain Current	IDSS	VDS=100V,VGS=0V	-	-	1	μA
Gate-Body Leakage Current	IGSS	VGS=±20V,VDS=0V	-	-	±100	nA
On Characteristics						
Gate Threshold Voltage	VGS(th)	VDS=VGS,ID=250μA	2	3	4	V
Drain-Source On-State Resistance ^(Note 3)	RDS(ON)	VGS=10V, ID=12A	-	25	30	mΩ
Forward Trans conductance	gFS	VDS=5V,ID=15A	-	11	-	S
Dynamic Characteristics						
Input Capacitance	Ciss	VDS=25V,VGS=0V, f=1.0MHz	-	2550	-	pF
Output Capacitance	Coss		-	225	-	pF
Reverse Transfer Capacitance	Crss		-	205	-	pF
Switching Characteristics ^(Note 4)						
Turn-on Delay Time	td(on)	VDD=50V, ID=20A, VGS=10V, RGEN=10Ω	-	29	-	nS
Turn-on Rise Time	tr		-	13	-	nS
Turn-Off Delay Time	td(off)		-	58.2	-	nS
Turn-Off Fall Time	tf			13.4	-	nS
Total Gate Charge	Qg	VDS=80V,ID=20A VGS=10V	-	55	-	nC
Gate-Source Charge	Qgs		-	15	-	nC
Gate-Drain Charge	Qgd		-	20	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage	VSD	VGS=0V,IS=20A	-	-	1.2	V
Reverse Recovery Time	Trr	Tj=25℃，If=10A, di/dt=100A/uS ^(note3)	-	58	-	nS
Reverse Recovery Charge	Qrr		-	110	-	nC

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. EAS condition :T j=25°C ,VDD=50V,VGS=10V,L=0.5mH,Rg=25Ω
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production.

Characteristics Curves

Figure 1 Output Characteristics

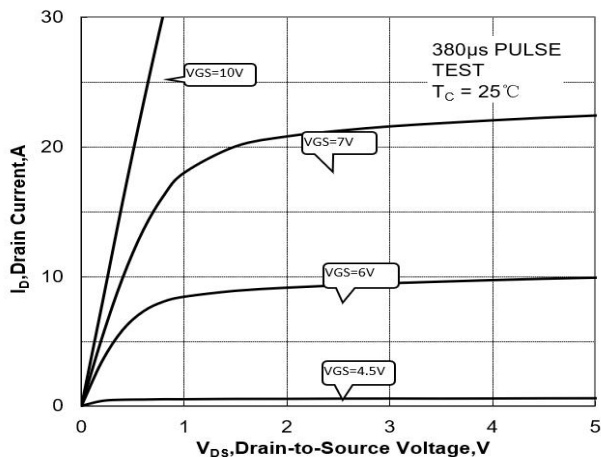


Figure 2 Transfer Characteristics

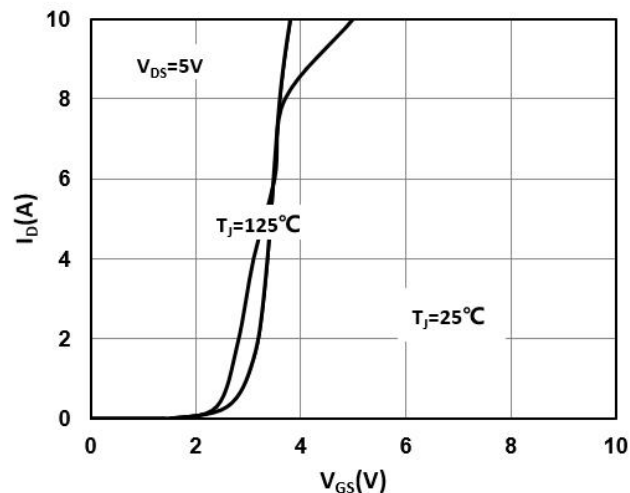


Figure 3 On-Resistance vs. ID and VGS

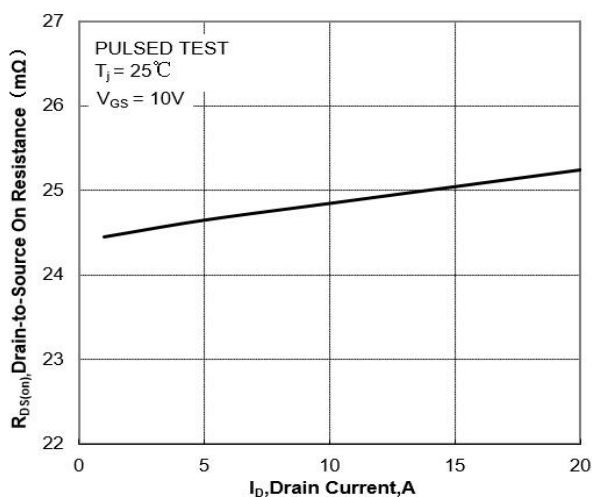


Figure 4 On-Resistance vs. Junction Temperature

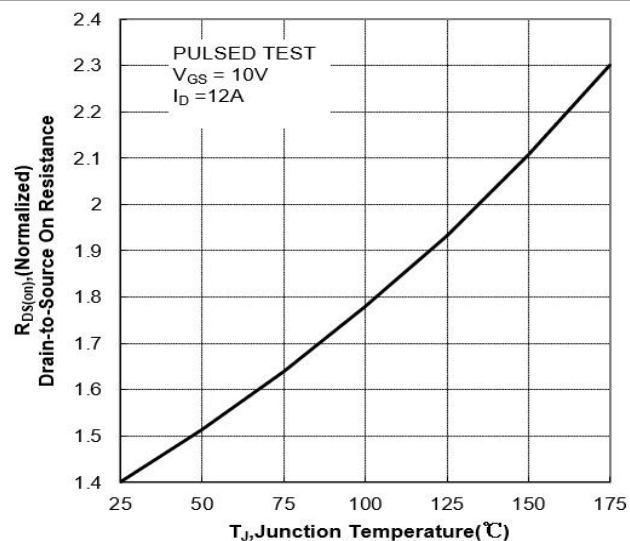


Figure 5 On-Resistance vs. VGS

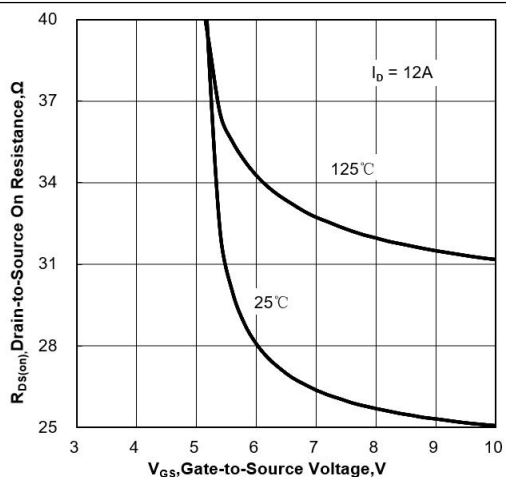


Figure 6 Body Diode Forward Voltage

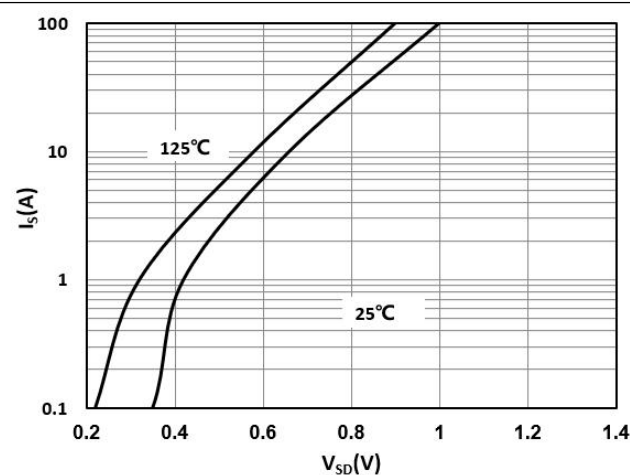


Figure 7 Gate-Charge Characteristics

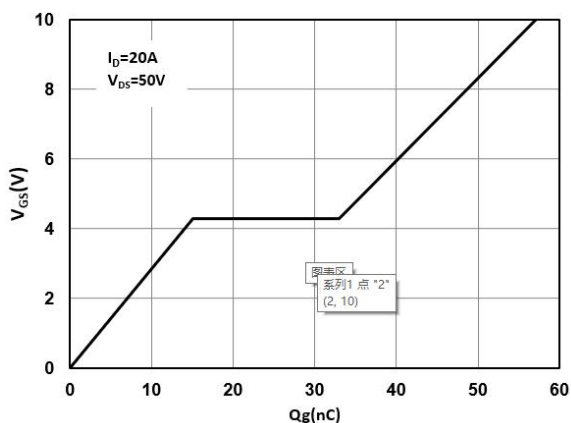


Figure 8 Capacitance Characteristics

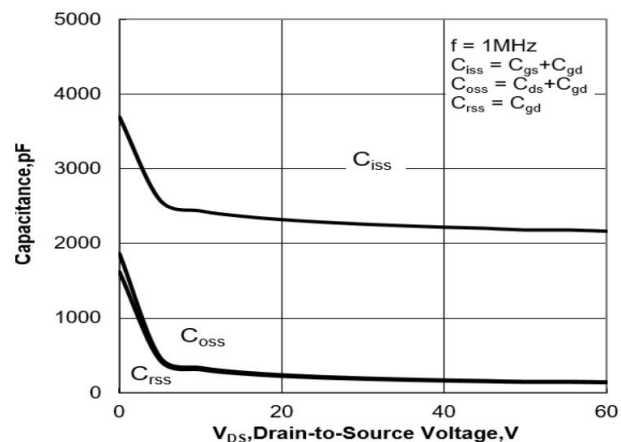


Figure 9 Maximum Forward Biased Safe Operation Area

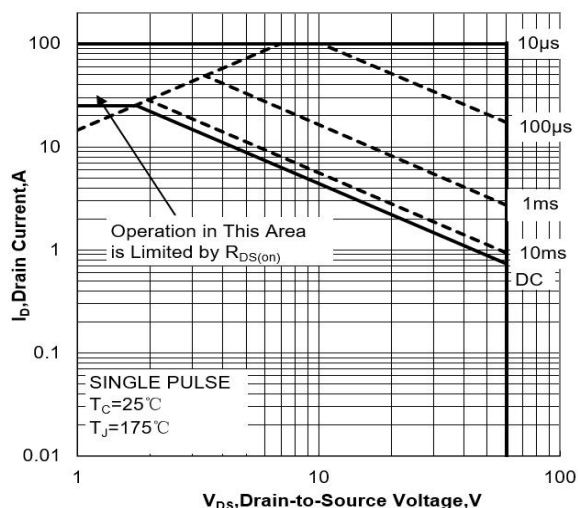


Figure 10 Single Pulse Power Rating Junction-to-Ambient

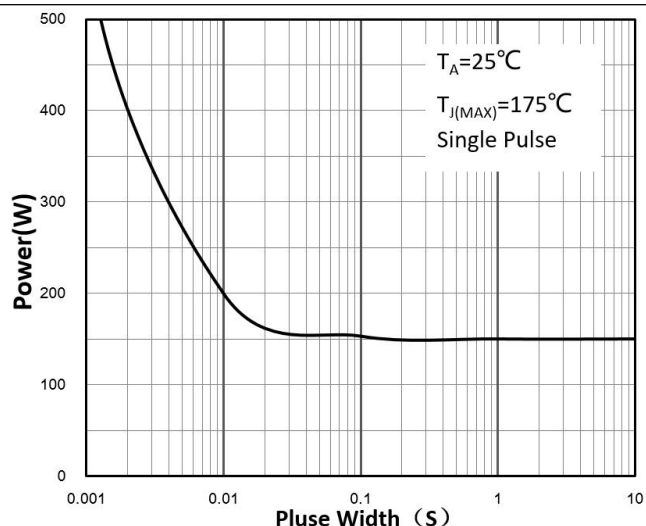
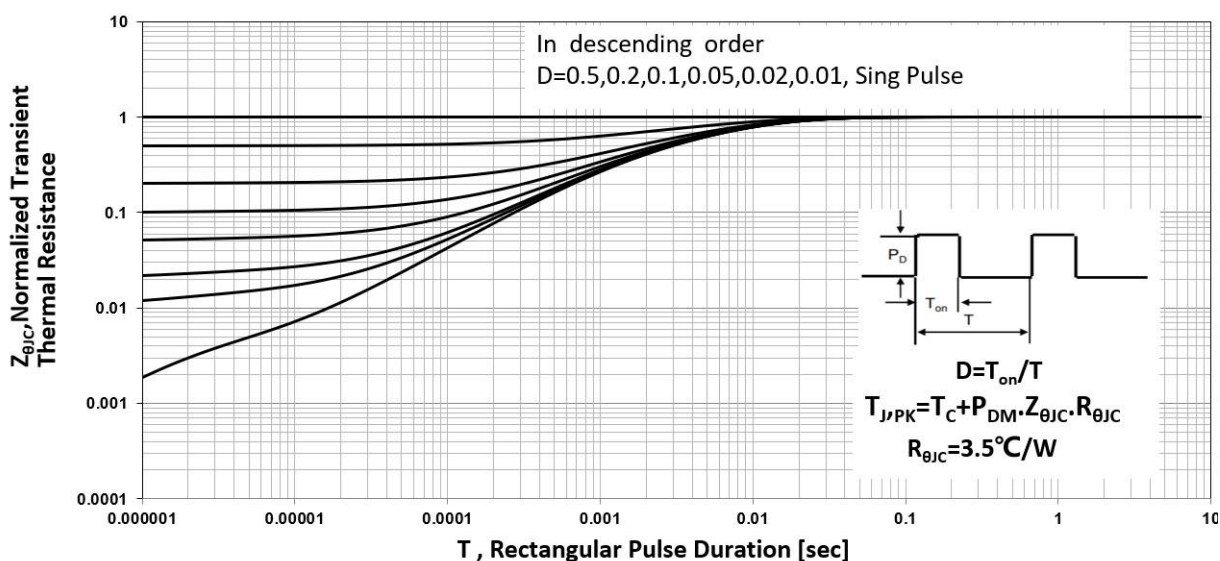
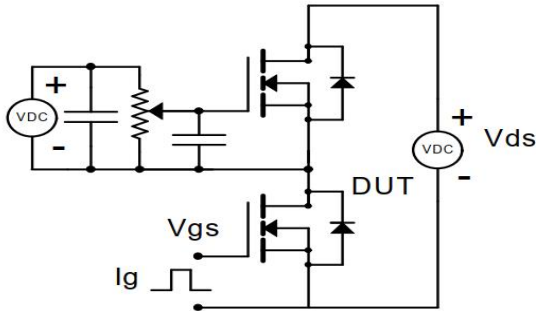
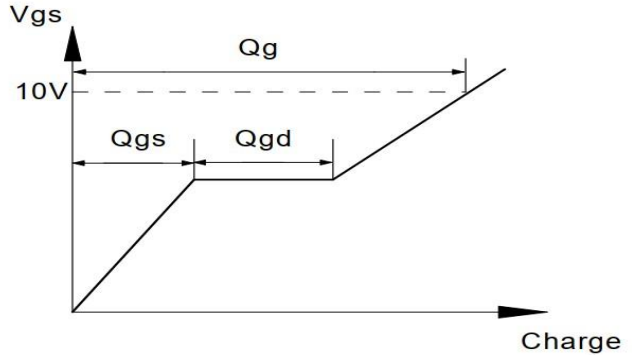
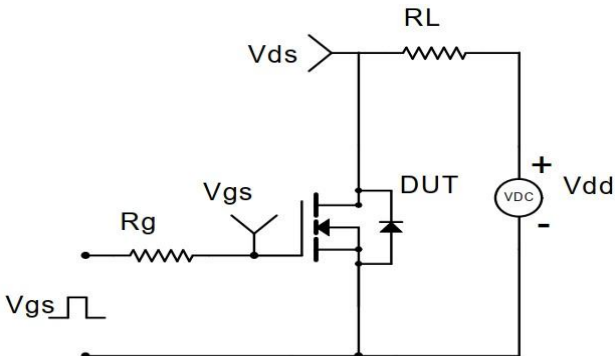
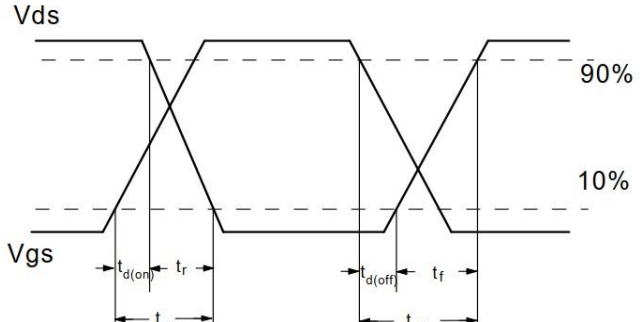
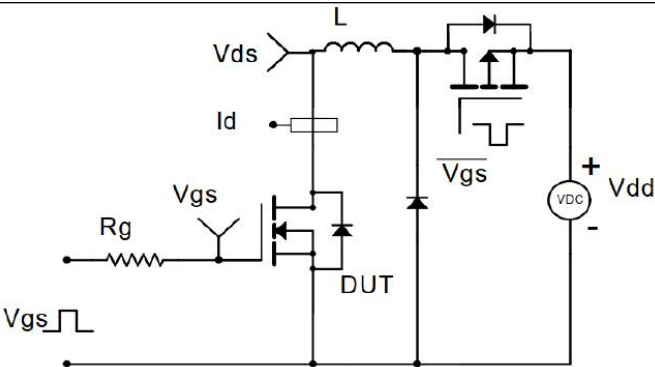
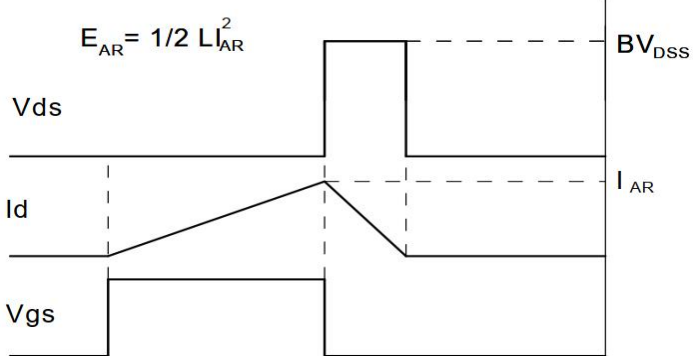
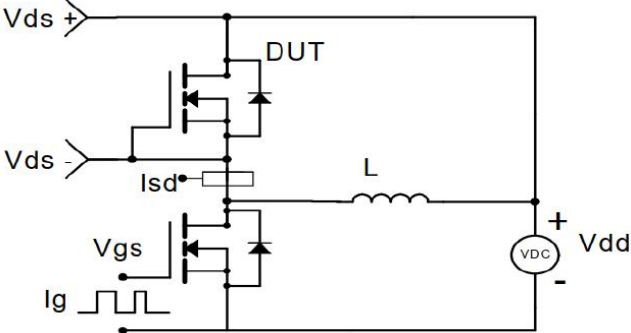
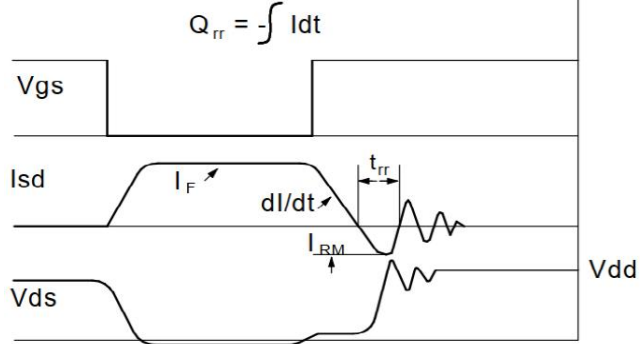


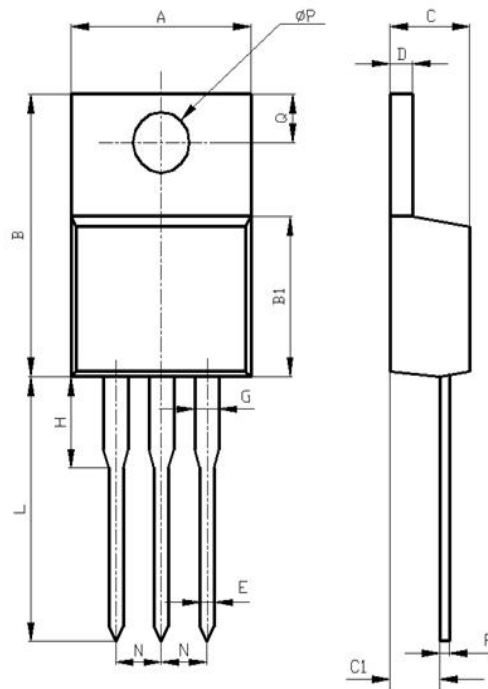
Figure 11 Normalized Maximum Transient Thermal Impedance



Test Circuit and Waveform

Gate Charge Test Circuit	Gate Charge Test Waveform
	
Resistive Switching Test Circuit	Resistive Switching Test Waveforms
	
Unclamped Inductive Switching (UIS) Test Circuit	Unclamped Inductive Switching (UIS) Test Waveforms
	
Diode Recovery Test Circuit	Diode Recovery Test Waveforms
	

Package Description



Items	Values(mm)	
	MIN	MAX
A	9.60	10.6
B	15.0	16.0
B1	8.90	9.50
C	4.30	4.80
C1	2.30	3.10
D	1.20	1.40
E	0.70	0.90
F	0.30	0.60
G	1.17	1.37
H	2.70	3.80
L	12.6	14.8
N	2.34	2.74
Q	2.40	3.00
Ø P	3.50	3.90

TO-220 Package



迈诺斯科技

IRF540N

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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