New Jersey Semi-Conductor Products, Inc.

20 STERN AVE.

SPRINGFIELD, NEW JERSEY 07081

U.S.A.

TELEPHONE: (973) 376-2922

(212) 227-6005

FAX: (973) 376-8960

IRF240R, IRF241R IRF242R, IRF243R

Avaianche Energy Rated N-Channel Power MOSFETs

16A and 18A, 200V, 150V $r_{os}(on) = 0.18\Omega$ and 0.22Ω

Features:

- Single pulse avaianche energy rated
- SOA is power-dissipation limited
- Nanosecond switching speeds
- 🖪 Linear transfer characteristics
- High input Impedance

TERMINAL DIAGRAM

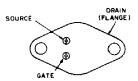


N-CHANNEL ENHANCEMENT MODE

The IRF240R, IRF241R, IRF242R and IRF243R are advanced power MOSFETs designed, tested, and guaranteed to withstand a specified level of energy in the breakdown avalanche mode of operation. These are n-channel enhancement-mode silicon-gate power field-effect transistors designed for applications such as switching regulators, switching converters, motor drivers, relay drivers, and drivers for high-power bipolar switching transistors requiring high speed and low gate-drive power. These types can be operated directly from integrated circuits.

The IRF-types are supplied in the JEDEC TO-204AE steel package. $\label{eq:control}$

TERMINAL DESIGNATION



JEDEC TO-204AE

Absolute Maximum Ratings

	Parameter	IRF240R	IRF241R	IRF242R	IRF243R	Units	
V _{DS}	Drain - Source Voltage ①	200	150	200	150	٧	
VDGR	Drain - Gate Voltage (R _{GS} = 20 KΩ) ①	200	150	200	150	٧	
l _p @ T _c = 25°C	p @ Tc = 25°C Continuous Drain Current		18	16	16	Α	
I _D @ T _C = 100°C	Continuous Drain Current	11	11	10	10	Α	
Грм	Pulsed Drain Current ③	72	72	64	64	Α	
V _{GS} Gate - Source Voltage			٧				
Po @ Tc = 25°C	Max. Power Dissipation		125 (See Fig. 14)		w		
	Linear Derating Factor	1.0 (See Fig. 14)		W/°C			
Es. Single Pulse Avalanche Energy Rating (8)			mj				
T _J Operating Junction and T _{stg} Storage Temperature Range			-55 to 150				
	300 (0.0	°C					

NJ Semi-Conductors reserves the right to change test conditions, parameter limits and package dimensions without notice. Information furnished by NJ Semi-Conductors is believed to be both accurate and reliable at the time of going to press. However, NJ Semi-Conductors assumes no responsibility for any errors or omissions discovered in its use. NJ Semi-Conductors encourages customers to verify that datasheets are current before placing orders.

Quality Semi-Conductors

IRF240R, IRF241R IRF242R, IRF243R

Electrical Characteristics @ $T_C = 25^{\circ}$ C (Unless Otherwise Specified)

	Parameter	Туре	Min.	Тур.	Max.	Units	Test Conditions	
BVoss	Drain - Source Breakdown Voltage	IRF240R IRF242R	200	_	_	٧	Vas = 0V	
		IRF241R IRF243R	150	-	_	٧	ι _ο = 250μΑ	
Vasani	Gate Threshold Voltage	ALL	2.0		4.0	V	V _{DS} = V _{GS,} I _D = 250μ A	
lass	Gate-Source Leakage Forward	ALL	_	<u> </u>	100	nA	Vas = 20V	
loss	Gate-Source Leakage Reverse	ALL		I <u> </u>	-100	пA	Vas = -20V	
loss	Zero Gate Voltage Drain Current		_	_	250	μA	Vps = Max. Rating, Vas = 0V	
	· ·	ALL	_	_	1000	μΑ	Vps = Max. Rating x 0.8, Vqs = 0V, Tc = 125°C	
Dieni	On-State Drain Current ②	IRF240R IRF241R	18	_	-	A	VDS > IDom X Rosson max, VDS = 10V	
		IRF242R IRF243R	16	_	_	A	VDS > ID(en) X PiDS(en) max., VQS - IUV	
Rosieni	Static Drain-Source On-State Resistance ②	IRF240R IRF241R	1	0.14	0.18	Ω	Ves = 10V. lo = 10A	
		IRF242R IRF243R	ı	0.20	0.22	Ω	Vas - 104, 15 - 10A	
Qts	Forward Transconductance ②	ALL	6.0	9.0	-	S(U)	VDS > IDIONI X ROSIONIMAX, ID = 10A	
Cjes	Input Capacitance	ALL		1275		pF	Vas = 0V, Vas = 25V, f = 1.0 MHz See Fig. 10	
C	Output Capacitance	ALL	1	500	_	ρF		
Cas	Reverse Transfer Capacitance	ALL	-	160	_	pF	300 / ig. 13	
tdioni	Turn-On Delay Time	ALL	ļ	16	30	ns	$V_{DD} = 75V$, $I_{D} = 10A$, $Z_{0} = 4.7\Omega$	
ţ,	Rise Time	ALL	-	27	60	ns	See Fig. 17 (MOSFET switching times are essentially	
Teleoffi	Turn-Off Delay Time	ALL	1	40	80	ns		
tı	Fall Time	ALL		31	60	ns	Independent of operating temperature.)	
Q.	Total Gate Charge (Gate-Source Plus Gate-Drain)	ALL	_	43	60	nC	V _{GS} = 10V, I _D = 22A, V _{DS} = 0.8 Max. Rating. See Fig. 18 for test circuit, (Gate charge is essentially independent of operating	
Q ₀₄	Gate-Source Charge	ALL	_	16		nC		
Q _{pd}	Gate-Drain ("Miller") Charge	ALL		27		nC	temperature.)	
Lo	Internal Drain Inductance	ALL	-	5.0	_	nΗ	Measured between the contact screw on header that is closer to source and gate pins and center of die. Modified MOSFET symbol showing the internal device plantactances of the contact of	
Ls	Internal Source Inductance	ALL	1	12.5	_	nH	Measured from the source pin, 8 mm (0.25 in.) from header and source bonding pad.	

Thermal Resistance

R _{th} JC Junction-to-Case	ALL	_	-	1.0	°C/W	
R _{th} CS Case-to-Sink	ALL		0.1		°C/W	Mounting surface flat, smooth, and greased.
RmJA Junction-to-Ambient	ALL	_		30	°C/W	Free Air Operation

Source-Drain Diode Ratings and Characteristics

la	Continuous Source Current (Body Diode)	IRF240R IRF241R	_	_	18	Α	Modified MOSFET symbol showing the integral Q
		IRF242R IRF243R	_	_	16	A	reverse P-N junction rectifier.
I _{SM}	Pulse Source Current (Body Diode) ③	IRF240R IRF241R	_	-	72	A	3
		IRF242R IRF243R	_	-	64	A	
Vso	Diode Forward Voltage ②	IRF240R IRF241R	_	-	2.0	v	T _C = 25°C, i _s = 18A, V _{GS} = 0V
		IRF242R IRF243R	_	-	1.9	V	Tc = 25°C. ls = 16A, Vas = 0V
ţ,	Reverse Recovery Time	ALL	_	650	_	ns	$T_J = 150^{\circ}C$, $I_F = 18A$, $dI_F/dt = 100A/\mu s$
Q _{RM}	Reverse Recovered Charge	ALL		4,1		μC	$T_J = 150$ °C, $I_F = 18A$, $dI_F/dt = 100A/\mu s$
ton	Forward Turn-on Time	ALL	Intrinsic turn-on time is negligible. Turn-on speed is substantially controlled by $L_s + L_0$.				

① T_J = 25°C to 150°C. ② Pulse Test: Pulse width ≤ 300µs, Duty Cycle ≤ 2%. ③ Repetitive Rating: Pulse width limited by max. junction temperature. See Transient Thermal Impedance Curve (Fig. 5). ④ V_{DD} = 50V, starting T_J = 25°C, L = 2.7 mH, R_{pp} = 50Ω, I_{penak} = 18A. See figures 15, 16.