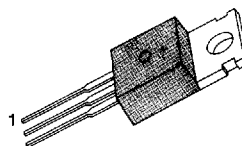


FEATURES

- Lower $R_{DS(on)}$
- Excellent voltage stability
- Fast switching speeds
- Rugged polysilicon gate cell structure
- Lower input capacitance
- Extended safe operating area
- Improved high temperature reliability

TO-220

1. Gate 2. Drain 3. Source
PRODUCT SUMMARY

Part Number	V _{DS}	R _{DS(on)}	I _D
IRL540	100V	0.11 Ω	24A
IRL541	80V	0.11 Ω	24A

ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	IRL540	IRL541	Unit
Drain-Source Voltage (1)	V _{DSS}	100	80	V _{dc}
Drain-Gate Voltage (R _{GS} =1M Ω)(1)	V _{DGR}	100	80	V _{dc}
Gate-Source Voltage	V _{GS}	± 15		V _{dc}
Continuous Drain Current T _C =25 °C	I _D	24		A _{dc}
Continuous Drain Current T _C =100 °C	I _D	18		A _{dc}
Drain Current - Pulsed (3)	I _{DM}	96		A _{dc}
Total Power Dissipation @ T _C =25 °C	P _D	125		Watts
Derate Above 25 °C		1.0		W/°C
Operating and Storage Junction Temperature Range	T _J , T _{STG}	-55 to +150		°C
Maximum Lead Temp. for Soldering Purposes, 1/8" from case for 5 seconds	T _L	300		°C

Notes : (1) T_J=25 °C to 150 °C

(2) Pulse test : Pulse width $\leq 300\mu s$, Duty Cycle $\leq 2\%$

(3) Repetitive rating : Pulse width limited by junction temperature

ELECTRICAL CHARACTERISTICS (Tc=25°C unless otherwise specified)

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
BV _{DSS}	Drain-Source Breakdown Voltage					
	IRL540	100	-	-	V	V _{GS} =0V, I _D =250μA
	IRL541	80	-	-	V	
V _{GS(th)}	Gate Threshold Voltage	1.0	-	2.0	V	V _{DS} =V _{GS} , I _D =1mA
I _{GSS}	Gate-Source Leakage Forward	-	-	100	nA	V _{GS} =15V
I _{GSS}	Gate-Source Leakage Reverse	-	-	-100	nA	V _{GS} =-15V
I _{DSS}	Zero Gate Voltage Drain Current	-	-	250	μA	V _{DS} =Max. Rating, V _{GS} =0V
		-	-	1000	μA	V _{DS} =0.8 Max. Rating, V _{GS} =0V, T _C =125°C
R _{DS(on)}	Static Drain-Source On-Resistance(2)	-	-	0.11	Ω	V _{GS} =5.0V, I _D =12A
g _{fs}	Forward Transconductance (2)	10	-	-	Ω	V _{DS} ≥ 25V, I _D =12A
C _{iss}	Input Capacitance	-	1500	-	pF	V _{GS} =0V, V _{DS} =25V, f=1.0MHz
C _{oss}	Output Capacitance	-	400	-	pF	
C _{rss}	Reverse Transfer Capacitance	-	180	-	pF	
t _{d(on)}	Turn-On Delay Time	-	-	30	ns	V _{DD} =0.5 BV _{DSS} , I _D =24A, Z _o =9.1Ω (MOSFET switching times are essentially independent of operating temperature)
t _r	Rise Time	-	-	110	ns	
t _{d(off)}	Turn-Off Delay Time	-	-	60	ns	
t _f	Fall Time	-	-	75	ns	
Q _g	Total Gate Charge (Gate-Source Plus Gate-Drain)	-	39	60	nC	V _{GS} =5V, I _D =24A, V _{DS} =0.8 Max. Rating (Gate charge is essentially independent of operating temperature)
Q _{gs}	Gate-Source Charge	-	12	-	nC	
Q _{gd}	Gate-Drain Charge	-	27	-	nC	

THERMAL RESISTANCE

Symbol	Characteristics		All	Units	Remark
R _{thJC}	Junction-to-Case	MAX	1.0	K/W	
R _{thCS}	Case-to-Sink	TYP	0.5	K/W	Mounting surface flat, smooth, and greased
R _{thJA}	Junction-to-Ambient	MAX	62.5	K/W	Free Air Operation

Notes : (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

SOURCE-DRAIN DIODE RATING AND CHARACTERISTICS

Symbol	Characteristic	Min	Typ	Max	Units	Test Condition
I_S	Continuous Source Current (Body Diode)	—	—	24	A	Modified MOSFET symbol showing the integral reverse P-N junction rectifier
I_{SM}	Pulse Source Current (Body Diode) (3)	—	—	96	A	
V_{SD}	Diode Forward Voltage (2)	—	—	2.5	V	$T_J=25^\circ\text{C}$, $I_S=24\text{A}$, $V_{GS}=0\text{V}$
t_{rr}	Reverse Recovery Time	—	—	500	ns	$T_J=25^\circ\text{C}$, $I_F=24\text{A}$, $dI_F/dt=100\text{A}/\mu\text{S}$

Notes: (1) $T_J=25^\circ\text{C}$ to 150°C (2) Pulse test: Pulse width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$

(3) Repetitive rating: Pulse width limited by max. junction temperature

