International
IOR Rectifier

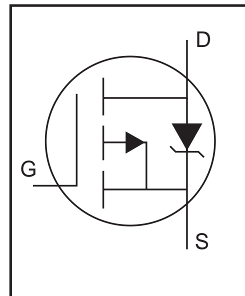
DIGITAL AUDIO MOSFET

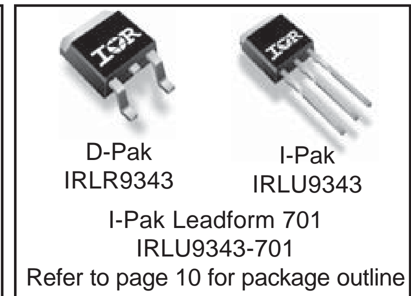
IRLR9343
IRLU9343
IRLU9343-701

Features

- Advanced Process Technology
- Key Parameters Optimized for Class-D Audio Amplifier Applications
- Low R_{DSON} for Improved Efficiency
- Low Q_g and Q_{sw} for Better THD and Improved Efficiency
- Low Q_{rr} for Better THD and Lower EMI
- 175°C Operating Junction Temperature for Ruggedness
- Repetitive Avalanche Capability for Robustness and Reliability
- Multiple Package Options

Key Parameters		
V_{DS}	-55	V
$R_{DS(ON)}$ typ. @ V_{GS} = -10V	93	mΩ
$R_{DS(ON)}$ typ. @ V_{GS} = -4.5V	150	mΩ
Q_g typ.	31	nC
T_J max	175	°C





D-Pak
IRLR9343

I-Pak
IRLU9343

I-Pak Leadform 701
IRLU9343-701
Refer to page 10 for package outline

Description

This Digital Audio HEXFET® is specifically designed for Class-D audio amplifier applications. This MosFET utilizes the latest processing techniques to achieve low on-resistance per silicon area. Furthermore, Gate charge, body-diode reverse recovery and internal Gate resistance are optimized to improve key Class-D audio amplifier performance factors such as efficiency, THD and EMI. Additional features of this MosFET are 175°C operating junction temperature and repetitive avalanche capability. These features combine to make this MosFET a highly efficient, robust and reliable device for Class-D audio amplifier applications.

Absolute Maximum Ratings

	Parameter	Max.	Units
V_{DS}	Drain-to-Source Voltage	-55	V
V_{GS}	Gate-to-Source Voltage	±20	
I_D @ T_C = 25°C	Continuous Drain Current, V_{GS} @ -10V	-20	A
I_D @ T_C = 100°C	Continuous Drain Current, V_{GS} @ 10V	-14	
I_{DM}	Pulsed Drain Current ①	-60	
P_D @T_C = 25°C	Power Dissipation	79	W
P_D @T_C = 100°C	Power Dissipation	39	
	Linear Derating Factor	0.53	W/°C
T_J T_{STG}	Operating Junction and Storage Temperature Range	-40 to + 175	°C
	Clamping Pressure ⑥	—	N

Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case ⑤	—	1.9	°C/W
$R_{\theta JA}$	Junction-to-Ambient (PCB Mounted) ⑤⑧	—	50	
$R_{\theta JA}$	Junction-to-Ambient (free air) ⑤	—	110	

Notes ① through ⑨ are on page 10

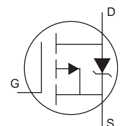
Electrical Characteristics @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	-55	—	—	V	V_{GS} = 0V, I_D = -250μA
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	-52	—	mV/°C	Reference to 25°C, I_D = -1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	93	105	mΩ	V_{GS} = -10V, I_D = -3.4A ③
		—	150	170		V_{GS} = -4.5V, I_D = -2.7A ③
$V_{GS(th)}$	Gate Threshold Voltage	-1.0	—	—	V	V_{DS} = V_{GS}, I_D = -250μA
$\Delta V_{GS(th)}/\Delta T_J$	Gate Threshold Voltage Coefficient	—	-3.7	—	mV/°C	
I_{DSS}	Drain-to-Source Leakage Current	—	—	-2.0	μA	V_{DS} = -55V, V_{GS} = 0V
		—	—	-25		V_{DS} = -55V, V_{GS} = 0V, T_J = 125°C
I_{GSS}	Gate-to-Source Forward Leakage	—	—	-100	nA	V_{GS} = -20V
	Gate-to-Source Reverse Leakage	—	—	100		V_{GS} = 20V
g_{fs}	Forward Transconductance	5.3	—	—	S	V_{DS} = -25V, I_D = -14A
Q_g	Total Gate Charge	—	31	47		V_{DS} = -44V
Q_{gs}	Gate-to-Source Charge	—	7.1	—		V_{GS} = -10V
Q_{gd}	Gate-to-Drain Charge	—	8.5	—		I_D = -14A
Q_{godr}	Gate Charge Overdrive	—	15	—		See Fig. 6 and 19
$t_{d(on)}$	Turn-On Delay Time	—	9.5	—		V_{DD} = -28V, V_{GS} = -10V ③
t_r	Rise Time	—	24	—		I_D = -14A
$t_{d(off)}$	Turn-Off Delay Time	—	21	—	ns	R_G = 2.5Ω
t_f	Fall Time	—	9.5	—		
C_{iss}	Input Capacitance	—	660	—		V_{GS} = 0V
C_{oss}	Output Capacitance	—	160	—	pF	V_{DS} = -50V
C_{rss}	Reverse Transfer Capacitance	—	72	—		ƒ = 1.0MHz, See Fig.5
C_{oss}	Effective Output Capacitance	—	280	—		V_{GS} = 0V, V_{DS} = 0V to -44V
L_D	Internal Drain Inductance	—	4.5	—	nH	Between lead, 6mm (0.25in.)
L_S	Internal Source Inductance	—	7.5	—		from package and center of die contact ④

Avalanche Characteristics

	Parameter	Typ.	Max.	Units
E_{AS}	Single Pulse Avalanche Energy②	—	120	mJ
I_{AR}	Avalanche Current ⑦	See Fig. 14, 15, 17a, 17b		A
E_{AR}	Repetitive Avalanche Energy ⑦			mJ

Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S @ T_C = 25°C	Continuous Source Current (Body Diode)	—	—	-20	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	-60		
V_{SD}	Diode Forward Voltage	—	—	-1.2	V	T_J = 25°C, I_S = -14A, V_{GS} = 0V ③
t_{rr}	Reverse Recovery Time	—	57	86	ns	T_J = 25°C, I_F = -14A
Q_{rr}	Reverse Recovery Charge	—	120	180	nC	di/dt = 100A/μs ③