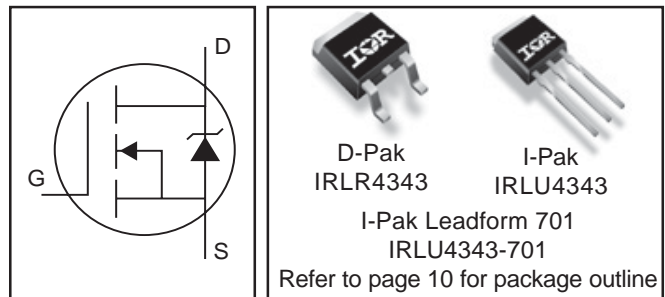


Features

- Advanced Process Technology
- Key Parameters Optimized for Class-D Audio Amplifier Applications
- Low $R_{DS(ON)}$ 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
- Lead-Free

Key Parameters		
V_{DS}	55	V
$R_{DS(ON)}$ typ. @ $V_{GS} = 10V$	42	mΩ
$R_{DS(ON)}$ typ. @ $V_{GS} = 4.5V$	57	mΩ
Q_g typ.	28	nC
T_J max	175	°C



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 @ $T_C = 25^\circ C$	Continuous Drain Current, V_{GS} @ 10V	26	A
I_D @ $T_C = 100^\circ C$	Continuous Drain Current, V_{GS} @ 10V	19	
I_{DM}	Pulsed Drain Current ①	80	
P_D @ $T_C = 25^\circ C$	Power Dissipation	79	W
P_D @ $T_C = 100^\circ C$	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

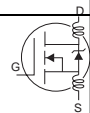
Thermal Resistance

	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 ⑩ 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
ΔBV _{DSS} /ΔT _J	Breakdown Voltage Temp. Coefficient	—	15	—	mV/°C	Reference to 25°C, I _D = 1mA
R _{DS(on)}	Static Drain-to-Source On-Resistance	—	42	50	mΩ	V _{GS} = 10V, I _D = 4.7A ③
		—	57	65		V _{GS} = 4.5V, I _D = 3.8A ③
V _{GS(th)}	Gate Threshold Voltage	1.0	—	—	V	V _{DS} = V _{GS} , I _D = 250μA
ΔV _{GS(th)} /ΔT _J	Gate Threshold Voltage Coefficient	—	-4.4	—	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	8.8	—	—	S	V _{DS} = 25V, I _D = 19A
Q _g	Total Gate Charge	—	28	42		V _{DS} = 44V
Q _{gs}	Pre-V _{th} Gate-to-Source Charge	—	3.5	—		V _{GS} = 10V
Q _{gd}	Gate-to-Drain Charge	—	9.5	—		I _D = 19A
Q _{godr}	Gate Charge Overdrive	—	15	—		See Fig. 6 and 19
t _{d(on)}	Turn-On Delay Time	—	5.7	—	ns	V _{DD} = 28V, V _{GS} = 10V ③
t _r	Rise Time	—	19	—		I _D = 19A
t _{d(off)}	Turn-Off Delay Time	—	23	—		R _G = 2.5Ω
t _f	Fall Time	—	5.3	—		
C _{iss}	Input Capacitance	—	740	—	pF	V _{GS} = 0V
C _{oss}	Output Capacitance	—	150	—		V _{DS} = 50V
C _{rss}	Reverse Transfer Capacitance	—	59	—		f = 1.0MHz, See Fig.5
C _{oss}	Effective Output Capacitance	—	250	—		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

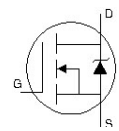


Avalanche Characteristics

	Parameter	Typ.	Max.	Units
E _{AS}	Single Pulse Avalanche Energy②	—	160	mJ
I _{AR}	Avalanche Current ⑦	See Fig. 14, 15, 17a, 17b		A
E _{AR}	Repetitive Avalanche Energy ⑦			mJ

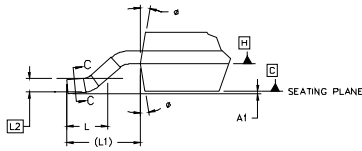
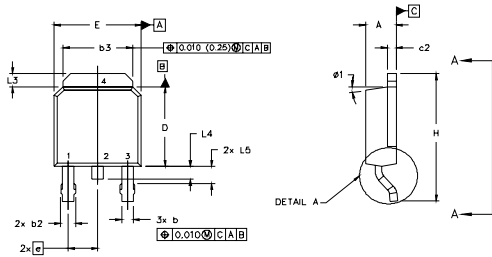
Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I _S @ T _C = 25°C	Continuous Source Current (Body Diode)	—	—	26	A	MOSFET symbol showing the integral reverse p-n junction diode.
I _{SM}	Pulsed Source Current (Body Diode) ①	—	—	80		
V _{SD}	Diode Forward Voltage	—	—	1.2	V	T _J = 25°C, I _S = 19A, V _{GS} = 0V ③
t _{rr}	Reverse Recovery Time	—	52	78	ns	T _J = 25°C, I _F = 19A
Q _{rr}	Reverse Recovery Charge	—	100	150	nC	di/dt = 100A/μs ③

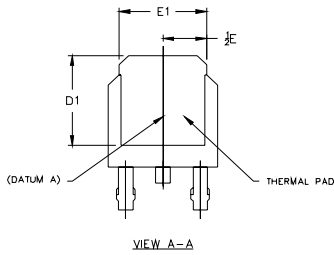


D-Pak (TO-252AA) Package Outline

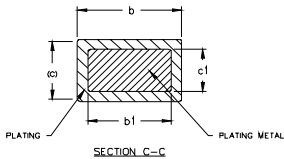
Dimensions are shown in millimeters (inches)



DETAIL "A"
ROTATED 90°



VIEW A-A



SECTION C-C

NOTES:

- 1.0 DIMENSIONING AND TOLERANCING PER ASME Y14.5 M- 1994.
- 2.0 DIMENSIONS ARE SHOWN IN INCHES [MILLIMETERS].
- 3.0 LEAD DIMENSION UNCONTROLLED IN L5
- 4.0 DIMENSION D1 AND E1 ESTABLISH A MINIMUM MOUNTING SURFACE FOR THERMAL PAD.
- 5.0 SECTION C-C DIMENSIONS APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN .005 [0.127] AND .010 [0.2540] FROM THE LEAD TIP.
- 6.0 DIMENSION D & E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED .005" (0.127) PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY.
- 7.0 OUTLINE CONFORMS TO JEDEC OUTLINE TO-252AA.

SYMBOL	DIMENSIONS				NOTES
	MILLIMETERS		INCHES		
	MIN.	MAX.	MIN.	MAX.	
A	2.18	2.39	.086	.094	
A1		0.13		.005	
b	0.64	0.89	.025	.035	5
b1	0.64	0.79	.025	0.031	5
b2	0.76	1.14	.030	.045	
b3	4.95	5.46	.195	.215	
c	0.46	0.61	.018	.024	5
c1	0.41	0.56	.016	.022	5
c2	.046	0.89	.018	.035	5
D	5.97	6.22	.235	.245	6
D1	5.21	-	.205	-	4
E	6.35	6.73	.250	.265	6
E1	4.32	-	.170	-	4
e	2.29		.090 BSC		
H	9.40	10.41	.370	.410	
L	1.40	1.78	.055	.070	
L1	2.74 REF.		.108 REF.		
L2	0.051 BSC		.020 BSC		
L3	0.89	1.27	.035	.050	
L4		1.02		.040	
L5	1.14	1.52	.045	.060	3
φ	0"	10"	0"	10"	
φ1	0"	15"	0"	15"	

LEAD ASSIGNMENTS

HEXFET

- 1.- GATE
- 2.- DRAIN
- 3.- SOURCE
- 4.- DRAIN

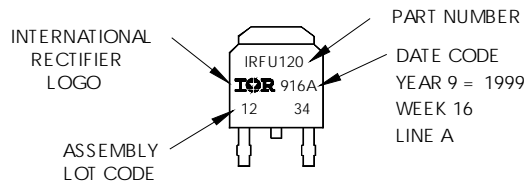
IGBTs, CoPACK

- 1.- GATE
- 2.- COLLECTOR
- 3.- EMITTER
- 4.- COLLECTOR

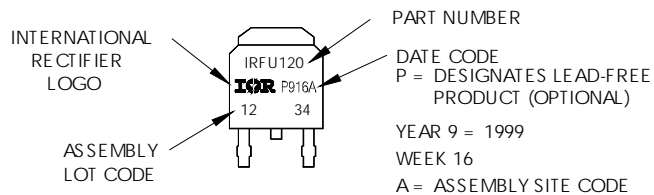
D-Pak (TO-252AA) Part Marking Information

EXAMPLE: THIS IS AN IRFR120
WITH ASSEMBLY
LOT CODE 1234
ASSEMBLED ON VW 16, 1999
IN THE ASSEMBLY LINE "A"

Note: "P" in assembly line position
indicates "Lead-Free"

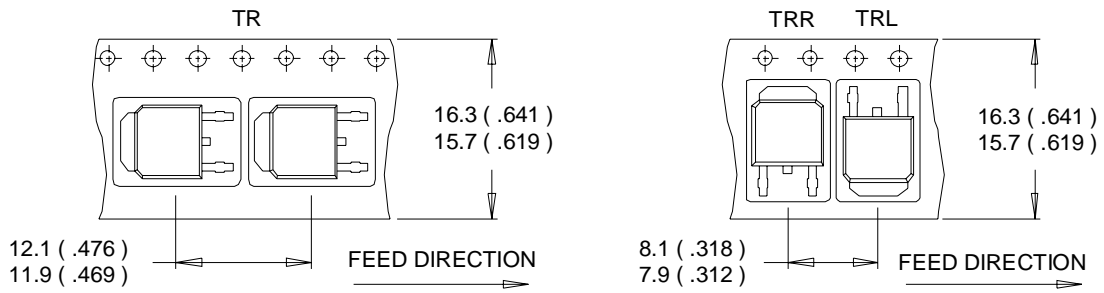


OR



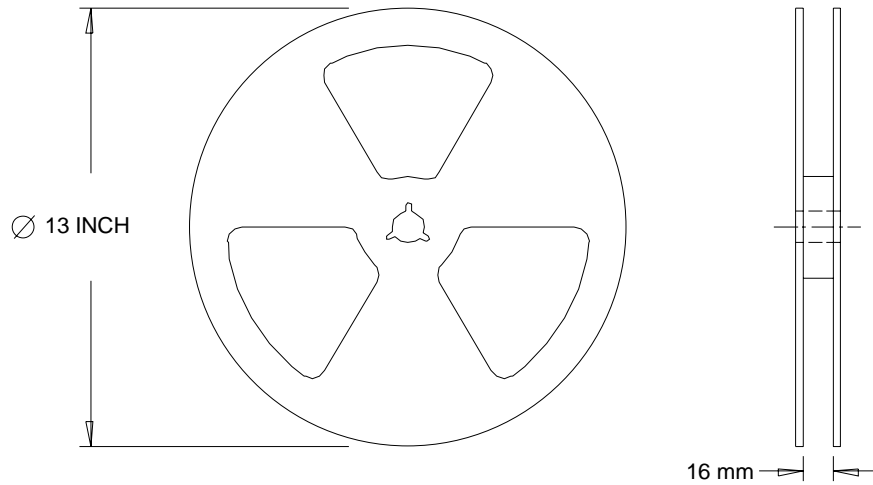
D-Pak (TO-252AA) Tape & Reel Information

Dimensions are shown in millimeters (inches)



NOTES :

1. CONTROLLING DIMENSION : MILLIMETER.
2. ALL DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).
3. OUTLINE CONFORMS TO EIA-481 & EIA-541.



NOTES :

1. OUTLINE CONFORMS TO EIA-481.