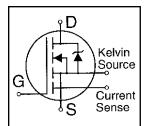
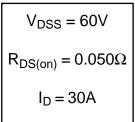


IRCZ34

HEXFET® Power MOSFET

- Dynamic dv/dt Rating
- Current Sense
- 175°C Operating Temperature
- Fast Switching
- Ease of Paralleling
- Simple Drive Requirements

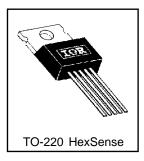




Description

Third Generation HEXFETs from International Rectifier provide the designer with the best combination of fast switching, ruggedized device, low on-resistance and cost-effectiveness.

The HEXSence device provides an accurate fraction of the drain current through the additional two leads to be used for control or protection of the device. These devices exhibit similar electrical and thermal characteristics as their IRF-series equivalent part numbers. The provision of a kelvin source connection effectively eliminates problems of common source inductance when the HEXSence is used as a fast, high-current switch in non current-sensing applications.



Absolute Maximum Ratings

	Parameter	Max.	Units
I _D @ T _C = 25°C	Continuous Drain Current, V _{GS} @ 10V	30	
I _D @ T _C = 100°C	Continuous Drain Current, V _{GS} @ 10V	21	A
I _{DM}	Pulsed Drain Current ①	120	
P _D @T _C = 25°C	Power Dissipation	88	W
	Linear Derating Factor	0.59	W/°C
V_{GS}	Gate-to-Source Voltage	±20	V
E _{AS}	Single Pulse Avalanche Energy ②	15	mJ
dv/dt	Peak Diode Recovery dv/dt ③	4.5	A
TJ	Operating Junction and	-55 to + 175	
T _{STG}	Storage Temperature Range		℃
	Soldering Temperature, for 10 seconds	300 (1.6mm from case)	
	Mounting Torque, 6-32 or screw	10 lbf•in (1.1 N•m)	

Thermal Resistance

	Parameter	Min.	Max.	Units	
$R_{\theta JC}$	Junction-to-Case		_	1.7	
R _{0CS}	Case-to-Sink, Flat, Greased Surface	_	0.50	_	°C/W
$R_{\theta JA}$	Junction-to-Ambient	_	_	62	

^{**} When mounted on FR-4 board using minimum recommended footprint. For recommended footprint and soldering techniques refer to application note #AN-994.

IRCZ34

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

	Parameter	Min.	Тур.	Max.	Units	Conditions
V _{(BR)DSS}	Drain-to-Source Breakdown Voltage	60			V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient		0.065		V/°C	Reference to 25°C, I _D = 1mA
R _{DS(ON)}	Static Drain-to-Source On-Resistance			0.050	Ω	V _{GS} = 10V, I _D = 18A⊕
V _{GS(th)}	Gate Threshold Voltage	2.0		4.0	V	$V_{DS} = V_{GS}$, $I_D = 250\mu A$
g _{fs}	Forward Transconductance	9.4			S	$V_{DS} = 25V, I_D = 18A$
I _{DSS}	Drain-to-Source Leakage Current			25		$V_{DS} = 60V, V_{GS} = 0V$
				250		$V_{DS} = 48V, V_{GS} = 0V, T_{J} = 150^{\circ}C$
I _{GSS}	Gate-to-Source Forward Leakage			100		$V_{GS} = 20V$
.633	Gate-to-Source Reverse Leakage			-100		$V_{GS} = -20V$
Q_g	Total Gate Charge			46		$I_D = 30A$
Q _{gs}	Gate-to-Source Charge			11	nC	$V_{DS} = 48V$
Q_{gd}	Gate-to-Drain ("Miller") Charge			22		V _{GS} = 10V, See Fig. 6 and 13 ④
t _{d(on)}	Turn-On Delay Time		13			$V_{DD} = 30V$
t _r	Rise Time		100			$I_D = 30A$
t _{d(off)}	Turn-Off Delay Time		29			$R_G = 12\Omega$
t _f	FallTime		52			$R_D = 1.0\Omega$, See Fig. 10 \oplus
L _D	Internal Drain Inductance		4.5		nH	Between lead, 6 mm (0.25 in.) from package
L _c	Internal Source Inductance		7.5		1111	and center of die contact
C _{iss}	Input Capacitance		1300			$V_{GS} = 0V$
Coss	Output Capacitance		640		pF	V _{DS} = 25V
C _{rss}	Reverse Transfer Capacitance		96			f = 1.0MHz, See Fig. 5
r	Current Sensing Ratio	1340		1480		$I_D = 30A, V_{GS} = 10V$
C _{oss}	Output Capacitance of Sensing Cells		9.0		pF	$V_{GS} = 0V, V_{DS} = 25V, f = 1.0MHz$

Source-Drain Ratings and Characteristics

	Parameter	Min.	Тур.	Max.	Units	Conditions			
ls	Continuous Source Current			20		MOSFET symbol			
	(Body Diode)			30	Α	showing the			
I _{SM}	Pulsed Source Current						400	^	integral reverse
	(Body Diode) ①	_		120		p-n junction diode.			
V_{SD}	Diode Forward Voltage			1.6	V	$T_J = 25^{\circ}C$, $I_S = 30A$, $V_{GS} = 0V$ ④			
t _{rr}	Reverse Recovery Time		120	230	ns	$T_J = 25^{\circ}C, I_F = 30A$			
Q _{rr}	Reverse Recovery Charge		0.70	1.4	nC	di/dt = 100A/µs ④			
t _{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by L _S +L _D)							

Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 11)
- $\ \Im \ I_{SD} \leq 30A, \ di/dt \leq 200A/\mu s, \ V_{DD} \leq V_{(BR)DSS}, \ T_{J} \leq 175^{\circ}C$
- $\begin{tabular}{ll} $\mathbb{V}_{DD}=25V$, starting $T_J=25^\circ$C$, $L=0.019mH$\\ $R_G=25\Omega$, $I_{AS}=30A$. (See Figure 12) \\ \end{tabular}$
- 4 Pulse width $\leq 300 \mu s$; duty cycle $\leq 2\%$.

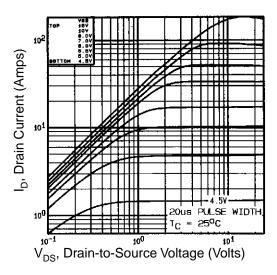


Fig. 1 Typical Output Characteristics, T_c =25°C

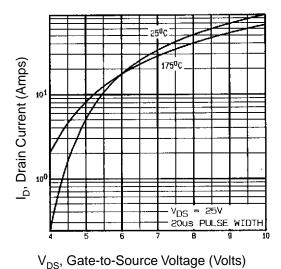


Fig. 3 Typical Transfer Characteristics

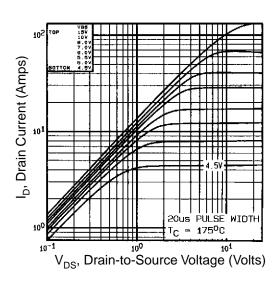


Fig. 2 Typical Output Characteristics, T_c =175°C

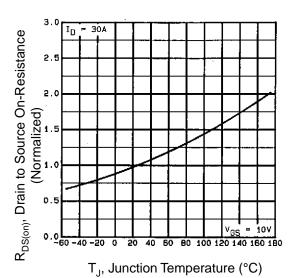


Fig. 4 Normalized On-Resistance vs. Temperature

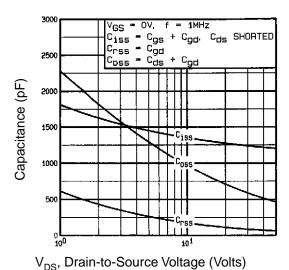
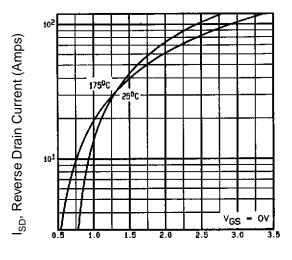


Fig. 5 Typical Capacitance vs. Drain-to-Source Voltage



V_{SD}, Source-to-Drain Voltage (Volts)

Fig. 7 Typical Source-Drain Diode Forward Voltage

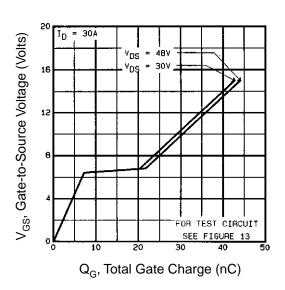
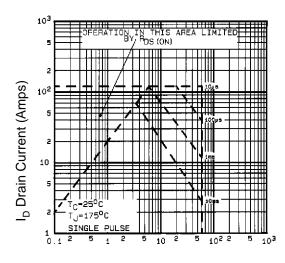


Fig. 6 Typical Gate Charge vs. Gate-to-Source Voltage



V_{DS}, Drain-to-Source Voltage (Volts)

Fig. 8 Maximum Safe Operating Area

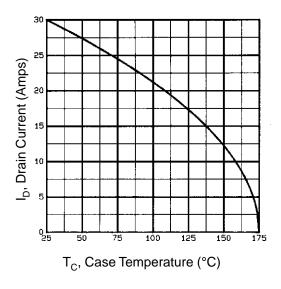


Fig. 9 Maximum Drain Current vs. Case Temperature

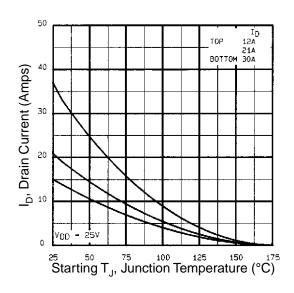


Fig. 12c Maximum Avalanche Energy vs. Drain Current

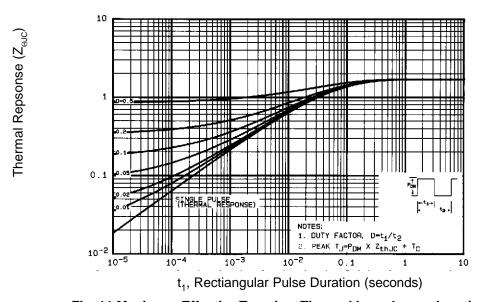


Fig. 11 Maximum Effective Transient Thermal Impedance, Junction-to-Case

IRCZ34 International serifier

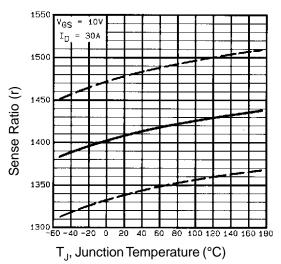


Fig. 15 Typical HEXSense Ratio vs. Junction Temperature

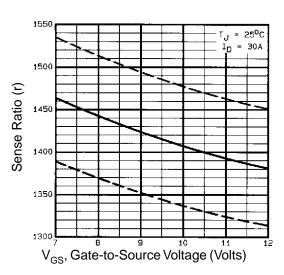


Fig. 17 Typical HEXSense Ratio vs. Gate Voltage

Mechanical drawings, Appendix A
Part marking information, Appendix B
Test Circuit diagrams, Appendix C

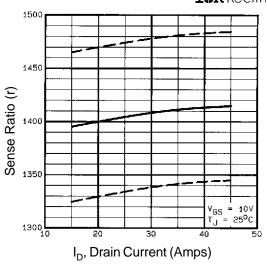


Fig. 16 Typical HEXSense Ratio vs.
Drain Current

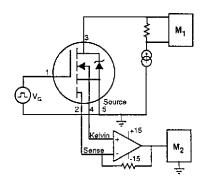


Fig. 18 HEXSense Ratio Test Circuit

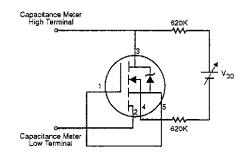


Fig. 19 HEXSense Sensing Cell Output Capacitance Test Circuit



Vishay

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