

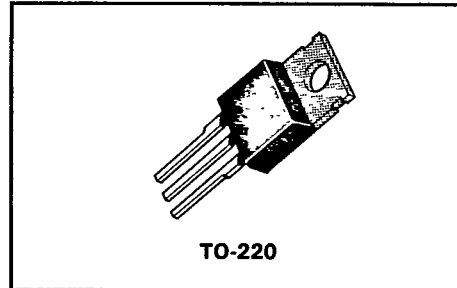
**N-channel enhancement
mode vertical DMOS FET**

**IRF530 IRF531
IRF532 IRF533**

T-39-11

FEATURES

- Compact geometry
- Fast switching speeds
- No secondary breakdown
- Excellent temperature stability
- High input impedance
- Low current drive
- Ease of paralleling



DESCRIPTION

A compact cell geometry forms the basis of this Ferranti MOSFET. Optimised for low on-resistance, low capacitance and fast switching this device is manufactured using the latest computer controlled processing techniques in order to achieve greater stability, reliability and ruggedness.

PRODUCT SUMMARY

Part No.	BV_{DSS}	I_D	$R_{DS(on)}$
IRF530	100V	14A	0.18 Ω
IRF531	60V	14A	0.18 Ω
IRF532	100V	12A	0.25 Ω
IRF533	60V	12A	0.25 Ω

IRF530 IRF531 IRF532 IRF533

ABSOLUTE MAXIMUM RATINGS

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Parameter	IRF530	IRF531	IRF532	IRF533	Units
V_{DS} Drain-source voltage	100	60	100	60	V
I_D Continuous drain current (@ $T_C = 25^\circ\text{C}$)	14	14	12	12	A
I_{DM} Pulse drain current	56	56	48	48	A
V_{GS} Gate-source voltage	± 20	± 20	± 20	± 20	V
P_D Max. power dissipation (@ $T_C = 25^\circ\text{C}$)	75	75	75	75	W
T_j, T_{stg} Operating/storage temperature range	- 55 to + 150				$^\circ\text{C}$

ELECTRICAL CHARACTERISTICS (at $T = 25^\circ\text{C}$ unless otherwise stated)

Parameter	Part No.	Min.	Max.	Unit	Conditions
BV_{DSS} Drain-source breakdown voltage	IRF530 IRF532	100	-	V	$V_{GS} = 0V, I_D = 250\mu\text{A}$
	IRF531 IRF533	60	-	V	
$V_{GS(th)}$ Gate threshold voltage	All	2	4	V	$V_{GS} = V_{DS}, I_D = 250\mu\text{A}$
I_{GSS} Gate-body leakage	All	-	500	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$
I_{DSS} Zero gate voltage drain current	All	-	250	μA	$V_{DS} = \text{Max. rating}, V_{GS} = 0V$
	All	-	1000	μA	$V_{DS} = 0.8 \times \text{Max. rating}$ $V_{GS} = 0V (T = 125^\circ\text{C}) (2)$
$I_{D(on)}$ On-state drain current (1)	IRF530 IRF531	14	-	A	$V_{DS} = 10V, V_{GS} = 10V$
	IRF532 IRF533	12	-	A	
$R_{DS(on)}$ Static drain-source on-state resistance (1)	IRF530 IRF531	-	0.18	Ω	$I_D = 8A, V_{GS} = 10V$
	IRF532 IRF533	-	0.25	Ω	
g_{fs} Forward transconductance (1) (2)	All	4	-	S	$V_{DS} = 10V, I_D = 8A$

IRF530 IRF531 IRF532 IRF533

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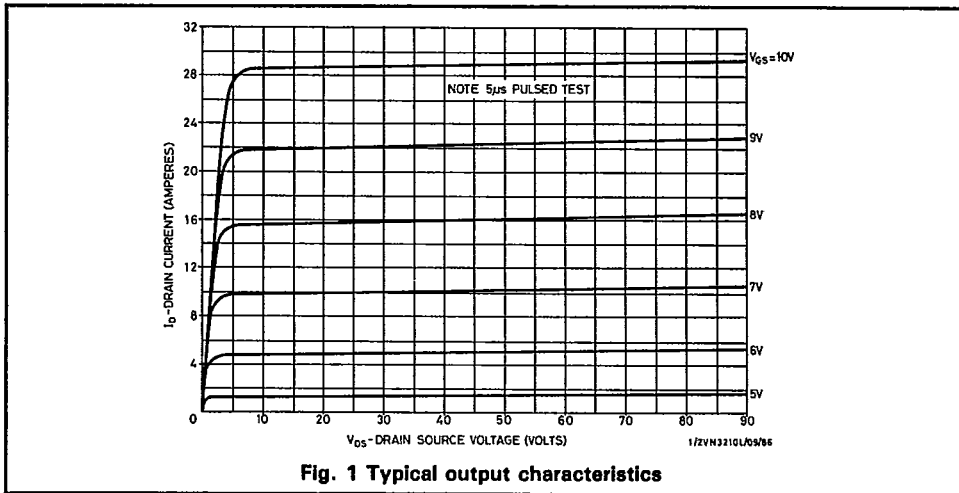
ELECTRICAL CHARACTERISTICS cont.

Parameter	Part No.	Min.	Max.	Unit	Conditions
C_{iss} Input capacitance (2)	All	-	800	pF	$V_{DS} = 25V, V_{GS} = 0V$ $f = 1MHz$
C_{oss} Common source output capacitance (2)	All	-	500	pF	
C_{rss} Reverse transfer capacitance (2)	All	-	150	pF	
$t_{d(on)}$ Turn-on delay time (2)	All	-	30	ns	$V_{DD} \approx 36V, I_D = 8A$ $Z_0 = 15\Omega$
t_r Rise time (2)	All	-	75	ns	
$t_{d(off)}$ Turn-off delay time (2)	All	-	40	ns	
t_f Fall time (2)	All	-	45	ns	

SOURCE-DRAIN DIODE CHARACTERISTICS

Parameter	Part No.	Typ.	Max.	Unit	Conditions
V_{SD} Diode forward voltage (1)	IRF530 IRF531	-	2.5	V	$V_{GS} = 0V, I_S = 14A$ $T_C = 25^\circ C$
	IRF532 IRF533	-	2.3	V	$V_{GS} = 0V, I_S = 12A$ $T_C = 25^\circ C$
t_{rr} Reverse recovery time (2)	All	360	-	ns	$I_F = 14A, di_F/dt = 100A/\mu s$ $T_J = 150^\circ C$

- (1) Measured under pulsed conditions. Width = 300 μs . Duty cycle $\leq 2\%$.
- (2) Sample test.



IRF530 IRF531 IRF532 IRF533

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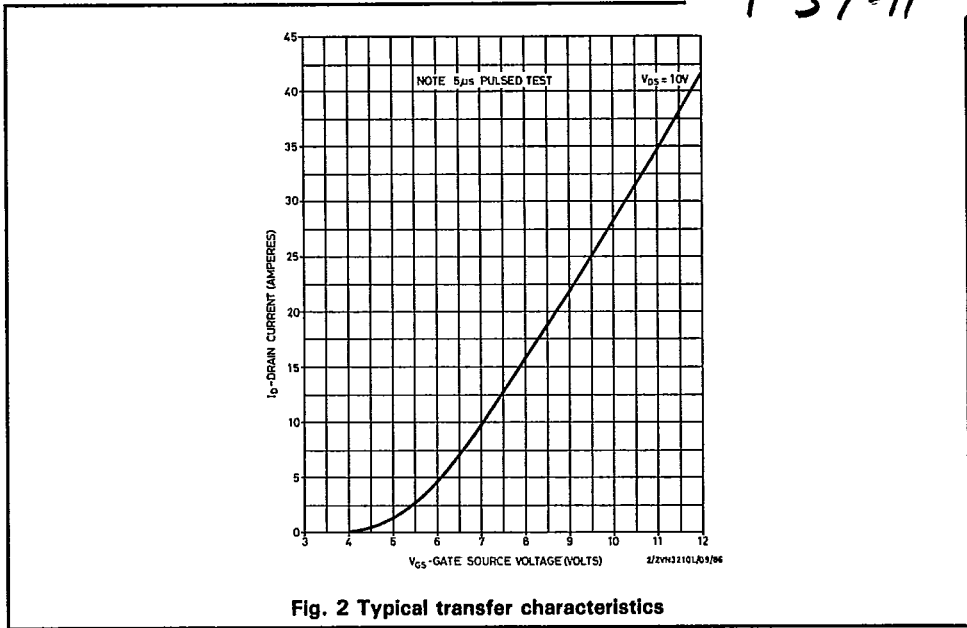


Fig. 2 Typical transfer characteristics

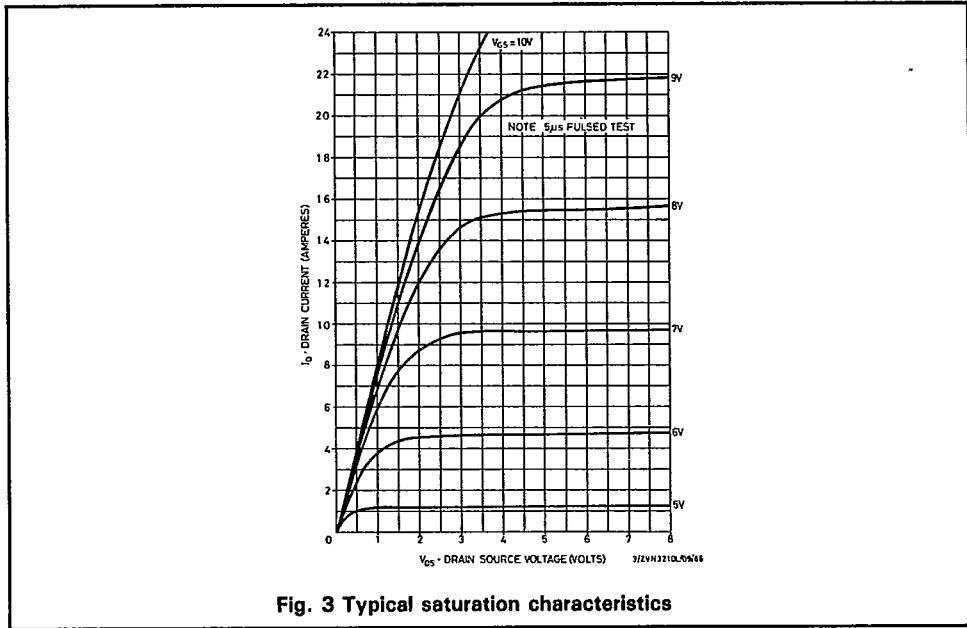
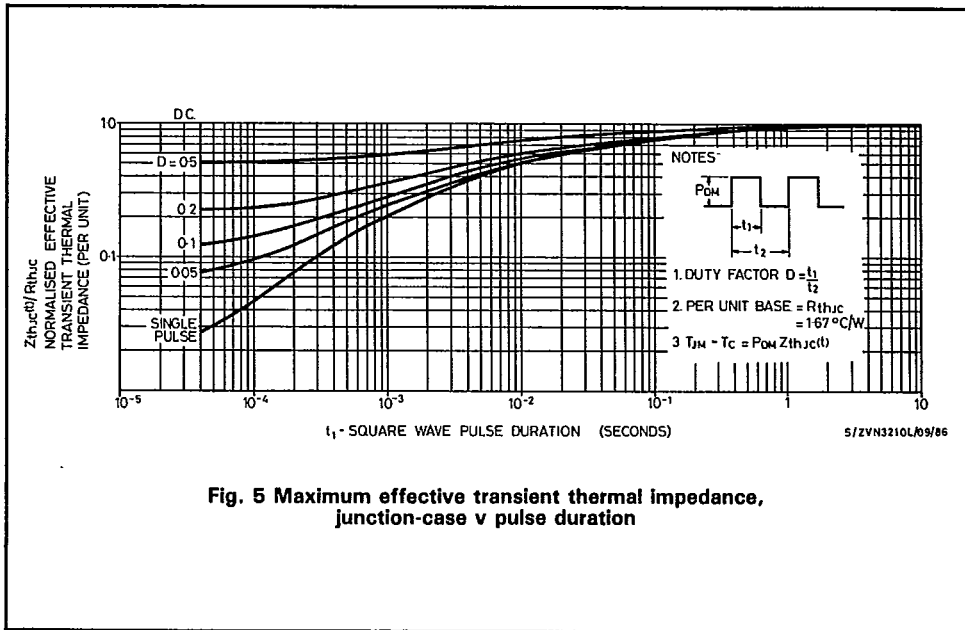
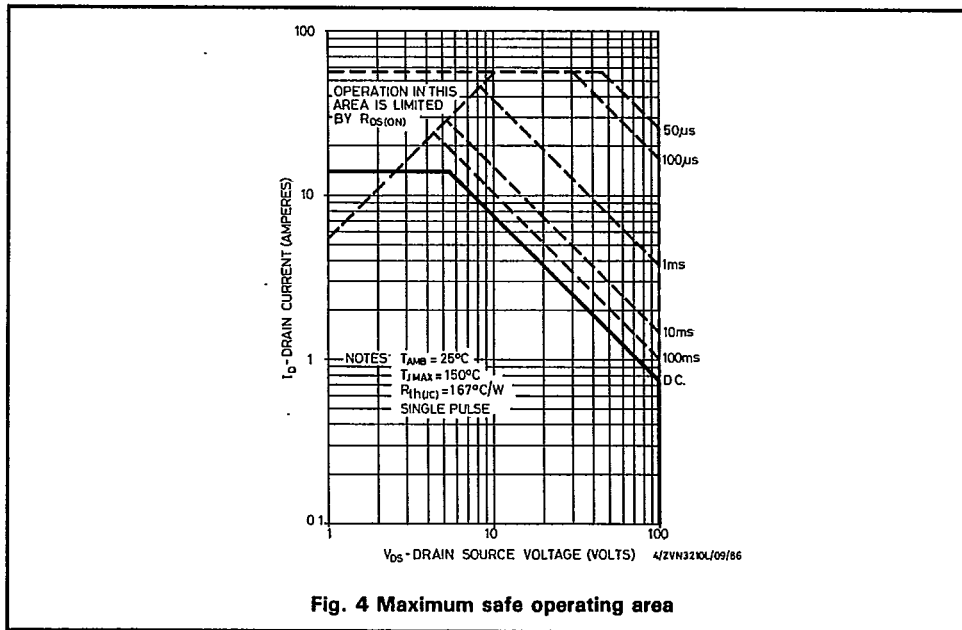


Fig. 3 Typical saturation characteristics

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IRF530 IRF531 IRF532 IRF533



IRF530 IRF531 IRF532 IRF533

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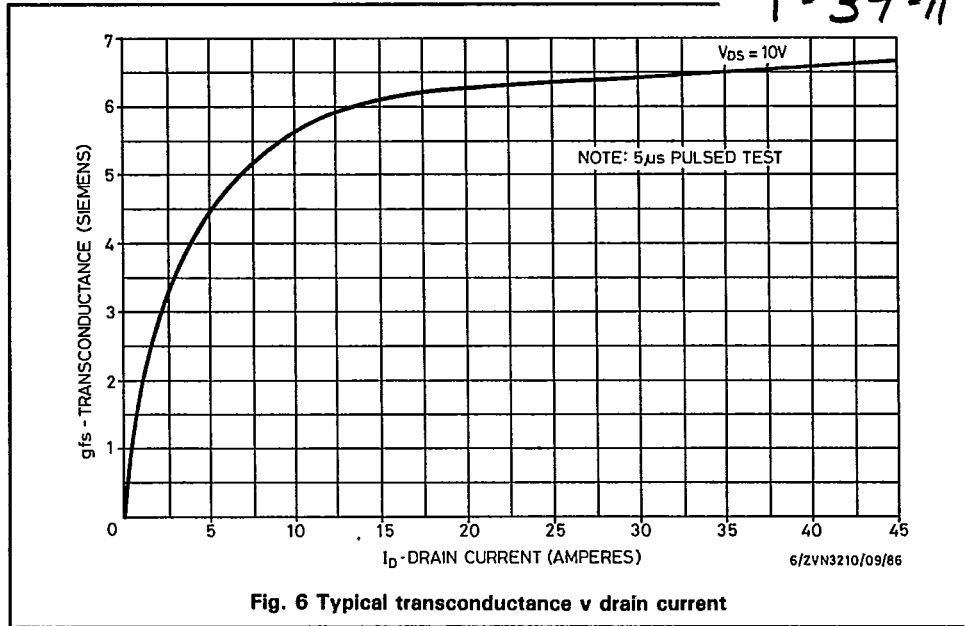


Fig. 6 Typical transconductance v drain current

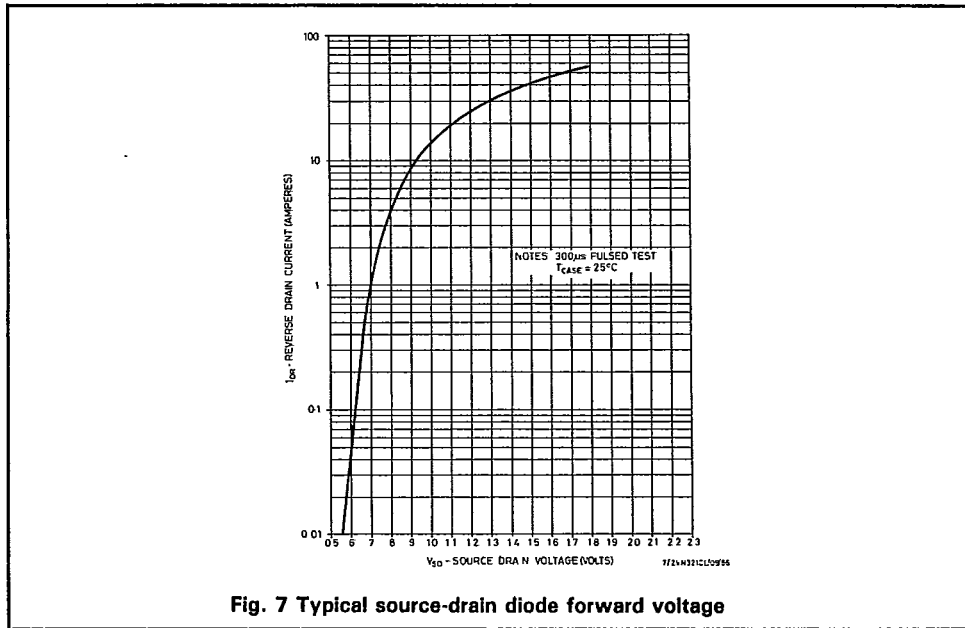
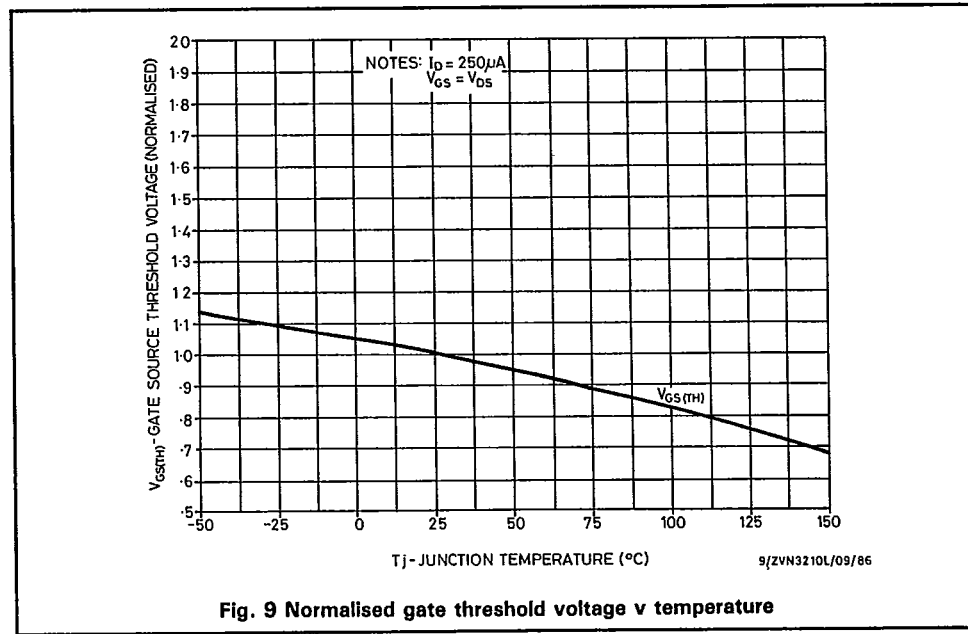
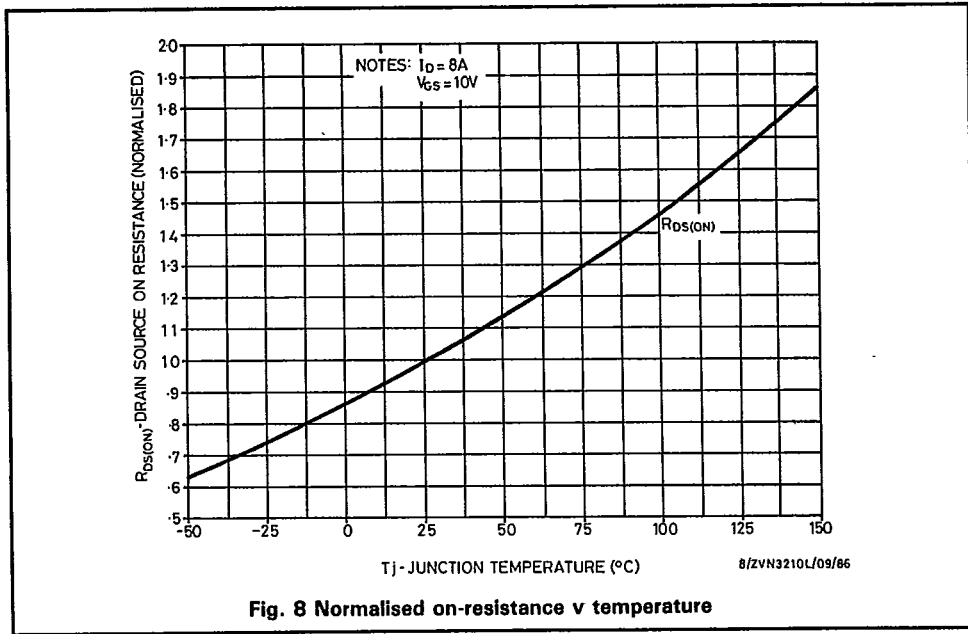


Fig. 7 Typical source-drain diode forward voltage

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IRF530 IRF531 IRF532 IRF533

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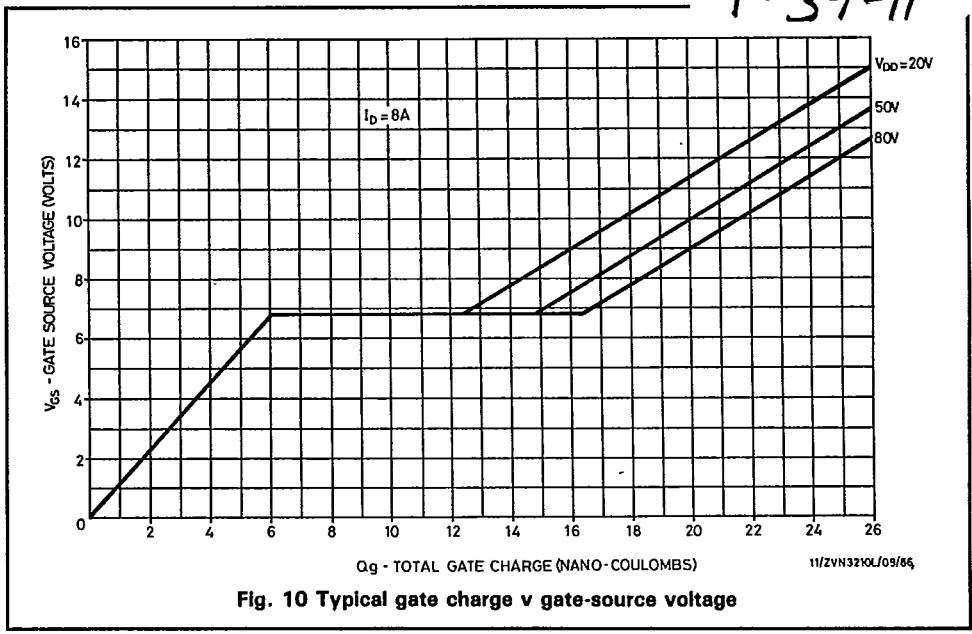


Fig. 10 Typical gate charge v gate-source voltage

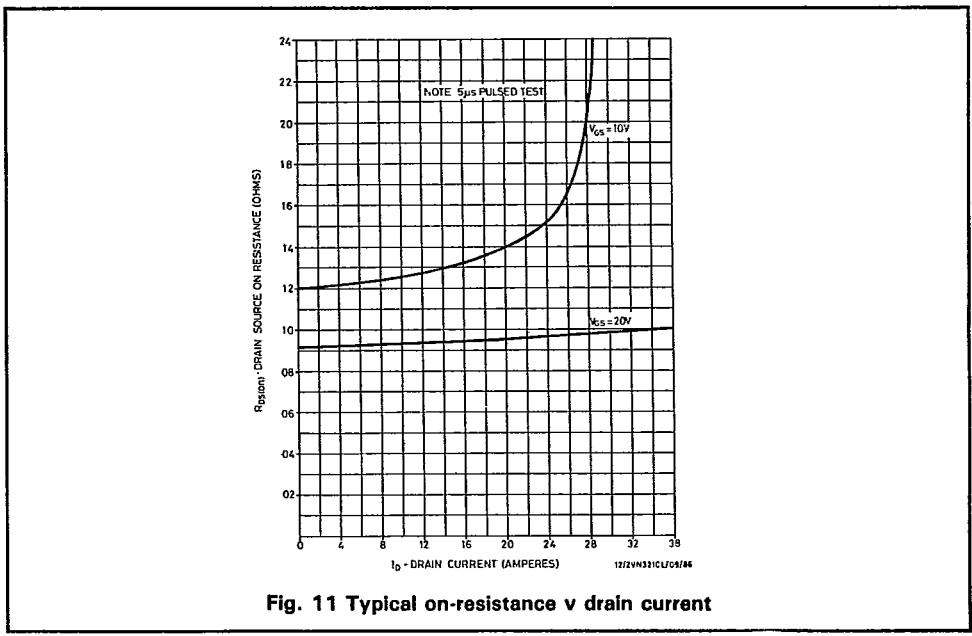
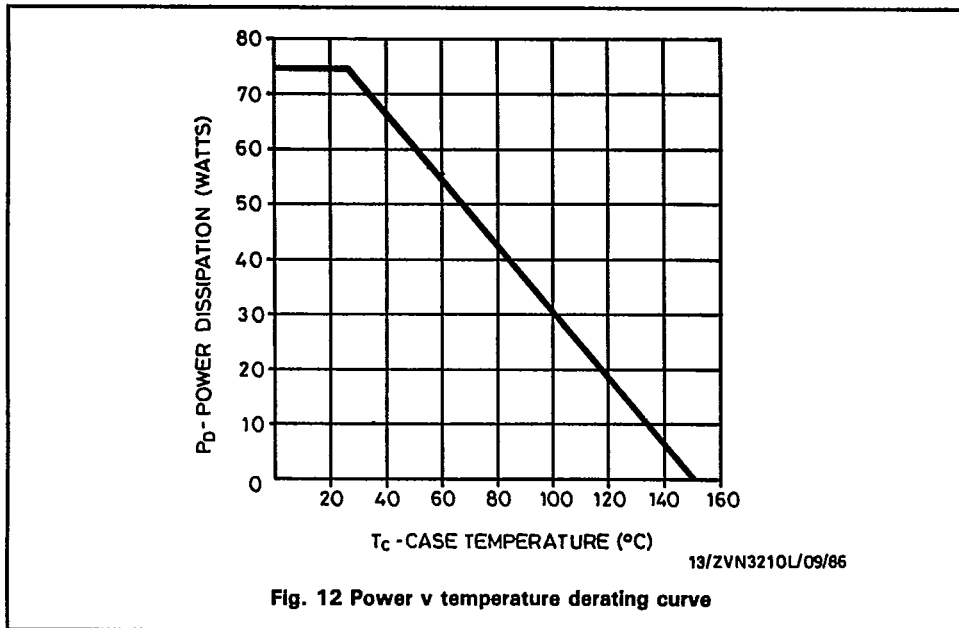


Fig. 11 Typical on-resistance v drain current

IRF530 IRF531 IRF532 IRF533

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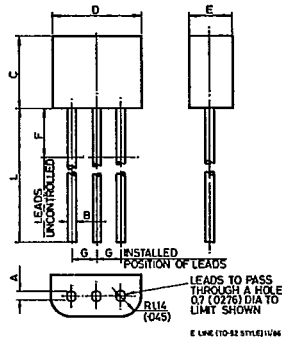


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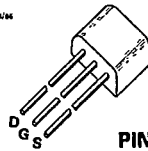
PACKAGE DETAILS

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E-Line (TO-92 style)



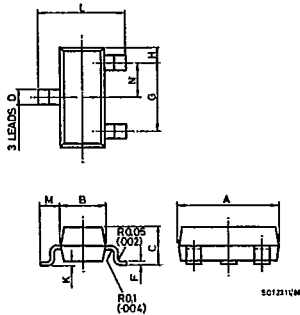
DIMENSION	MILLIMETRES		INCHES	
	MIN	MAX	MIN	MAX
A	0.41	0.495	0.016	0.0195
B	0.41	0.495	0.016	0.0195
C	3.61	4.01	0.142	0.158
D	4.37	4.77	0.172	0.188
E	2.16	2.41	0.085	0.095
F		2.5		0.098
G	1.27 NOM		0.050 NOM	
L	12.06	13.97	0.475	0.550



PIN CONFIGURATION

Available on tape on reels. Please enquire for details.

SOT-23



DIMENSION	MILLIMETRES		INCHES	
	MIN	MAX	MIN	MAX
A	2.75	3.04	0.108	0.120
B	1.2	1.4	0.047	0.055
C	0.89	1.12	0.035	0.044
D	0.37	0.43	0.0145	0.017
F	0.085	0.14	0.0034	0.0055
G	1.78	2.04	0.070	0.080
H	0.33	0.51	0.013	0.020
K	0.075	0.125	0.003	0.005
L	2.10	2.5	0.0825	0.0985
M	0.45	0.64	0.018	0.025
N	0.89	1.02	0.035	0.040



PIN CONFIGURATION

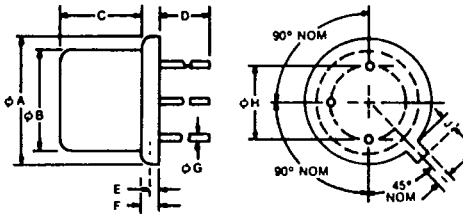
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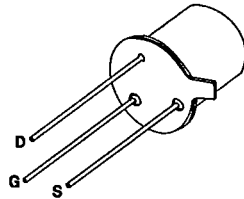
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PACKAGE DETAILS

TO-39

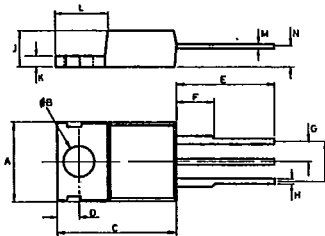


DIMENSION	INCHES		MILLIMETRES	
	MIN	MAX	MIN	MAX
∅A	0.350	0.370	8.99	9.40
∅B	0.306	0.335	7.77	8.51
C	0.240	0.260	6.10	6.60
D	0.500		12.70	
E	0.009	0.023	0.229	0.548
F	0.018	0.045	0.458	1.143
∅G	0.016	0.021	0.406	0.533
∅H	0.190	0.210	4.83	5.33
I	0.028	0.037	0.711	0.939
J	0.026	0.040	0.660	1.016

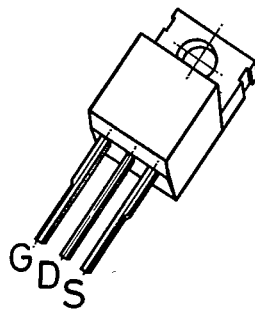


PIN CONFIGURATION

TO-220



DIMENSION	INCHES		MILLIMETRES	
	MIN	MAX	MIN	MAX
A	0.387	0.403	9.8	10.2
∅B	0.139	0.147	3.53	3.73
C	0.612	0.648	15.56	16.46
D	0.10	0.12	2.55	3.05
E	0.50	0.56	12.71	14.21
F		0.25		6.35
G	0.09	0.11	2.29	2.79
H	0.022	0.032	0.57	0.83
I	0.19	0.21	4.85	5.35
J	0.17	0.19	4.32	4.82
K	0.045	0.055	1.14	1.4
L	0.245	0.265	6.23	6.73
M	0.015	0.025	0.37	0.63
N	0.085	0.105	2.15	2.65



PIN CONFIGURATION