International TOR Rectifier

POWER MOSFET THRU-HOLE (TO-254AA)

Product Summary

Part Number	RDS(on)	ΙD
IRFM9240	0.51Ω	-11A

HEXFET® MOSFET technology is the key to International Rectifier's advanced line of power MOSFET transistors. The efficient geometry design achieves very low on-state resistance combined with high transconductance. HEXFET transistors also feature all of the well-established advantages of MOSFETs, such as voltage control, very fast switching, ease of paralleling and electrical parameter temperature stability. They are well-suited for applications such as switching power supplies, motor controls, inverters, choppers, audio amplifiers, high energy pulse circuits, and virtually any application where high reliability is required. The HEXFET transistor's totally isolated package eliminates the need for additional isolating material between the device and the heatsink. This improves thermal efficiency and reduces drain capacitance.

IRFM9240 JANTX2N7237 JANTXV2N7237 REF:MIL-PRF-19500/595 200V, P-CHANNEL HEXFET® MOSFETTECHNOLOGY



Features:

- Simple Drive Requirements
- Ease of Paralleling
- Hermetically Sealed
- Electrically Isolated
- Dynamic dv/dt Rating
- Light-weight

Absolute Maximum Ratings

	Parameter		Units
ID @ VGS = -10V, TC = 25°C	Continuous Drain Current	-11	
ID @ VGS = -10V, TC = 100°C Continuous Drain Current		-7.0	Α
IDM	Pulsed Drain Current ①	-44	
P _D @ T _C = 25°C	Max. Power Dissipation	125	W
	Linear Derating Factor	1.0	W/°C
VGS	Gate-to-Source Voltage	±20	V
EAS	Single Pulse Avalanche Energy ②	500	mJ
IAR	Avalanche Current ①	-11	Α
EAR	Repetitive Avalanche Energy ①	12.5	mJ
dv/dt	Peak Diode Recovery dv/dt 3	-5.0	V/ns
ТЈ	Operating Junction	-55 to 150	
TSTG Storage Temperature Range			°C
	Lead Temperature	300 (0.063 in.(1.6mm) from case for 10s)	
	Weight	9.3 (typical)	g

For footnotes refer to the last page

Electrical Characteristics @ Tj = 25°C (Unless Otherwise Specified)

	Parameter	Min	Тур	Max	Units	Test Conditions
BVDSS	Drain-to-Source Breakdown Voltage	-200			V	VGS = 0V, ID = -1.0mA
ΔBV _{DSS} /ΔT _J	Temperature Coefficient of Breakdown Voltage	_	-0.2		V/°C	Reference to 25°C, I _D = -1.0mA
RDS(on)	Static Drain-to-Source On-State	_	_	0.51	Ω	Vgs = -10V, ID = -7.0A4
	Resistance	_	_	0.52	1 52	VGS = -10V, ID = -11A ④
VGS(th)	Gate Threshold Voltage	-2.0		-4.0	V	$V_{DS} = V_{GS}$, $I_{D} = -250\mu A$
9fs	Forward Transconductance	4.0	_	_	S (U)	V _{DS} > -15V, I _{DS} = -7.0A④
IDSS	Zero Gate Voltage Drain Current	_		-25		V _{DS} = -160V, V _{GS} = 0V
		_		-250	μΑ	V _{DS} = -160V
						VGS = 0V, TJ = 125°C
IGSS	Gate-to-Source Leakage Forward	_	_	-100	nA	VGS = -20V
IGSS	Gate-to-Source Leakage Reverse	_	_	100	''^	V _{GS} =20V
Qg	Total Gate Charge	_	_	60		$V_{GS} = -10V, ID_{=} -11A$
Qgs	Gate-to-Source Charge		_	15	nC	V _{DS} = -100V
Q _{gd}	Gate-to-Drain ('Miller') Charge	_	_	38	1	
td(on)	Turn-On Delay Time	_	_	35		V _{DD} = -100V, I _D = -11A,
tr	Rise Time	_	_	85	ns	$R_{G} = 9.1\Omega, V_{GS} = -10V$
td(off)	Turn-Off Delay Time	_	_	85	1115	
tf	Fall Time	_		65		
LS + LD	Total Inductance	_	6.8	_	nΗ	Measured from drain lead (6mm/ 0.25in. from package) to source lead (6mm/0.25in. from package)
Ciss	Input Capacitance	_	1200			VGS = 0V, VDS = -25V
Coss	Output Capacitance	_	570	_	pF	f = 1.0MHz
C _{rss}	Reverse Transfer Capacitance	_	81	_		

Source-Drain Diode Ratings and Characteristics

	Parameter		Min	Тур	Max	Units	Test Conditions	
Is	Continuous Source Current (B	ody Diode)		_	-11	Α		
ISM	Pulse Source Current (Body Diode) ①		_	_	-44	^		
VSD	Diode Forward Voltage		_	_	-4.6	V	$T_j = 25$ °C, $I_S = -11A$, $V_{GS} = 0V$ ④	
t _{rr}	Reverse Recovery Time		ı	_	440	nS	Tj = 25°C, I _F = -11A, di/dt ≤-100A/μs	
QRR	R Reverse Recovery Charge		l	_	7.2	μc	V _{DD} ≤ -50V ④	
ton	Forward Turn-On Time	Intrinsic turn-on time is negligible. Turn-on speed is substantially controlled by LS + LD.						

Thermal Resistance

	Parameter	Min	Тур	Max	Units	Test Conditions
RthJC	Junction-to-Case	_	_	1.0		
RthCS	Case-to-sink	_	0.21	_	°C/W	
R _{th} JA	Junction-to-Ambient	_	_	48		Typical socket mount

For footnotes refer to the last page

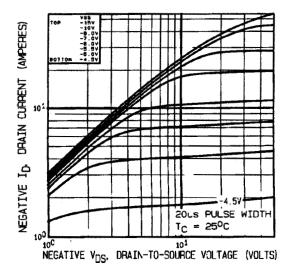


Fig 1. Typical Output Characteristics

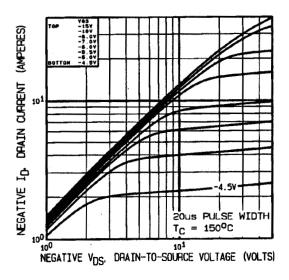


Fig 2. Typical Output Characteristics

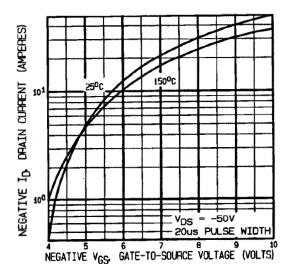


Fig 3. Typical Transfer Characteristics

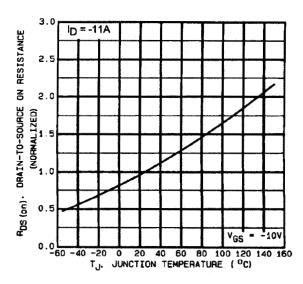
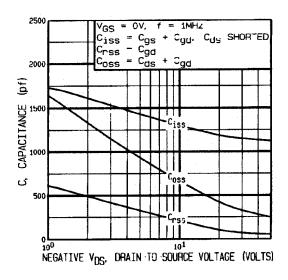


Fig 4. Normalized On-Resistance Vs. Temperature



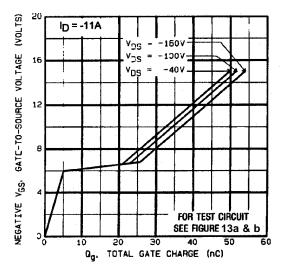
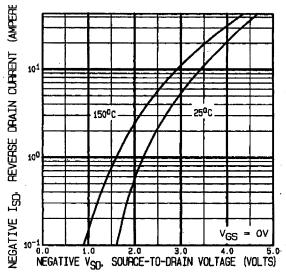
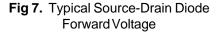


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

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





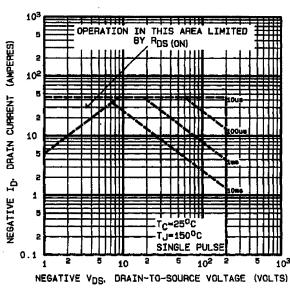


Fig 8. Maximum Safe Operating Area

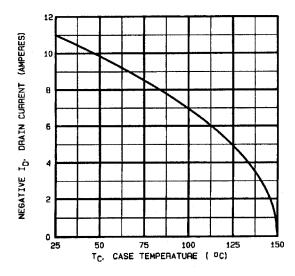


Fig 9. Maximum Drain Current Vs. Case Temperature

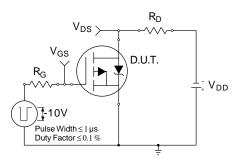


Fig 10a. Switching Time Test Circuit

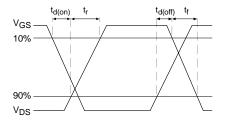


Fig 10b. Switching Time Waveforms

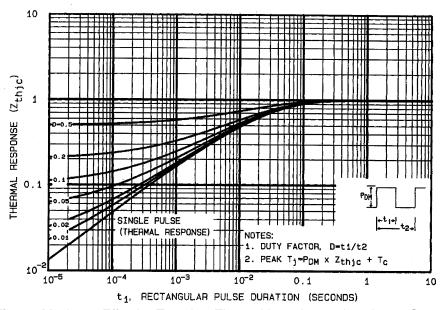


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

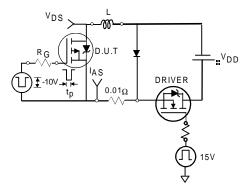


Fig 12a. Unclamped Inductive Test Circuit

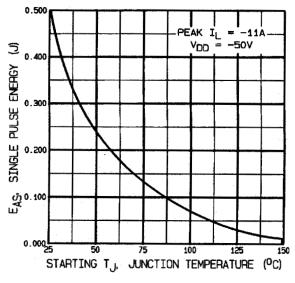


Fig 12c. Maximum Avalanche Energy Vs. Drain Current

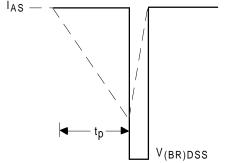


Fig 12b. Unclamped Inductive Waveforms

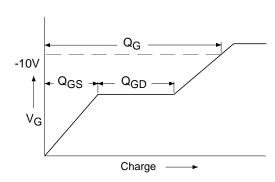


Fig 13a. Basic Gate Charge Waveform

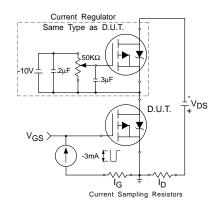


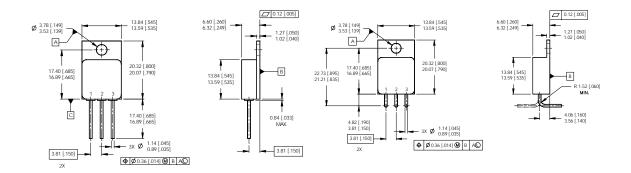
Fig 13b. Gate Charge Test Circuit

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Foot Notes:

- ① Repetitive Rating; Pulse width limited by maximum junction temperature.
- ? V_{DD} =-50V, starting T_J = 25°C, L = 8.3mH Peak IL = -11A, VGS = -10V
- $\label{eq:interpolation} \mbox{3} \ \ I_{\mbox{SD}} \leq \mbox{-11A}, \ di/dt \leq -150 A/\mu s,$ V_{DD}≤ -200V, T_J ≤ 150°C
- 4 Pulse width $\leq 300 \,\mu s$; Duty Cycle $\leq 2\%$

Case Outline and Dimensions — TO-254AA



NOTES:

- DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
 ALL DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
- 3. CONTROLLING DIMENSION: INCH.
- 4. CONFORMS TO JEDEC OUTLINE TO-254AA

PIN ASSIGNMENTS

- 1 = DRAIN
- 2 = SOURCE 3 = GATE

CAUTION BERYLLIA WARNING PER MIL-PRF-19500

Packages containing beryllia shall not be ground, sandblasted, machined or have other operations performed on them which will produce beryllia or beryllium dust. Furthermore, beryllium oxide packages shall not be placed in acids that will produce fumes containing beryllium.



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