NXP Semiconductors
Preliminary Data

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Rev. 1.1, 09/2018

RoHS

RF Power LDMOS Transistor

High Ruggedness N-Channel Enhancement-Mode Lateral MOSFET

This high ruggedness device is designed for use in high VSWR industrial, medical, broadcast, aerospace and mobile radio applications. Its unmatched input and output design supports frequency use from 1.8 to 512 MHz.

Typical Performance: V_{DD} = 65 Vdc

Frequency (MHz)	Signal Type	P_{out} (W)	G_{ps} (dB)	η_D (%)
1.8–54 (1)	CW	40 CW	23.0	62.6
30–512 (1)	CW	35 CW	17.3	32.0
230	CW	35 CW	24.8	75.8

Load Mismatch/Ruggedness

Frequency (MHz)	Signal Type	VSWR	P_{in} (dBm)	Test Voltage	Result
230	CW	> 65:1 at all Phase Angles	23.5 (3 dB Overdrive)	65	No Device Degradation

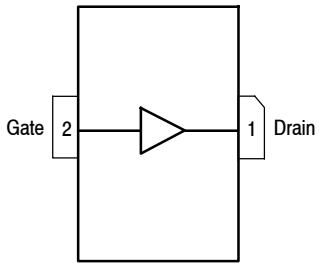
1. The values shown are the minimum measured performance numbers across the indicated frequency range.

MRFX035H

PREPRODUCTION

1.8–512 MHz, 35 W CW, 65 V WIDEBAND RF POWER LDMOS TRANSISTOR

NI-360H-2SB



(Top View)

Note: The backside of the package is the source terminal for the transistor.

Figure 1. Pin Connections

Features

- Unmatched input and output allowing wide frequency range utilization
- 50 ohm native output impedance
- Device can be used single-ended or in a push-pull configuration
- Qualified up to a maximum of 65 V_{DD} operation
- Characterized from 30 to 65 V for extended power range
- High breakdown voltage for enhanced reliability
- Suitable for linear application with appropriate biasing
- Integrated ESD protection with greater negative gate-source voltage range for improved Class C operation
- Included in NXP product longevity program with assured supply for a minimum of 15 years after launch

Typical Applications

- Industrial, scientific, medical (ISM)
  - Laser generation
  - Plasma generation
  - Particle accelerators
  - MRI, RF ablation and skin treatment
  - Industrial heating, welding and drying systems
- Radio and VHF TV broadcast
- Aerospace
  - HF communications
  - Radar
- Mobile radio
  - HF and VHF communications
  - PMR base stations

This document contains information on a preproduction product. Specifications and information herein are subject to change without notice.

Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	–0.5, +179	Vdc
Gate-Source Voltage	V_{GS}	–6.0, +10	Vdc
Storage Temperature Range	T_{stg}	–65 to +150	°C
Case Operating Temperature Range	T_C	–40 to +150	°C
Operating Junction Temperature Range (1,2)	T_J	–40 to +225	°C
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	154 0.769	W W/°C

Table 2. Thermal Characteristics

Characteristic	Symbol	Value (2,3)	Unit
Thermal Resistance, Junction to Case CW: Case Temperature 74.2°C, 35 W CW, 65 Vdc, I_{DQ} = 15 mA, 230 MHz	$R_{\theta JC}$	1.3	°C/W

Table 3. ESD Protection Characteristics

Test Methodology	Class
Human Body Model (per JS-001-2017)	2, passes 2500 V
Charge Device Model (per JS-002-2014)	C3, passes 1200 V

Table 4. Electrical Characteristics (T_A = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Off Characteristics					
Gate-Source Leakage Current (V_{GS} = 5 Vdc, V_{DS} = 0 Vdc)	I_{GSS}	—	—	400	nAdc
Drain-Source Breakdown Voltage (V_{GS} = 0 Vdc, I_D = 250 μAdc)	$V_{(BR)DSS}$	179	193	—	Vdc
Zero Gate Voltage Drain Leakage Current (V_{DS} = 65 Vdc, V_{GS} = 0 Vdc)	I_{DSS}	—	—	10	μAdc
Zero Gate Voltage Drain Leakage Current (V_{DS} = 179 Vdc, V_{GS} = 0 Vdc)	I_{DSS}	—	—	300	μAdc
On Characteristics					
Gate Threshold Voltage (V_{DS} = 10 Vdc, I_D = 640 μAdc)	$V_{GS(th)}$	1.7	2.75	3.0	Vdc
Gate Quiescent Voltage (V_{DD} = 65 Vdc, I_D = 15 mAdc, Measured in Functional Test)	$V_{GS(Q)}$	2.5	3.0	3.5	Vdc
Drain-Source On-Voltage (V_{GS} = 10 Vdc, I_D = 100 mAdc)	$V_{DS(on)}$	—	0.17	—	Vdc
Dynamic Characteristics					
Reverse Transfer Capacitance (V_{DS} = 65 Vdc ± 30 mV(rms)ac @ 1 MHz, V_{GS} = 0 Vdc)	C_{rss}	—	0.13	—	pF
Output Capacitance (V_{DS} = 65 Vdc ± 30 mV(rms)ac @ 1 MHz, V_{GS} = 0 Vdc)	C_{oss}	—	13.7	—	pF
Input Capacitance (V_{DS} = 65 Vdc, V_{GS} = 0 Vdc ± 30 mV(rms)ac @ 1 MHz)	C_{iss}	—	42.8	—	pF

1. Continuous use at maximum temperature will affect MTTF.
2. MTTF calculator available at http://www.nxp.com/RF/calculators. (Calculator available when part is in production.)
3. Refer to AN1955, *Thermal Measurement Methodology of RF Power Amplifiers.* Go to http://www.nxp.com/RF and search for AN1955.

(continued)

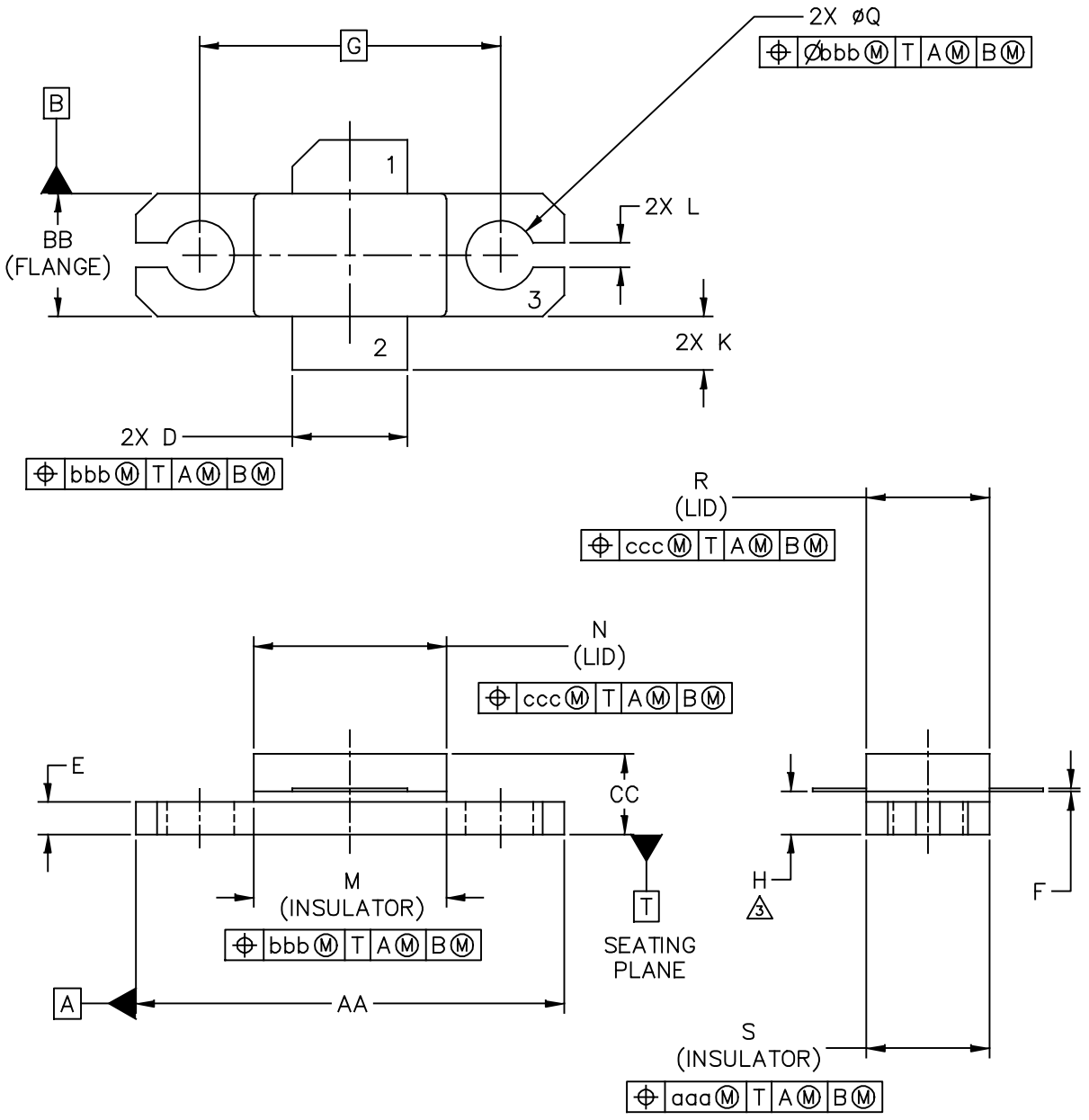
Table 4. Electrical Characteristics (T_A = 25°C unless otherwise noted) **(continued)**

Characteristic	Symbol	Min	Typ	Max	Unit
Functional Tests (In NXP Production Test Fixture, 50 ohm system) V_{DD} = 65 Vdc, I_{DQ} = 15 mA, P_{out} = 35 W CW, f = 230 MHz					
Power Gain	G_{ps}	23.5	24.8	26.5	dB
Drain Efficiency	η_D	72.0	75.8	—	%
Input Return Loss	IRL	—	–16	–11	dB

Load Mismatch/Ruggedness (In NXP Production Test Fixture, 50 ohm system) I_{DQ} = 15 mA

Frequency (MHz)	Signal Type	VSWR	P_{in} (dBm)	Test Voltage, V_{DD}	Result
230	CW	> 65:1 at all Phase Angles	23.5 (3 dB Overdrive)	65	No Device Degradation

PACKAGE DIMENSIONS



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	STANDARD: NON−JEDEC	
	SOT1791−1	17 FEB 2016

NOTES:

1. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M–1994.
2. CONTROLLING DIMENSION: INCH
3. DIMENSION H IS MEASURED .030 INCH (0.762 MM) AWAY FROM THE FLANGE TO CLEAR THE EPOXY FLOW OUT REGION PARALLEL TO DATUM B.

DIM	INCH MIN	INCH MAX	MILLIMETER MIN	MILLIMETER MAX	DIM	INCH MIN	INCH MAX	MILLIMETER MIN	MILLIMETER MAX
AA	.795	.805	20.19	20.45	N	.357	.363	9.07	9.22
BB	.225	.235	5.72	5.97	Q	.125	.135	3.18	3.43
CC	.125	.175	3.18	4.45	R	.227	.233	5.77	5.92
D	.210	.220	5.33	5.59	S	.225	.235	5.72	5.97
E	.055	.065	1.40	1.65					
F	.004	.006	0.10	0.15	aaa	.005		0.13	
G	.562 BSC		14.28 BSC		bbb	.010		0.25	
H	.077	.087	1.96	2.21	ccc	.015		0.38	
K	.085	.115	2.16	2.92					
L	.040	.050	1.02	1.27					
M	.355	.365	9.02	9.27					

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