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## QUAD P-CHANNEL MOSFET

### Qualified per MIL-PRF-19500/599

*Qualified Levels:  
JAN, JANTX, and  
JANTXV*

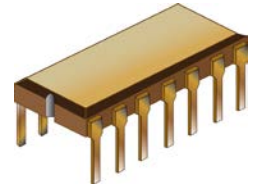
#### DESCRIPTION

This 2N7335 device is military qualified up to a JANTXV level for high-reliability applications. Microsemi also offers numerous other products to meet higher and lower power voltage regulation applications.

**Important:** For the latest information, visit our website <http://www.microsemi.com>.

#### FEATURES

- JEDEC registered 2N7335.
- JAN, JANTX, and JANTXV qualifications are available per MIL-PRF-19500/599.
- RoHS compliant version available (commercial grade only).



**MO-036AB  
Package**

#### APPLICATIONS / BENEFITS

- High Frequency Operation.
- Lightweight.
- ESD to class 1A.

#### MAXIMUM RATINGS @ T<sub>A</sub> = +25 °C unless otherwise noted.

Parameters / Test Conditions	Symbol	Value	Unit
Operating & Storage Temperature	T <sub>op</sub> , T <sub>stg</sub>	-55 to +150	°C
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	90 50	°C/W
Thermal Resistance, Junction to Case	R <sub>θJC</sub>	17	°C/W
Gate – Source Voltage	V <sub>GS</sub>	± 20	V
Continuous Drain Current @ T <sub>C</sub> = +25 °C	I <sub>D1</sub>	-0.75	A
Continuous Drain Current @ T <sub>C</sub> = +100 °C	I <sub>D2</sub>	-0.50	A
Max. Power Dissipation @ T <sub>C</sub> = +25°C (free air) <sup>(1)</sup>	P <sub>D1</sub>	1.4	W
Maximum Drain to Source On State Resistance <sup>(1, 2)</sup>	MAX R <sub>ds(on)</sub>	1.4 2.5	Ω
		@ T <sub>J</sub> = +25 °C @ T <sub>J</sub> = +150 °C	
Collector Efficiency	I <sub>S</sub>	-0.75	A
Single Pulse Avalanche Energy Capability	E <sub>AS</sub>	75	mJ
Repetitive Avalanche Energy Capability	E <sub>AR</sub>	.14	mJ
Rated Avalanche Current (repetitive and nonrepetitive)	I <sub>AR</sub>	-0.75	A
Off-State Current	I <sub>DM</sub>	-3.0	A (pk)

**Notes:** 1. Derated Linearly by 11 mW/°C for T<sub>C</sub> > +25 °C.  
2. V<sub>GS</sub> = -10 V, I<sub>D</sub> = -0.5 A.

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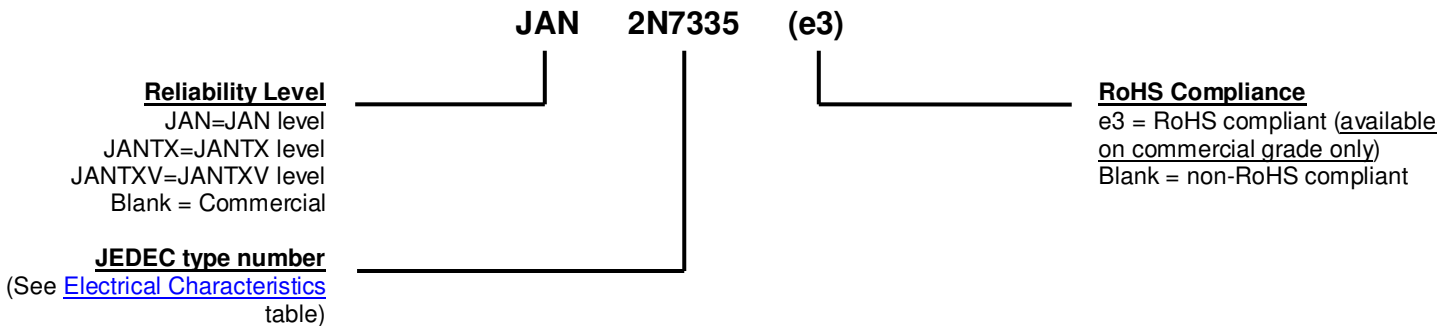
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**MECHANICAL and PACKAGING**

- CASE: Ceramic, lid: alloy 42, Au over Ni plating.
- TERMINALS: Alloy 42, Au over Ni plating, solder dipped.
- MARKING: Manufacturer's ID, part number, date code.
- POLARITY: See package outline.
- WEIGHT: Approx. 1.3 grams.
- See [Package Dimensions](#) on last page.

**PART NOMENCLATURE**

**SYMBOLS & DEFINITIONS**

Symbol	Definition
$I_D$	Drain current.
$I_F$	Forward current.
$T_C$	Case temperature.
$V_{DD}$	Drain supply voltage.
$V_{DS}$	Drain to source voltage.
$V_{GS}$	Gate to source voltage.



**ELECTRICAL CHARACTERISTICS @  $T_A = +25^\circ\text{C}$ , unless otherwise noted**

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
<b>OFF CHARACTERISTICS</b>				
Drain-Source Breakdown Voltage $V_{GS} = 0\text{ V}, I_D = -1\text{ mA}$	$V_{(BR)DSS}$	-100		V
Gate-Source Voltage (Threshold) $V_{DS} \geq V_{GS}, I_D = -0.25\text{ mA}$ $V_{DS} \geq V_{GS}, I_D = -0.25\text{ mA}, T_j = +125^\circ\text{C}$ $V_{DS} \geq V_{GS}, I_D = -0.25\text{ mA}, T_j = -55^\circ\text{C}$	$V_{GS(th)1}$ $V_{GS(th)2}$ $V_{GS(th)3}$	-2.0 -1.0	-4.0 -5.0	V
Gate Current $V_{GS} = \pm 20\text{ V}, V_{DS} = 0\text{ V}$ $V_{GS} = \pm 20\text{ V}, V_{DS} = 0\text{ V}, T_j = +125^\circ\text{C}$	$I_{GSS1}$ $I_{GSS2}$		$\pm 100$ $\pm 200$	nA
Drain Current $V_{GS} = 0\text{ V}, V_{DS} = 80\% \text{ of rated } V_{DS}$ $V_{GS} = 0\text{ V}, V_{DS} = 80\% \text{ of rated } V_{DS}, T_j = +125^\circ\text{C}$	$I_{DSS1}$ $I_{DSS2}$		-25 -0.25	$\mu\text{A}$ mA
Static Drain-Source On-State Resistance $V_{GS} = -10\text{ V}$ , cond. A pulsed per MIL-STD-750, sect. 4, $I_D = -0.50\text{ A}$ $T_j = +125^\circ\text{C}$ $V_{GS} = -10\text{ V}$ , pulsed per MIL-STD-750, section 4, $I_D = -0.50\text{ A}$	$r_{DS(on)1}$ $r_{DS(on)2}$		1.4 2.3	$\Omega$ $\Omega$
Diode Forward Voltage $V_{GS} = 0\text{ V}, I_D = -0.75\text{ A}$ , pulsed per MIL-STD-750, section 4	$V_{SD}$		5.5	V

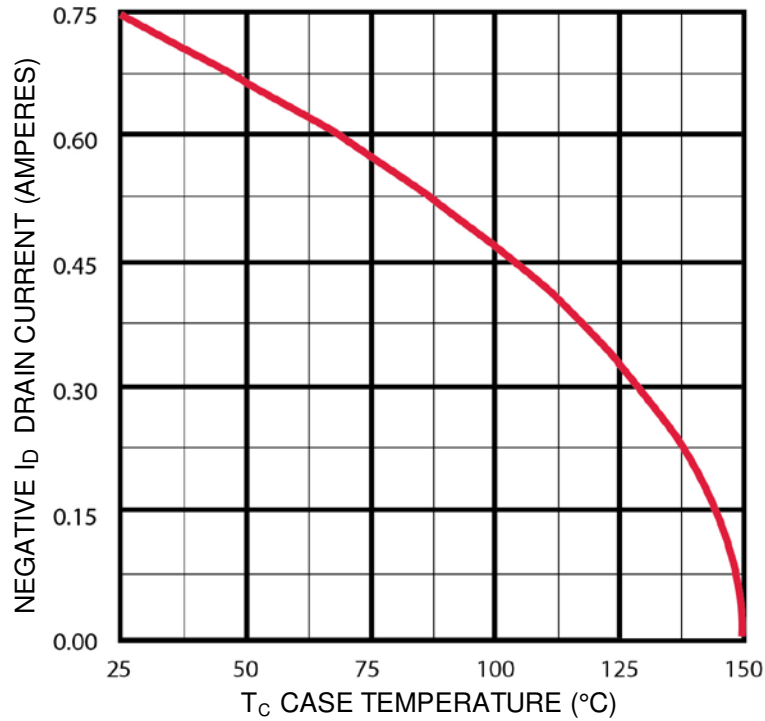
**DYNAMIC CHARACTERISTICS**

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Gate Charge: Condition B	$Q_{g(on)}$		15	nC
On-State Gate Charge	$Q_{gs}$		7.0	nC
Gate to Source Charge	$Q_{gd}$		8.0	nC
Gate to Drain Charge				

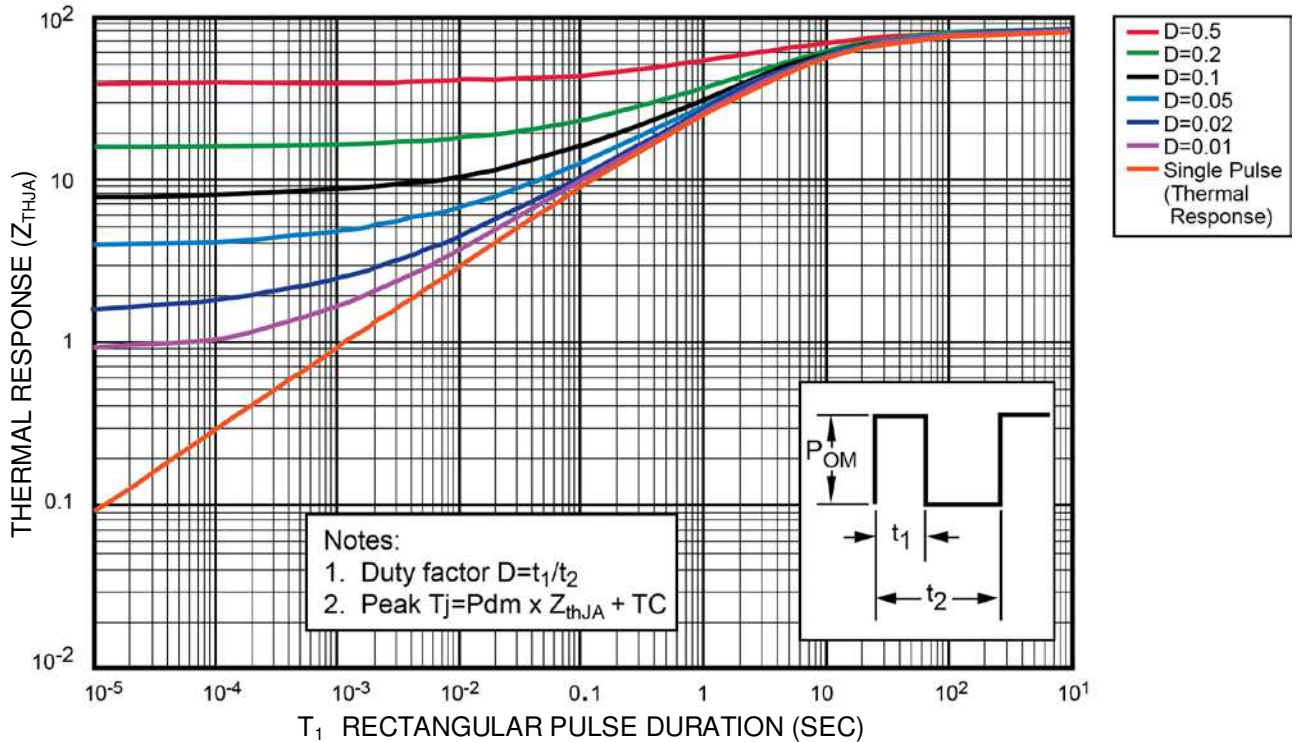
**SWITCHING CHARACTERISTICS**

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Switching time tests:				
Turn-on delay time $I_D = -0.75\text{ A}, V_{GS} = -10\text{ V}$	$t_{d(on)}$		30	ns
Rinse time Gate drive impedance = 7.5 $\Omega$	$t_r$		60	ns
Turn-off delay time $V_{DD} = -50\text{ V}$	$t_{d(off)}$		70	ns
Fall time	$t_f$		80	ns
Diode Reverse Recovery Time $di/dt \leq -100\text{ A}/\mu\text{s}, V_{DD} \leq -30\text{ V}, I_D = -0.75\text{ A}$	$t_{rr}$		200	ns

GRAPHS

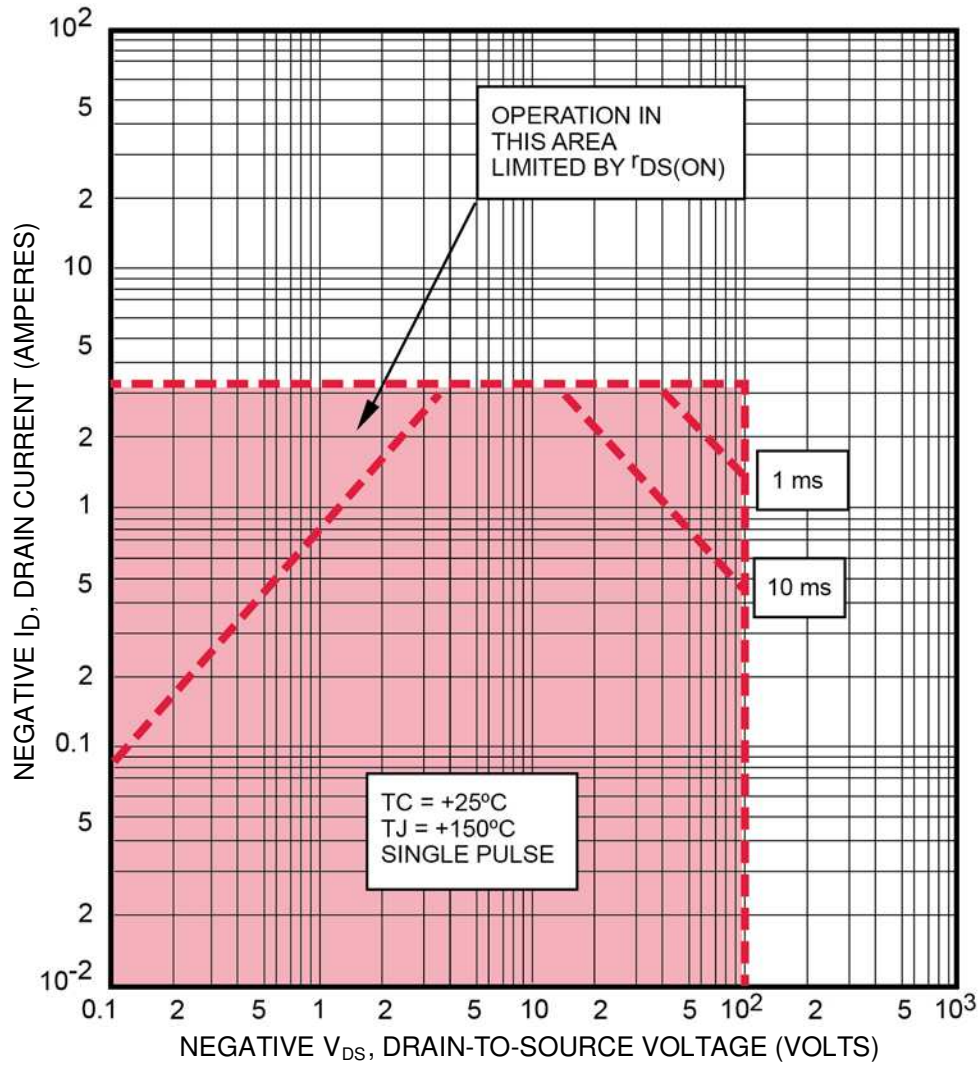


**FIGURE 1 – Maximum Drain Current vs. Case Temperature Graph**



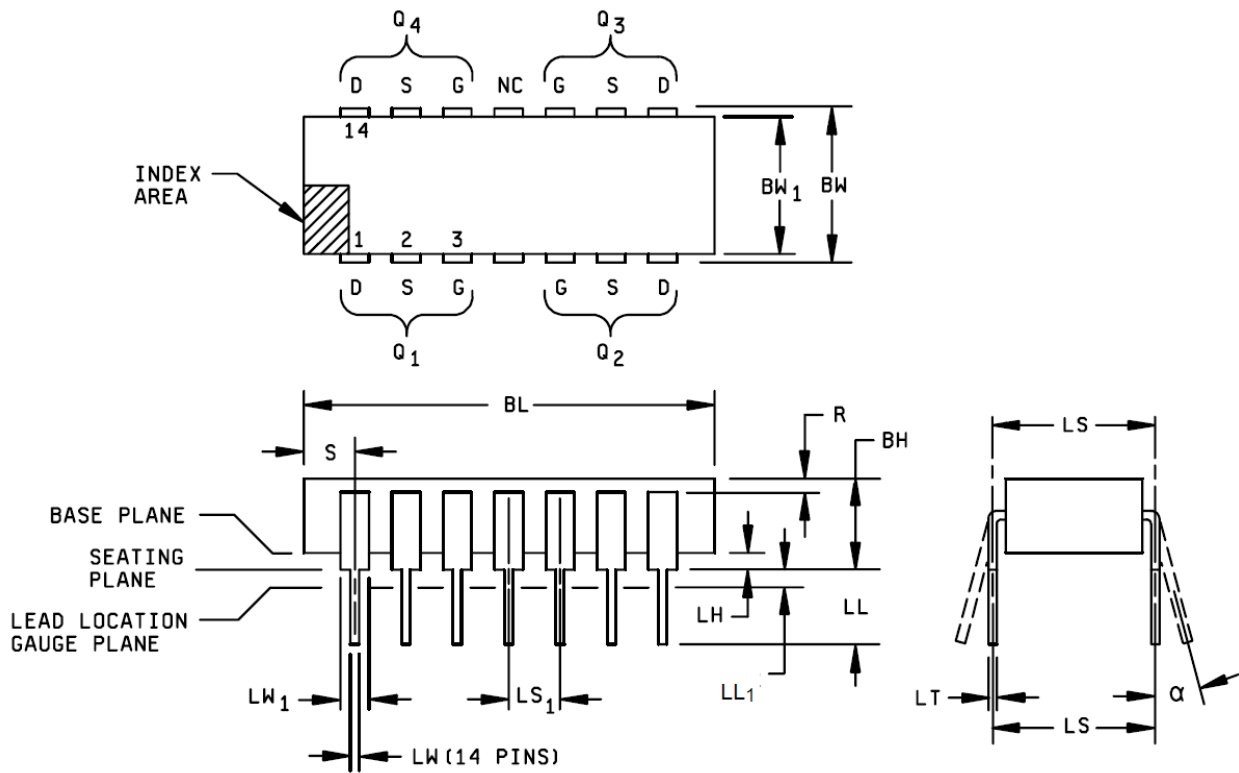
**FIGURE 2 – Normalized Transient Thermal Impedance**

GRAPHS (continued)



**FIGURE 3 – Maximum Safe Operating Area**

PACKAGE DIMENSIONS



Symbol	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
BH	.105	.175	2.67	4.45	11
BL	.690	.770	17.53	19.56	
BW	.290	.325	7.37	8.26	
BW <sub>1</sub>	.280	.310	7.11	7.87	10
LH	.025	.055	0.64	1.40	11
LT	.008	.012	0.203	0.305	
LW	.015	.021	0.381	0.533	
LW <sub>1</sub>	.038	.060	0.97	1.52	

Symbol	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
LS	.300 TP		7.62 TP		5, 6
LS <sub>1</sub>	.100 TP		2.54 TP		5, 6
LL	.125	.175	3.18	4.45	11
LL <sub>1</sub>	.000	.030	0.00	0.76	
α	0°	15°	0°	15°	7
R	.010		0.25		
S	.030	.095	0.76	2.41	
N	14		14		8

NOTES:

- Dimensions are in inches.
- Millimeters are given for general information only.
- Refer to applicable symbol list.
- Dimensioning and tolerancing in accordance with ASME Y14.5.
- Leads within +/- .005 inch (0.13 mm) radius of True Position (TP) at gauge plane with maximum material condition and unit installed.
- LS<sub>1</sub> and LS applies in zone LL<sub>1</sub> when unit installed.
- α applies to spread leads prior to installation.
- N is the number of terminal positions.
- Outlines on which the seating plane is coincident with the base plane (A<sub>1</sub> = 0), terminals lead standoffs are not required, and LW<sub>1</sub> may equal LW along any part of the lead above the seating/base plane.
- BW<sub>1</sub> does not include particles of package materials.
- This dimension shall be measured with the device seated in the seating plane gauge JEDEC Outline No. GS-3.