

## UT9435G-TN3-R-VB Datasheet P-Channel 30-V (D-S) MOSFET

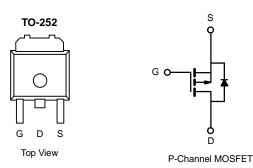
PRODUCT SUMMARY						
V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (Ω) I <sub>D</sub> (A)		Q <sub>g</sub> (Typ.)			
- 30	0.033 at V <sub>GS</sub> = - 10 V	- 38	19 nC			
- 30	0.046 at $V_{GS}$ = - 4.5 V	- 25	13110			

#### **FEATURES**

- Halogen-free
- Trench Power MOSFET
- 100 % R<sub>g</sub> Tested
- 100 % UIS Tested

#### **APPLICATIONS**

- Load Switch
- Notebook Adaptor Switch



Parameter	Symbol	Limit	Unit		
Drain-Source Voltage	V <sub>DS</sub>	- 30	V		
Gate-Source Voltage	V <sub>GS</sub>	± 20	V		
	T <sub>C</sub> = 25 °C		- 38		
Continuous Drain Current (T <sub>1</sub> = 150 °C)	T <sub>C</sub> = 70 °C		- 25		
Continuous Drain Current (1j = 100 °C)	T <sub>A</sub> = 25 °C	I <sub>D</sub>	- 14.9 <sup>a, b</sup>		
	T <sub>A</sub> = 70 °C		- 13.6 <sup>a, b</sup>	Α	
Pulsed Drain Current	I <sub>DM</sub>	- 112	A		
Continuous Source-Drain Diode Current	T <sub>C</sub> = 25 °C		- 4.1		
Continuous Source-Drain Diode Current	T <sub>A</sub> = 25 °C	Is	- 2.2 <sup>a, b</sup>		
Avalanche Current	L = 0.1 mH	I <sub>AS</sub>	- 20		
Single-Pulse Avalanche Energy	L = 0.1 IIIH	E <sub>AS</sub>	20	mJ	
	T <sub>C</sub> = 25 °C		25		
Maximum Dawar Dissinction	T <sub>C</sub> = 70 °C	P <sub>D</sub>	20	W	
Maximum Power Dissipation	T <sub>A</sub> = 25 °C	'D	2.7 <sup>a, b</sup>	VV	
	T <sub>A</sub> = 70 °C		1.7 <sup>a, b</sup>		
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	- 55 to 150	°C		

THERMAL RESISTANCE RATINGS							
Parameter		Symbol	Typical	Maximum	Unit		
Maximum Junction-to-Ambient <sup>a, c</sup>	t ≤ 10 s	R <sub>thJA</sub>	38	46	°C/W		
Maximum Junction-to-Foot	Steady State	R <sub>thJF</sub>	20	25	C/W		

Notes:

b. t = 10 s.

c. Maximum under Steady State conditions is 85  $^{\circ}\text{C/W}.$ 

d. Based on T<sub>C</sub> = 25 °C.

a. Surface mounted on 1" x 1" FR4 board.

<b>SPECIFICATIONS</b> T <sub>J</sub> = 25 °C, unless otherwise noted							
Parameter	Symbol	Test Conditions	Min.	Тур.	Max.	Unit	
Static							
Drain-Source Breakdown Voltage	V <sub>DS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = - 250 μA	- 30			V	
V <sub>DS</sub> Temperature Coefficient	$\Delta V_{DS}/T_{J}$	I <sub>D</sub> = - 250 μA		- 34		mV/ °C	
V <sub>GS(th)</sub> Temperature Coefficient	$\Delta V_{GS(th)}/T_J$	i <sub>D</sub> = - 250 μA		5.3			
Gate-Source Threshold Voltage	V <sub>GS(th)</sub>	$V_{DS} = V_{GS}, I_{D} = -250 \ \mu A$	- 1.0		- 2.5	V	
Gate-Source Leakage	I <sub>GSS</sub>	$V_{DS} = 0 V, V_{GS} = \pm 25 V$			± 100	nA	
Zana Osta Mallana Dasia Osmaal	I <sub>DSS</sub>	$V_{DS} = -30 \text{ V}, V_{GS} = 0 \text{ V}$ $V_{DS} = -30 \text{ V}, V_{GS} = 0 \text{ V}, T_J = 55 \text{ °C}$			- 1	μA	
Zero Gate Voltage Drain Current					- 5		
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	$V_{DS} \ge -10 \text{ V}, \text{ V}_{GS} = -10 \text{ V}$	- 30			Α	
	_	V <sub>GS</sub> = - 10 V, I <sub>D</sub> = - 10 A		0.033		Ω	
Drain-Source On-State Resistance <sup>a</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = - 4.5 V, I <sub>D</sub> = - 8 A		0.046			
Forward Transconductance <sup>a</sup>	9 <sub>fs</sub>	V <sub>DS</sub> = - 10 V, I <sub>D</sub> = - 10 A		28		S	
Dynamic <sup>b</sup>							
Input Capacitance	C <sub>iss</sub>			1350		pF	
Output Capacitance	C <sub>oss</sub>	V <sub>DS</sub> = - 15 V, V <sub>GS</sub> = 0 V, f = 1 MHz		255			
Reverse Transfer Capacitance	C <sub>rss</sub>			190			
Total Gate Charge		V <sub>DS</sub> = - 15 V, V <sub>GS</sub> = - 10 V, I <sub>D</sub> = - 10 A		27	43	nC	
	$Q_g$			19	25		
Gate-Source Charge	Q <sub>qs</sub>	V <sub>DS</sub> = - 15 V, V <sub>GS</sub> = - 4.5 V, I <sub>D</sub> = - 10 A		6			
Gate-Drain Charge	Q <sub>gd</sub>			12			
Gate Resistance	R <sub>q</sub>	f = 1 MHz	0.5	2.2	4.4	Ω	
Turn-On Delay Time	t <sub>d(on)</sub>			13	25	-	
Rise Time	t <sub>r</sub>	$V_{DD}$ = - 15 V, R <sub>L</sub> = 1.5 $\Omega$		12	24		
Turn-Off DelayTime	t <sub>d(off)</sub>	$I_D \cong$ - 10 A, $V_{GEN}$ = - 10 V, $R_q$ = 1 $\Omega$		40	70		
Fall Time	t <sub>f</sub>	, , , , , , , , , , , , , , , , , , ,		9	18		
Turn-On Delay Time	t <sub>d(on)</sub>			48	80	ns	
Rise Time	t <sub>r</sub>	$V_{DD}$ = - 15 V, R <sub>L</sub> = 1.5 $\Omega$		92	160		
Turn-Off DelayTime	t <sub>d(off)</sub>	$I_D \cong$ - 10 A, $V_{GEN}$ = - 4.5 V, $R_q$ = 1 $\Omega$		34	60		
Fall Time	t <sub>f</sub>			19	35		
Drain-Source Body Diode Characteris	stics					1	
Continous Source-Drain Diode Current	۱ <sub>s</sub>	T <sub>C</sub> = 25 °C			- 4.1		
Pulse Diode Forward Current	I <sub>SM</sub>	-			- 40	A	
Body Diode Voltage	V <sub>SD</sub>	I <sub>S</sub> = - 3 A, V <sub>GS</sub> = 0 V		- 0.75	- 1.2	V	
Body Diode Reverse Recovery Time	t <sub>rr</sub>			27	45	ns	
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>	I <sub>F</sub> = - 10 A, dl/dt = 100 A/μs, T <sub>J</sub> = 25 °C		16	27	nC	
Reverse Recovery Fall Time	t <sub>a</sub>			12			
Reverse Recovery Rise Time	t <sub>b</sub>			15		ns	

Notes:

a. Pulse test; pulse width  $\leq$  300  $\mu s,$  duty cycle  $\leq$  2 %.

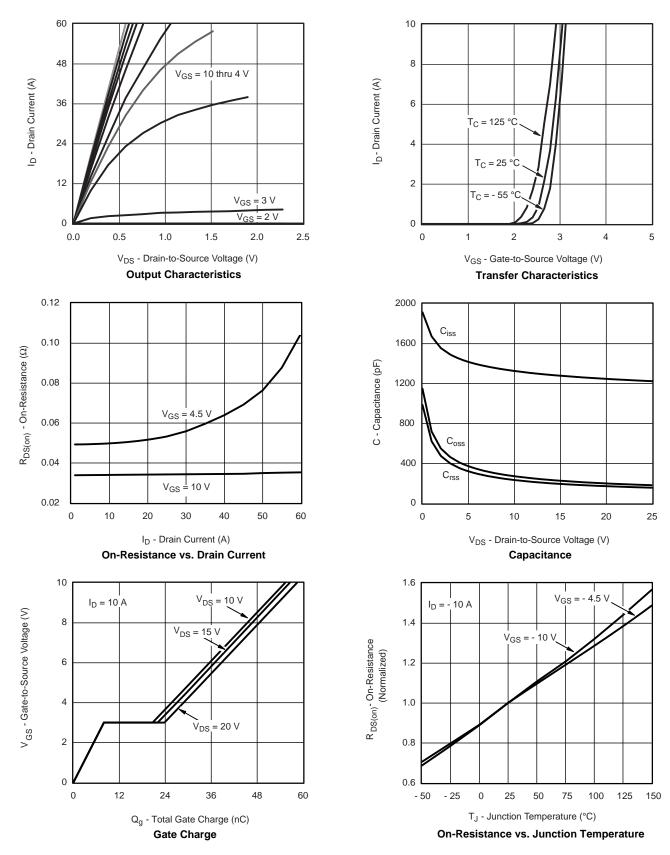
b. Guaranteed by design, not subject to production testing.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

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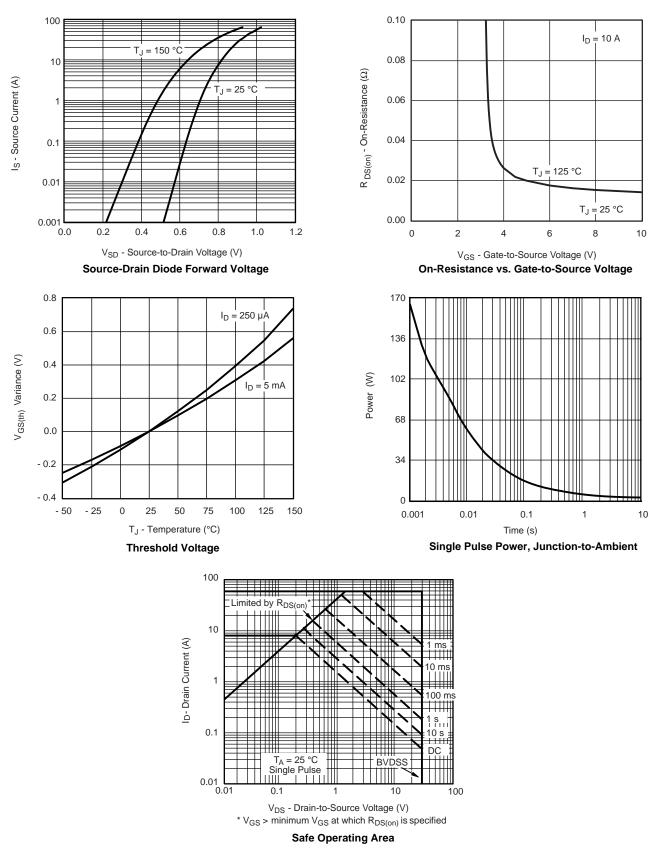


#### TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



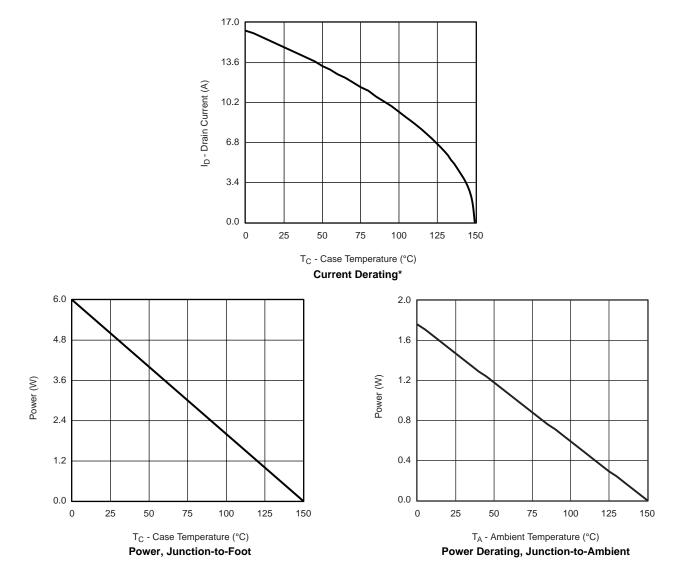


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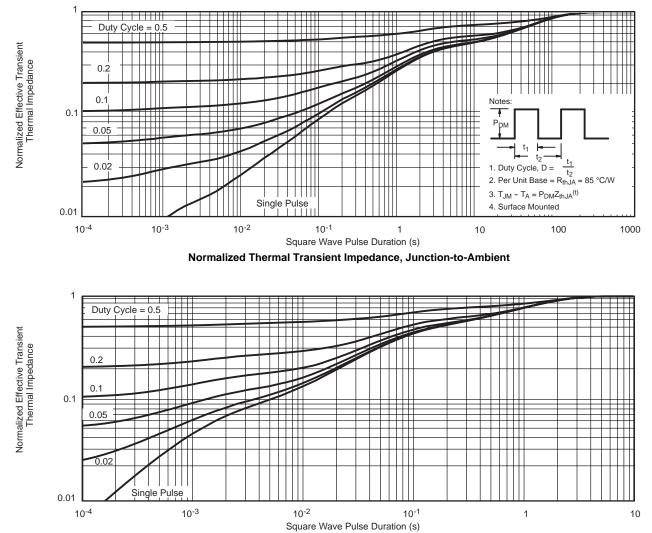


### MOSFET TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



\* The power dissipation  $P_D$  is based on  $T_{J(max)}$  = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

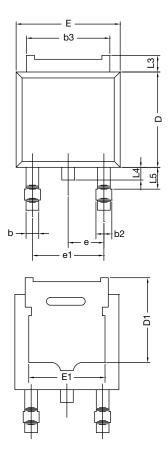
#### TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Normalized Thermal Transient Impedance, Junction-to-Foot



## **TO-252AA CASE OUTLINE**





	MILLIN	<b>METERS</b>	INC	HES	
DIM.	MIN.	MAX.	MIN.	MAX.	
А	2.18	2.38	0.086	0.094	
A1	-	0.127	-	0.005	
b	0.64	0.88	0.025	0.035	
b2	0.76	1.14	0.030	0.045	
b3	4.95	5.46	0.195	0.215	
С	0.46	0.61	0.018	0.024	
C2	0.46	0.89	0.018	0.035	
D	5.97	6.22	0.235	0.245	
D1	5.21	-	0.205	-	
E	6.35	6.73	0.250	0.265	
E1	4.32	-	0.170	-	
Н	9.40	10.41	0.370	0.410	
е	2.28	BSC	0.090 BSC		
e1	4.56 BSC		0.180 BSC		
L	1.40	1.78	0.055	0.070	
L3	0.89	1.27	0.035	0.050	
L4	-	1.02	-	0.040	
L5	1.14	1.52	0.045	0.060	
ECN: X12-0247-Rev. M, 24-Dec-12 DWG: 5347					

#### Note

• Dimension L3 is for reference only.



#### **RECOMMENDED MINIMUM PADS FOR DPAK (TO-252)**



Recommended Minimum Pads Dimensions in Inches/(mm)



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