



VMDSEMI

VUTL004R170PA

Datasheet

General Description

VUTL004R170PA MOSFET is based on unique device design to achieve low $R_{DS(ON)}$, low gate charge, fast switching and excellent avalanche characteristics.

Symbol

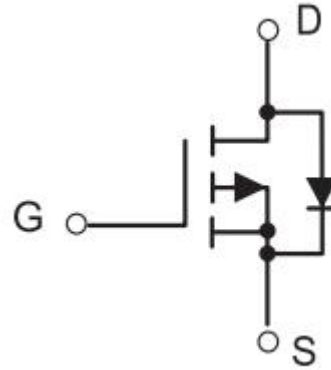


Figure 1 Symbol of VUTL004R170PA

Features

- High density cell design for ultra low $R_{DS(ON)}$
- $R_{DS(ON)_{max}} = 17.0m\Omega @ V_{GS} = -10V$
- Excellent package for good heat dissipation

Application

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible Power Supply

Package Type



TO-252

Figure 2 Package Type of VUTL004R170PA

Ordering Information

Product Name	Package
VUTL004R170PA	TO-252

Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DSS}	-40	V
Gate-Source Voltage	V_{GSS}	± 20	V
Continuous Drain Current	I_D	-40	A
Pulsed Drain Current	I_{DM}	-160	A
Single Pulsed Avalanche Energy ⁽¹⁾	E_{AS}	544	mJ
Max Power Dissipation	P_D	1.25	W
Junction Temperature	T_J	150	°C
Storage Temperature	T_{STG}	-55 to 150	°C

(1). E_{AS} condition: $V_{DD} = -20V$, $L = 1mH$, $R_G = 25\Omega$, Starting $T_J = 25^\circ C$

Thermal Resistance

Parameter	Symbol	Min	Typ	Max	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$		100		°C/W

17mΩ, 40V, P-Channel Power MOSFET
VUTL004R170PA
Electrical Characteristics $T_J = 25\text{ }^{\circ}\text{C}$, unless otherwise specified

Parameter		Symbol	Test Conditions	Min	Typ	Max	Unit
Statistic Characteristics							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V, I _D =-250uA	-40			V
Zero Gate Voltage Drain Current		I _{DSS}	V _{DS} =-40V, V _{GS} =0V			-1	uA
Gate-Body Leakage Current	Forward	I _{GSSF}	V _{GS} = -20V			100	nA
	Reverse	I _{GSSR}	V _{GS} = 20V			-100	
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =-250uA	-1	-2	-3	V
Static Drain-Source On-Resistance		R _{DS(ON)}	V _{GS} = -10V, I _D = -12A		11	17	mΩ
Forward trans conductance		g _{FS}	V _{DS} = -5V, I _D = -12A	24			S
Dynamic Characteristics							
Input Capacitance		C _{ISS}	V _{DS} = -20V V _{GS} =0V f=1MHz		4100		pF
Output Capacitance		C _{OSS}			320		pF
Reverse Transfer Capacitance		C _{RSS}			290		pF
Turn-on Delay Time		t _{d(on)}	V _{DS} = -20V V _{GS} =-10V I _D = -20A R _G =3.0Ω		11		ns
Rise Time		t _r			19		
Turn-off Delay Time		t _{d(off)}			40		
Fall Time		t _f			26		
Gate Charge Characteristics							
Gate to Source Charge		Q _{gs}	V _{DS} = -20V V _{GS} = -10V I _D = -12A		18		nC
Gate to Drain Charge		Q _{gd}			14		
Gate Charge Total		Q _g			83		
Diode Characteristics							
Diode Forward Voltage		V _{SD}	V _{GS} =0V, I _{SD} = -10A			-1.2	V

Note :

1. Pulse Test : Pulse Width $\leq 300\mu s$, duty cycle $\leq 2\%$.
2. Guaranteed by design, not subject to production.

Typical Performance Characteristics

Figure 3: Transfer Characteristics

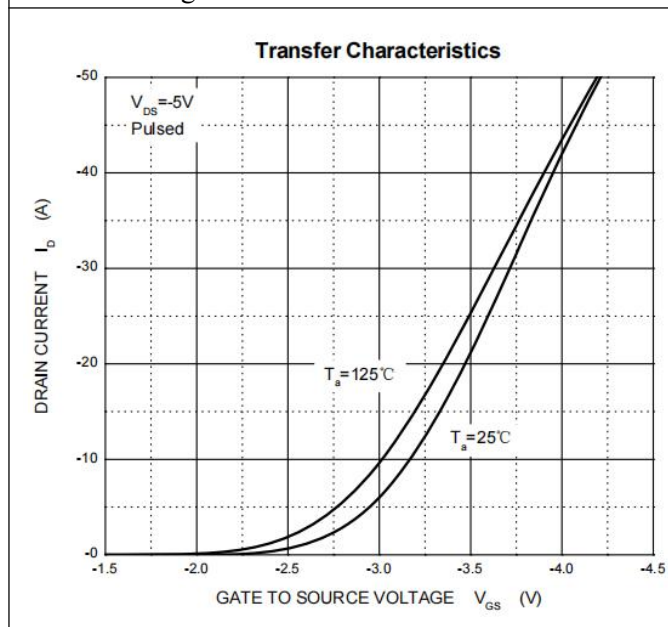


Figure 4: Typ. Output Characteristics

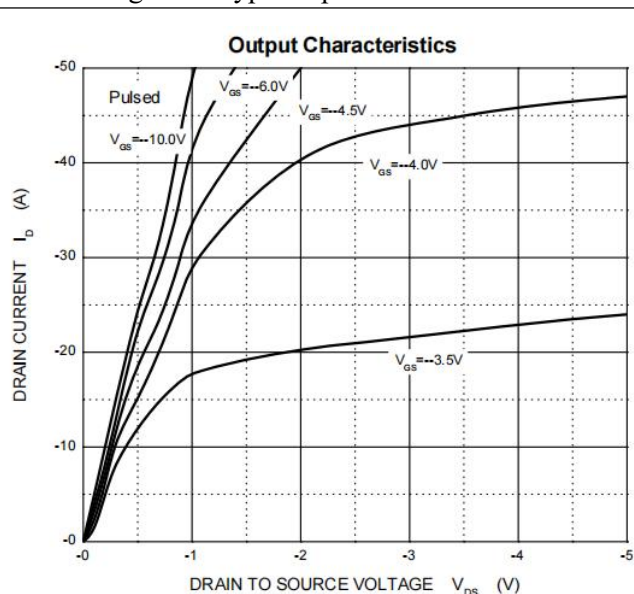


Figure 5: Drain-Source On-State Resistance- I_D

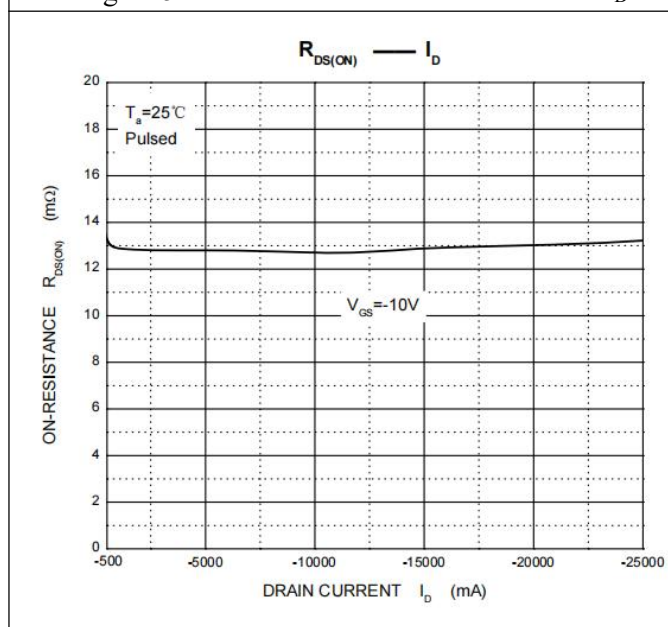


Figure 6: Drain-Source On-State Resistance- V_{GS}

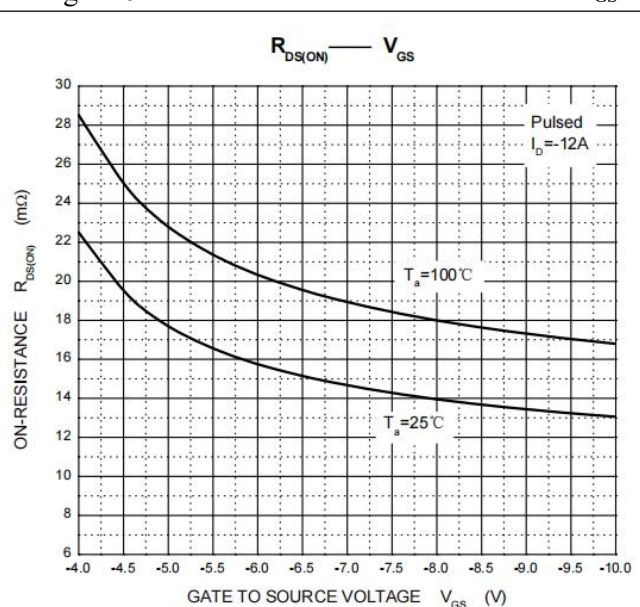
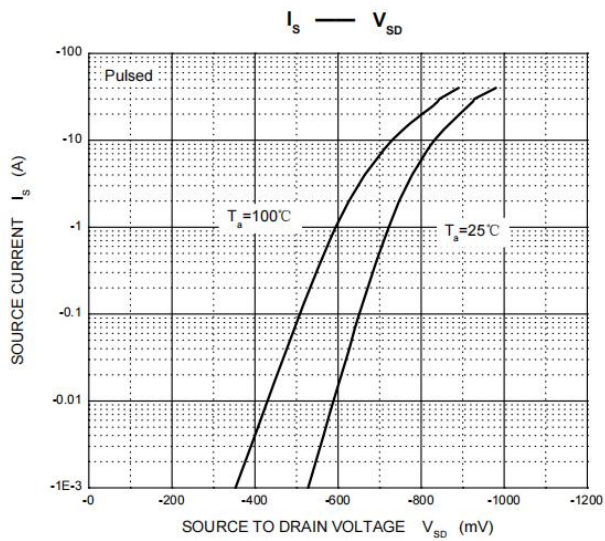
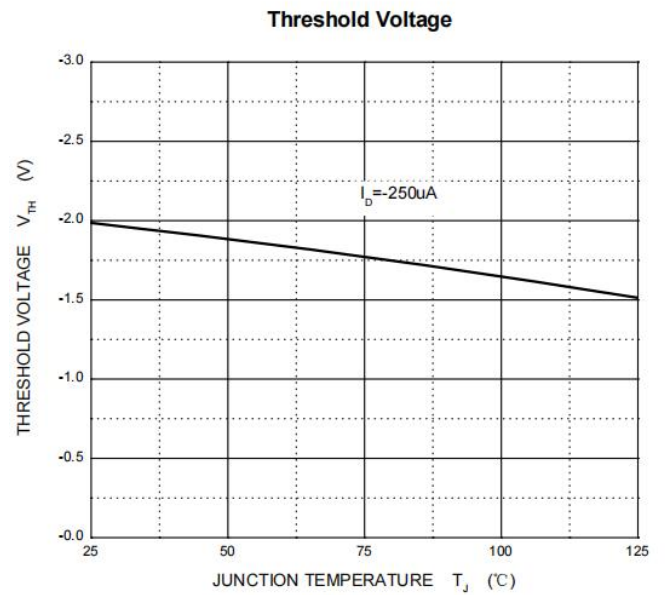
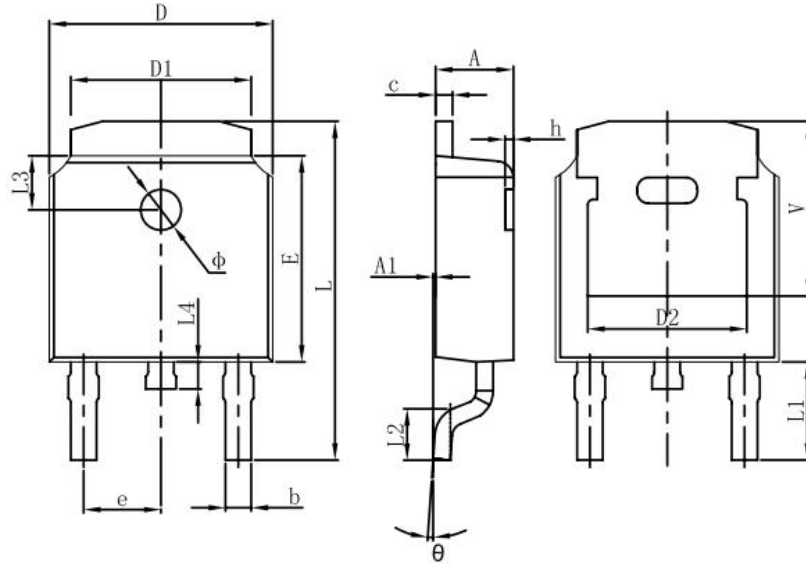


Figure 7: Source Current

Figure 8: Threshold Voltage


Mechanical Dimensions:

TO-252 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.635	0.770	0.025	0.030
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830REF		0.190REF	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.712	10.312	0.382	0.406
L1	2.900REF		0.114REF	
L2	1.400	1.700	0.055	0.067
L3	1.600REF		0.063REF	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.250REF		0.207REF	

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