



VMDSEMI

VUTL004R140PA

Datasheet

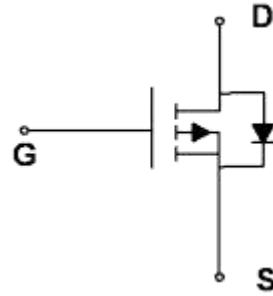


VMDSEMI

General Description

Symbol

$V_{(BR)DSS}$	$R_{DS(ON)_{max}}$	I_D
-40V	14mΩ@-10V	-72A
	18mΩ@-4.5V	



Symbol of VUTL004R140PA

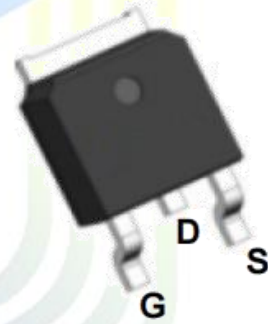
Features

- Excellent package for good heat dissipation
- Advanced Trench technology
- Low Gate Charge

Application

- Power switching application
- DC-DC converters
- Power Management Switches

Package Type



TO-252

Package Type of VUTL004R140PA

Ordering Information

Product Name	Package
VUTL004R140PA	TO-252

Absolute Maximum Ratings($T_A=25\text{ }^\circ\text{C}$, unless otherwise specified)

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	-40	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current ^{Note 1}	$T_C=25^\circ\text{C}$	I_D	-72	A
Pulsed Drain Current ^{Note 2}	$T_C=25^\circ\text{C}$	I_{DM}	-288	A
Max Power Dissipation ^{Note 3}	$T_C=25^\circ\text{C}$	P_D	94	W
Avalanche Energy, Single Pulse ^{Note 4}		E_{AS}	174	mJ
Operation Junction temperature		T_J, T_{SGT}	-55 to 150	$^\circ\text{C}$

Thermal Resistance

Parameter	Symbol	Min	Typ	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	-	1.32	-	$^\circ\text{C/W}$

Notes:

- 1) Calculated continuous current based on maximum allowable junction temperature.
- 2) Repetitive rating; pulse width limited by max. junction temperature.
- 3) P_D is based on max. junction temperature, using junction-case thermal resistance.
- 4) $V_{DS} = -25\text{V}, V_{GS} = -10\text{V}, L = 0.1\text{mH}$, starting $T_J = 25\text{ }^\circ\text{C}$.

Electrical Characteristics ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Statistic Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=-250\mu A$	-40	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-40V, V_{GS}=0V$	-	-	-1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.0	-1.7	-2.5	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-16A$	-	10.9	14	mΩ
		$V_{GS}=-4.5V, I_D=-12A$	-	13.6	18	
Gate Resistance	R_G	f=1MHz, Open Drain	-	6.8	-	Ω
Forward Transconductance	gfs	$V_{DS}=-10V, I_D=-16A$	-	25	-	S
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{GS}=0V$	-	3062	-	pF
Output Capacitance	C_{oss}	$V_{DS}=-20V$	-	216	-	pF
Reverse Transfer Capacitance	C_{rss}	f=1MHz	-	240	-	pF
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-15V$	-	11.2	-	ns
Rise Time	t_r	$V_{GS}=-10V$	-	22.6	-	
Turn-off Delay Time	$t_{d(off)}$	$I_D=-18A$	-	57.5	-	
Fall Time	t_f	$R_G=3\Omega$	-	26.4	-	
Gate Charge Characteristics						
Total Gate Charge	Q_g	$V_{GS}=-10V$	-	65	-	nC
Gate to Source Charge	Q_{gs}	$V_{DS}=-20V$	-	12.7	-	
Gate to Drain Charge	Q_{gd}	$I_D=-18A$	-	12.2	-	
Reverse Diode Characteristics						
Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=-16A$	-	-0.85	-1.2	V

Typical Performance Characteristics

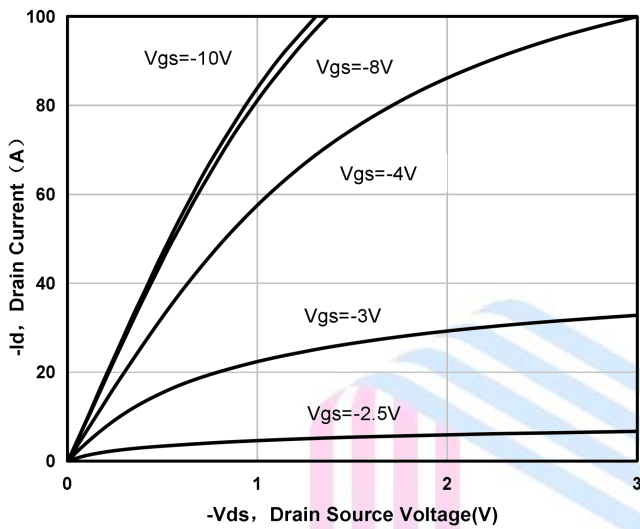
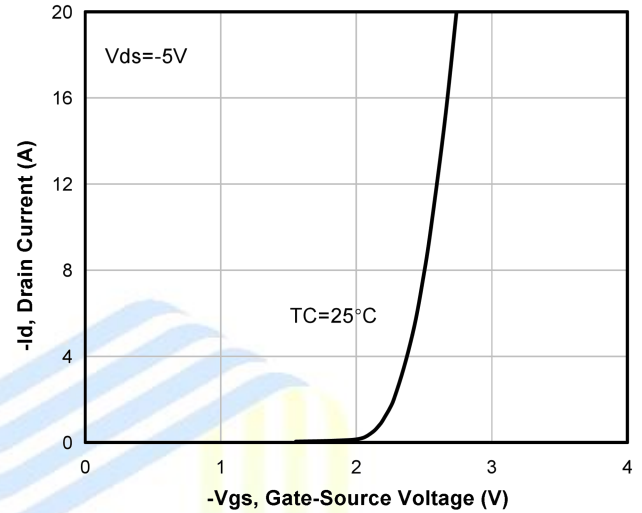
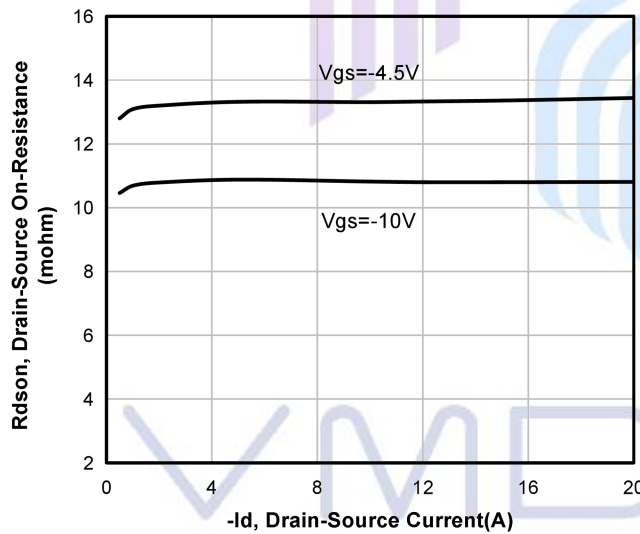
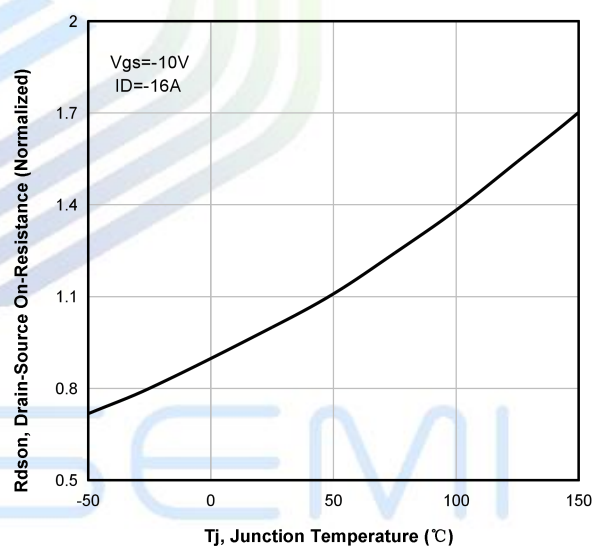
Figure 1: Typ. Output Characteristics

Figure 2: Typ. Transfer Characteristics

Figure 3: Typ. On-Resistance vs. Drain Current

Figure 4: On-Resistance vs. Temperature


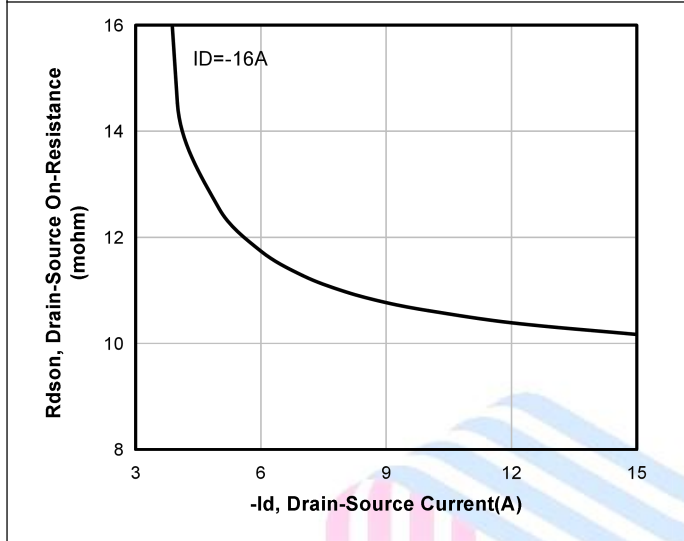
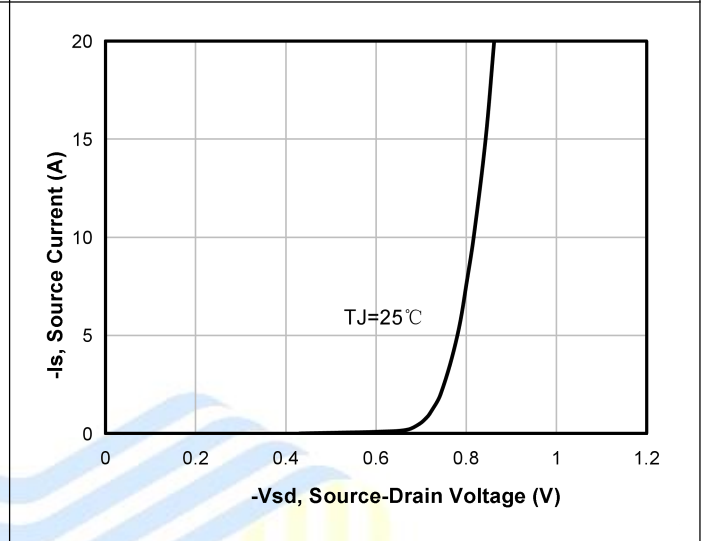
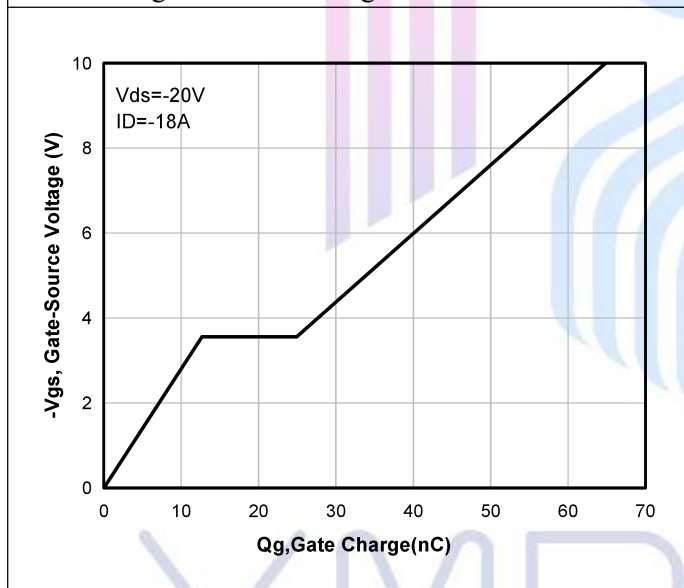
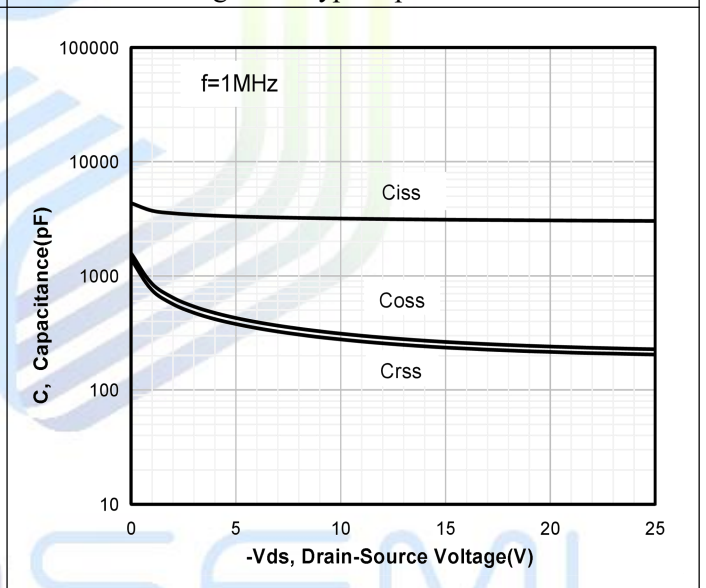
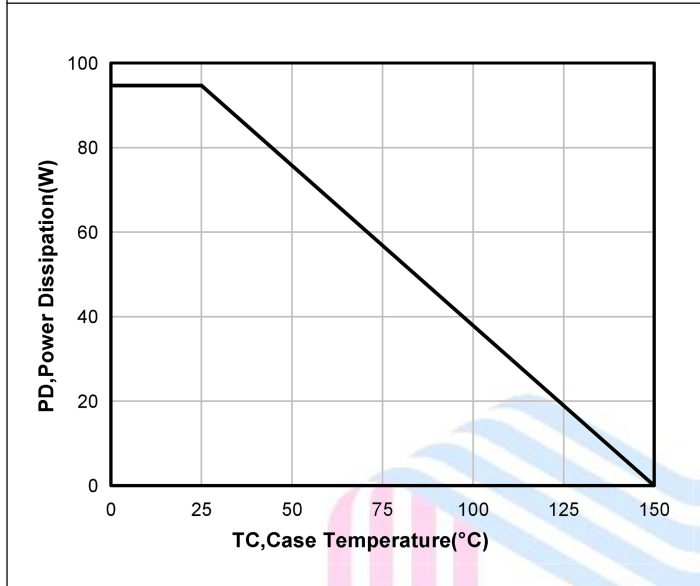
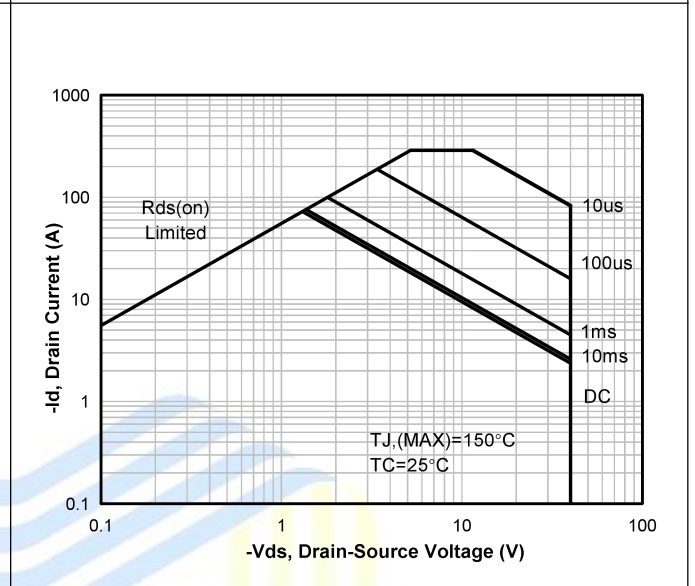
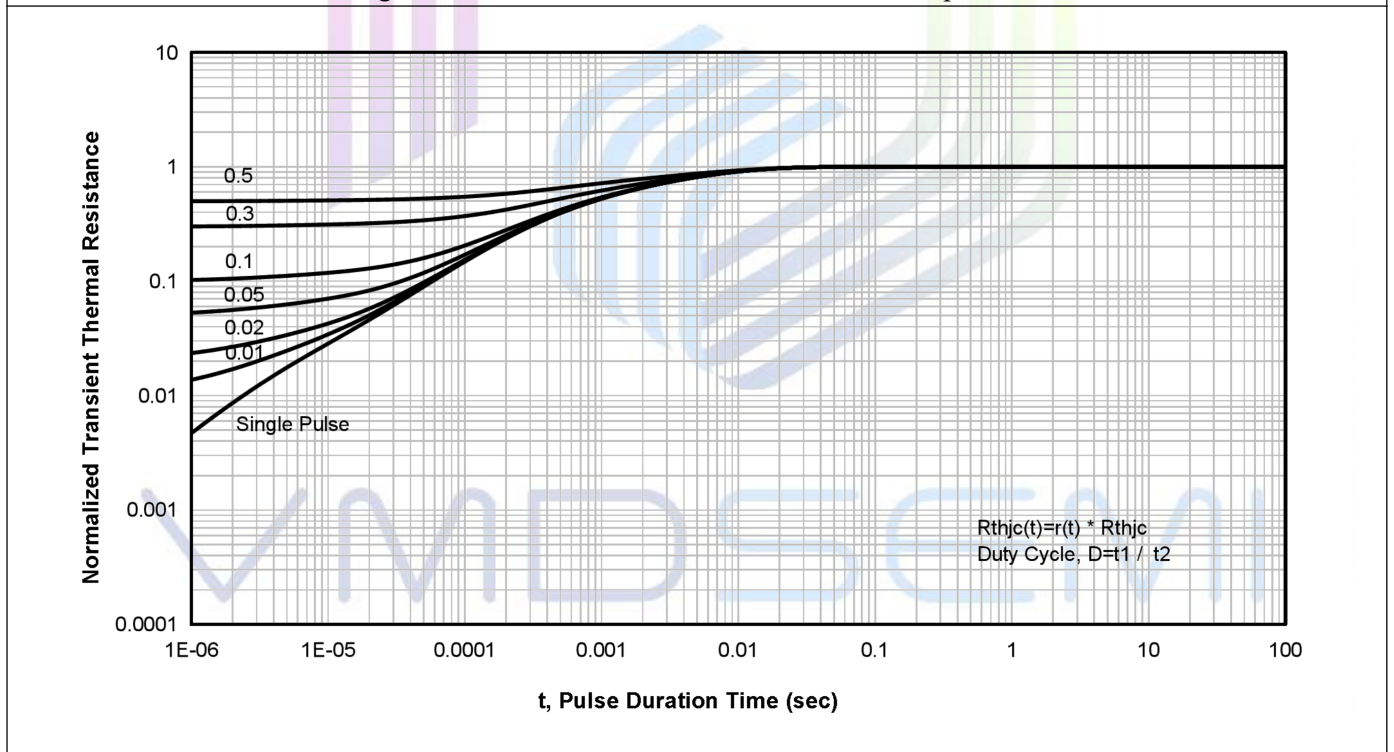
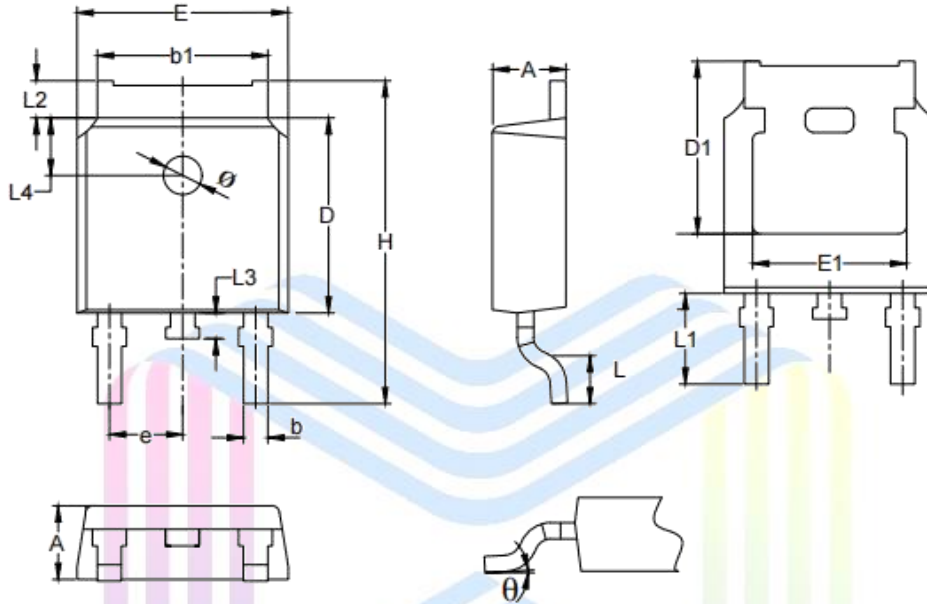
Figure 5: On-Resistance vs. Gate-Source Voltage

Figure 6: Forward Characteristics of Body Diode

Figure 7: Gate Charge Characteristics

Figure 8: Typ. Capacitances


Figure 9: Power Dissipation

Figure 10: Safe Operating Area

Figure 11: Normalized Max Transient Thermal Impedance


Mechanical Dimensions

TO-252 Package Information



SYMBOL	MILLIMETERS	
	MIN	MAX
A	2.2	2.4
A1	0	0.127
A2	-	-
b	0.66	0.9
b1	5.1	5.5
c	0.43	0.61
D	5.95	6.22
D1	5.3REF	
E	6.4	6.75
E1	4.8REF	
e	2.286BSC	
H	9.4	10.5
L	1.38	2
L1	2.9REF	
L2	0.88	1.28
L3	0.5	1
L4	1.8REF	
θ	0°	8°

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VMDSEMI



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Via-Media Semiconductor Limited Company

<http://www.vmdsemi.com>

Main Sites:

- Headquarters

Hangzhou Via-Media Semiconductor Co., LTD.
1305-1306, Building 71, No. 90, Wensan Road, Xihu
District, Hangzhou, Zhejiang Province, P.R. China
Tel: +86-0571-8515 0563

- Chengdu Office

Chengdu Winhi Semiconductor Co., LTD.
Floor 15, Building 5, No. 171, Hele 2nd Street,
Chengdu, Sichuan Province, P.R. China
Tel: +86-028-8505 0771

- Shanghai

Shanghai R&D Center.
1506~1508, Xinyin Building, 888 Yishan Road,
Shanghai, P.R. of China

Tel: +86-021-54201999

- Shenzhen

Shenzhen Sales office .
Room 4A15, Block AB, Tianxiang Building,
Chegongmiao, Futian District, Shenzhen, P.R. of
China

Tel: +86-0755-82570682

- Xi'an

Xi'an R&D Center
Room 10504, Building 2, Central Plaza, Jinye Road,
High tech Zone, Xi'an City, Shanxi Province, R.P. of
China