VUTL004R160PA

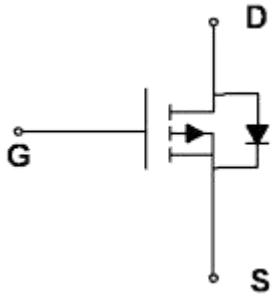
Datasheet

16mΩ, -40V, P-Channel Power MOSFET VUTL004R160PA

General Description

$V_{(BR)DSS}$	$R_{DS(ON)\_max}$	I_D
-40V	16mΩ@-10V	-64A
	21mΩ@-4.5V	

Symbol



Symbol of VUTL004R160PA

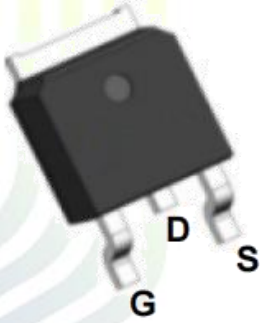
Features

- Excellent package for good heat dissipation
- Advanced Trench technology
- Power Management Switches

Application

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

Package Type



TO-252

Package Type of VUTL004R160PA

Ordering Information

Product Name	Package
VUTL004R160PA	TO-252

Absolute Maximum Ratings(T_A= 25 ºC, 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=25ºC	I_D	-64	A
Pulsed Drain Current Note 2	T_C=25ºC	I_{DM}	-192	A
Max Power Dissipation Note 3	T_C=25ºC	P_D	94	W
Avalanche Energy, Single Pulse Note 4		E_{AS}	210	mJ
Operation Junction temperature		T_J,T_{SGT}	-55 to 150	ºC

Thermal Resistance

Parameter	Symbol	Min	Typ	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	-	1.32	-	ºC/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}= -20V,V_{GS}= -10 V, L=1 mH, Rg=25Ω,starting T_J=25 °C.

Electrical Characteristics(T_A= 25 ºC, 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	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250uA	-1.0	-1.7	-2.5	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-12A	-	13	16	mΩ
		V_{GS}=-4.5V, I_D=-8A	-	16.3	21	
Forward Transconductance	gfs	V_{DS}=-5V, I_D=-12A	-	30	-	S
Dynamic Characteristics						
Input Capacitance	C_{ISS}	V_{GS}=0V	-	2526	-	pF
Output Capacitance	C_{OSS}	V_{DS}=-20V	-	209	-	pF
Reverse Transfer Capacitance	C_{RSS}	f=1MHz	-	181	-	pF
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-20V	-	9	-	ns
Rise Time	t_r	V_{GS}=-10V	-	42	-	
Turn-off Delay Time	$t_{d(off)}$	I_D=-20A	-	41	-	
Fall Time	t_f	R_G=3Ω	-	67	-	
Gate Charge Characteristics						
Total Gate Charge	Q_g	V_{GS}=-10V	-	52	-	nC
Gate to Source Charge	Q_{gs}	V_{DS}=-20V	-	9	-	
Gate to Drain Charge	Q_{gd}	I_D=-12A	-	10	-	
Reverse Diode Characteristics						
Drain-Source Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=-12A	-	-0.84	-1.2	V
Reverse Recovery Time	t_{rr}	T_J= 25 ºC, I_{SD}=-20A	-	3.47	-	ns
Reverse Recovery Charge	Q_{rr}	di/dt=-100A/us	-	0.2	-	nC

Typical Performance Characteristics

Figure 1: Typ. Output Characteristics

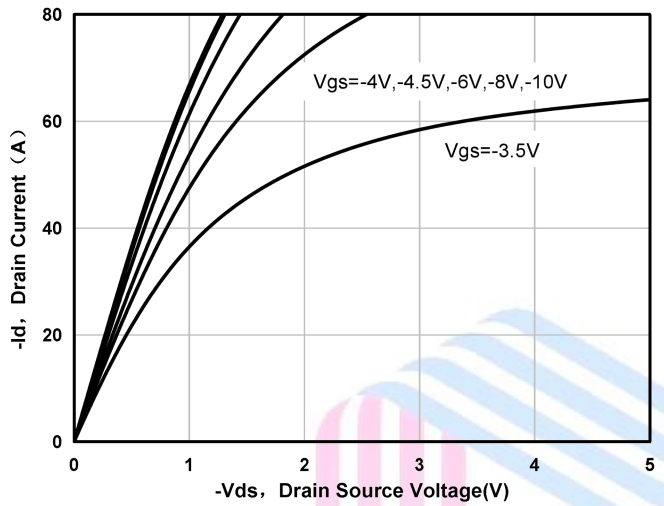


Figure 2: Typ. Transfer Characteristics

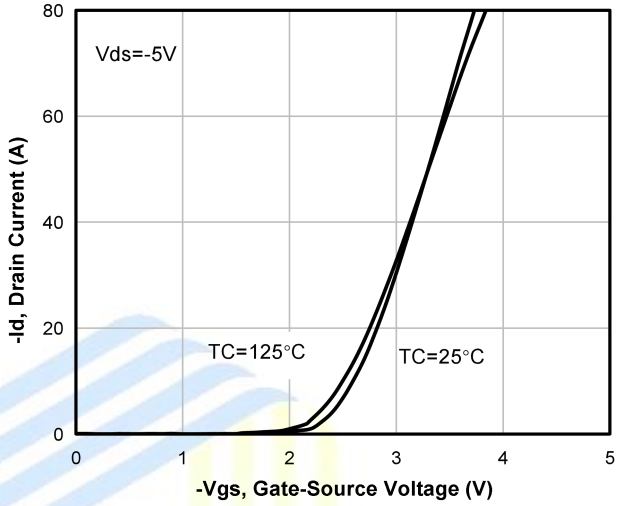


Figure 3: Typ. On-Resistance vs. Drain Current

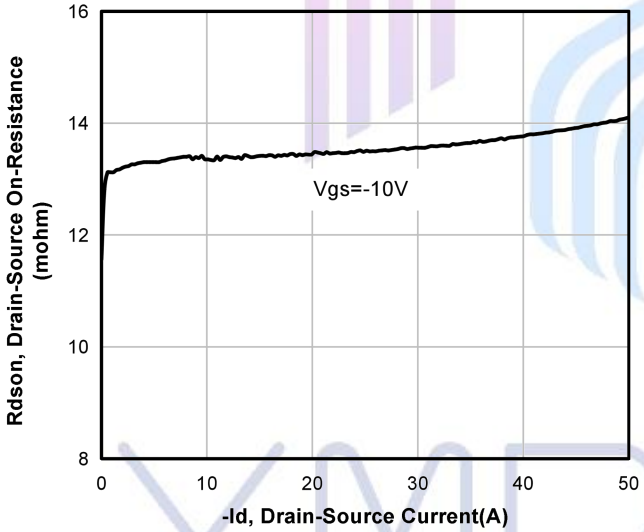


Figure 4: On-Resistance vs. Temperature

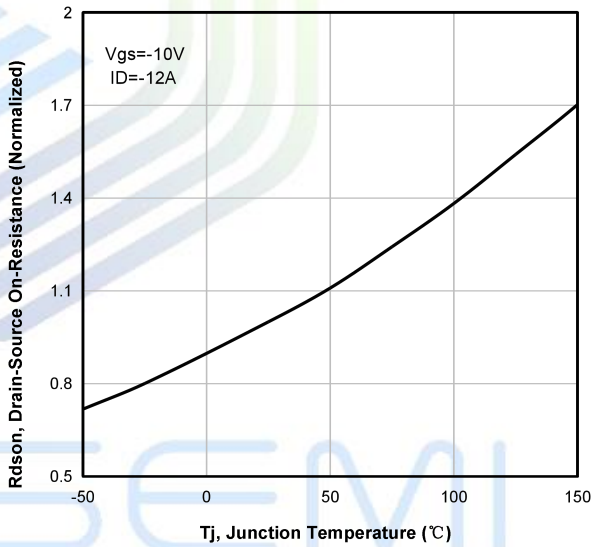


Figure 5: Forward Characteristics of Body Diode

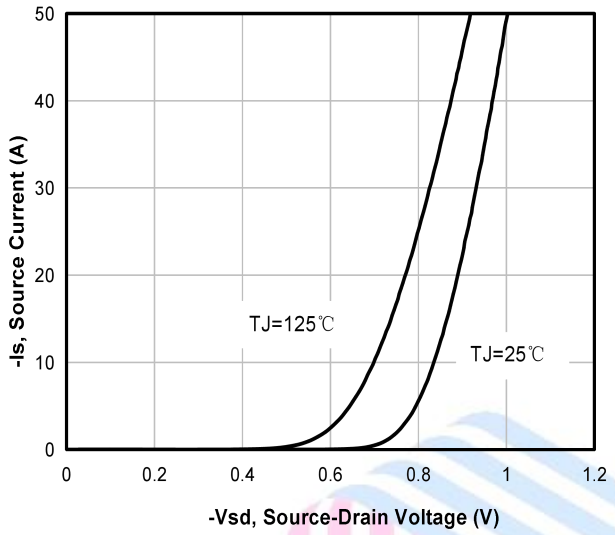


Figure 6: Gate Charge Characteristics

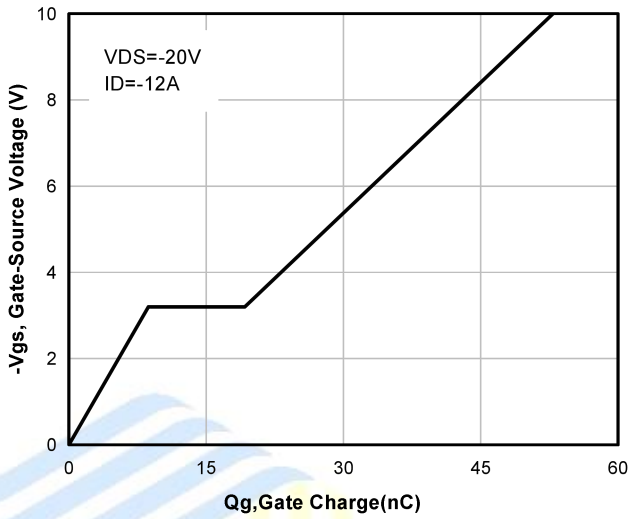


Figure 7: Typ. Capacitances

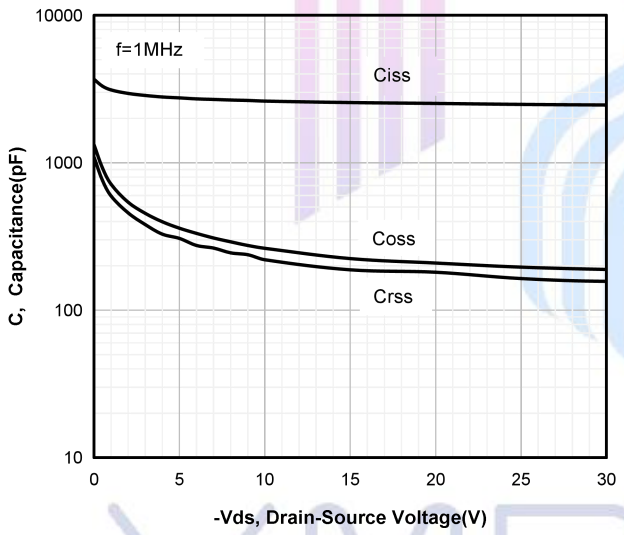


Figure 8: BV_{DSS} vs. Temperature

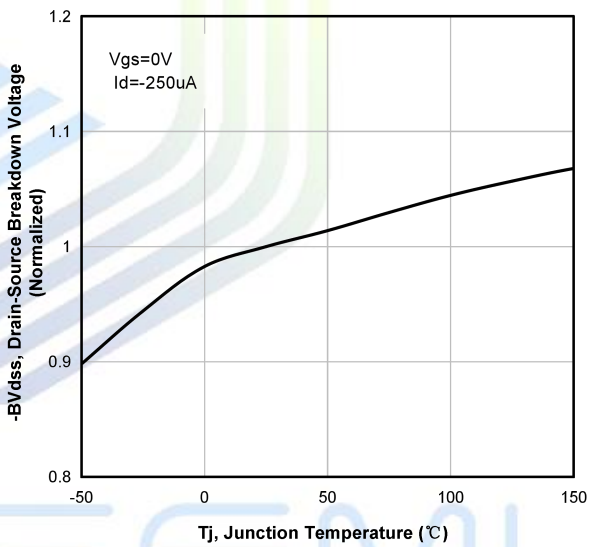


Figure 9: Power Dissipation

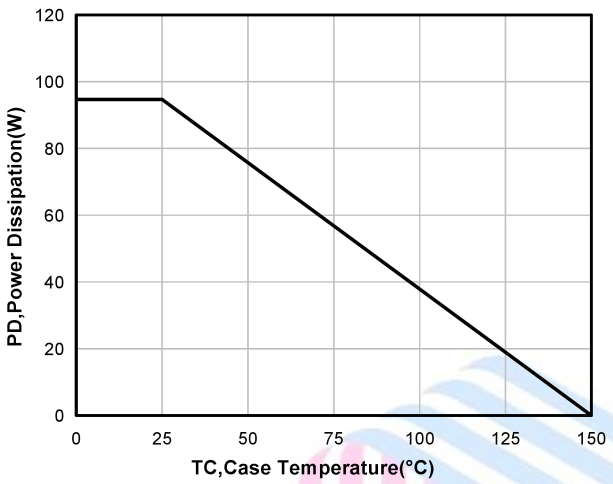


Figure 10: ID Current Derating

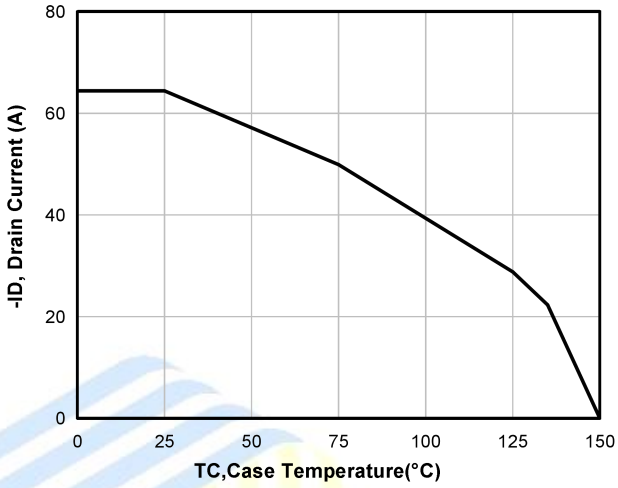


Figure 11: Safe Operating Area

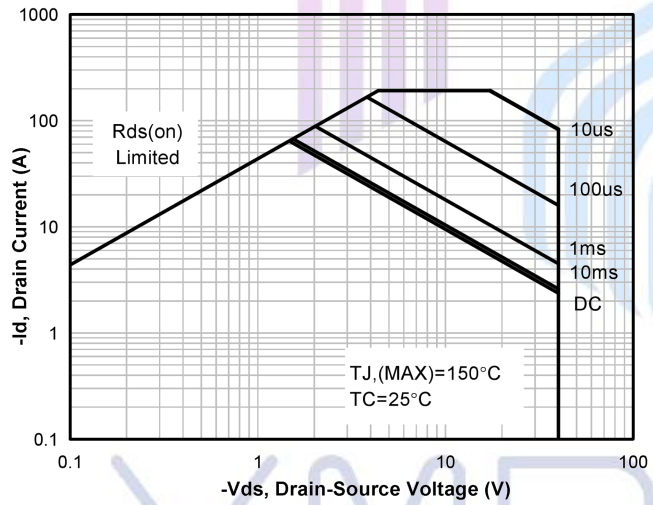
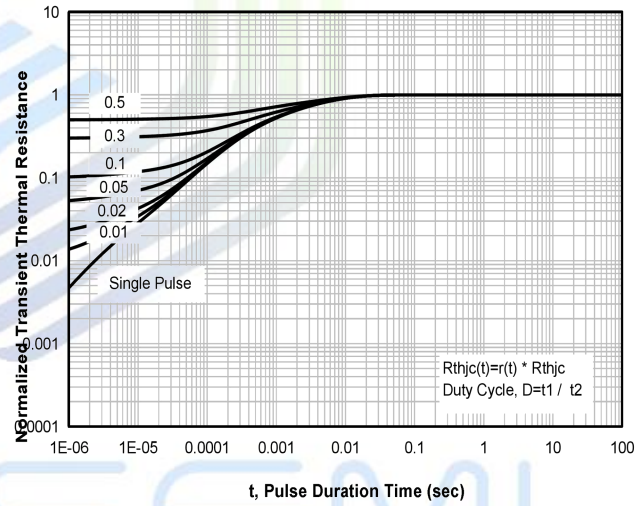
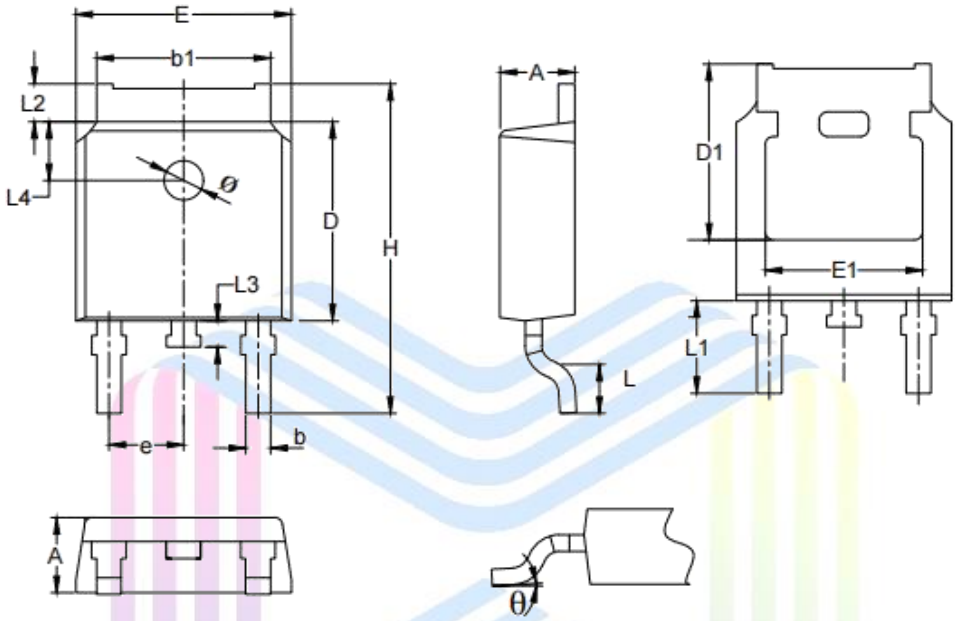


Figure 12: Normalized Max Transient Thermal Impedance



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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