

VMDSEMI

VUSE004R350PA

Datasheet



VMDSEMI

General Description

Symbol

$V_{(BR)DSS}$	$R_{DS(ON)_{max}}$	I_D
-40V	35mΩ@-10V	-7A
	50mΩ@-4.5V	

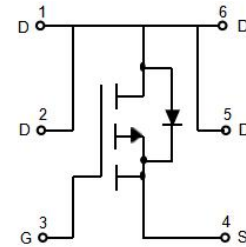


Figure 1 Symbol of VUSE004R350PA

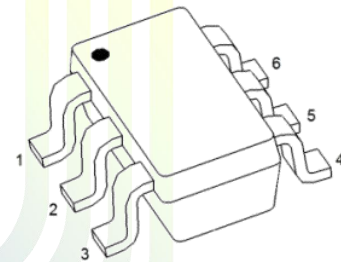
Features

- High Cell Density Trenched P-ch MOSFETs
- Excellent $R_{DS(ON)}$
- Low Gate Charge

Application

- Power Switching Application
- Hard Switched and High Frequency Circuits
- DC-DC Converter

Package Type



SOT-23-6L

Figure 2 Package Type of VUSE004R350PA

Ordering Information

Product Name	Package
VUSE004R350PA	SOT-23-6L

35mΩ, -40V, P-Channel Power MOSFET

VUSE004R350PA

Absolute Maximum Ratings (T_C= 25 °C, unless otherwise specified)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V _{DSS}	-40	V
Gate-Source Voltage	V _{GSS}	±20	V
Continuous Drain Current ^{Note1}	I _D	-7	A
Pulsed Drain Current ^{Note2}	I _{DM}	-28	
Single Pulsed Avalanche Energy ^{Note3}	E _{AS}	40	mJ
Single Pulsed Avalanche Current ^{Note3}	I _{AS}	-27	A
Total Power Dissipation ^{Note5}	P _D	1.1	W
Junction Temperature	T _J	150	°C
Storage Temperature	T _{STG}	-55 to 150	°C

Thermal Resistance

Parameter	Symbol	Min	Typ	Max	Unit
Thermal Resistance, Junction-to-Ambient ^{Note6}	R _{θJA}		110		°C/W

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35mΩ, -40V, P-Channel Power MOSFET
VUSE004R350PA
Electrical Characteristics ($T_J = 25^\circ\text{C}$, 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} = -32V, V _{GS} =0V			-1	uA
Gate-Body Leakage Current	I _{GSS}	V _{GS} = ±20V, V _{DS} = 0V			±100	nA
Gate Threshold Voltage ^{Note3}	V _{GS(th)}	V _{DS} =V _{GS} , I _D =-250uA	-1.2	-1.5	-2.5	V
Static Drain-Source On-Resistance ^{Note3}	R _{DS(ON)}	V _{GS} =-10V, I _D = -5A		28	35	mΩ
		V _{GS} =-4.5V, I _D = -4A		38	50	
Forward Transconductance ^{Note3}	g _{FS}	V _{DS} =-5V, I _D = -8A		12		S
Dynamic Characteristics						
Input Capacitance	C _{ISS}	V _{DS} =-15V		1415		pF
Output Capacitance	C _{OSS}	V _{GS} =0V		134		pF
Reverse Transfer Capacitance	C _{RSS}	f=1MHz		102		pF
Total Gate Charge	Q _g	V _{DS} =-15V		11.5		nC
Gate-Source Charge	Q _{gs}	V _{GS} =-4.5V		3.5		
Gate-Drain Charge	Q _{gd}	I _D = -1A		3.3		
Switching Parameters						
Turn-on Delay Time	t _{d(on)}	V _{DD} = -15V		22		ns
Turn-on Rise Time	t _r	V _{GS} = -10V		15.7		
Turn-off Delay Time	t _{d(off)}	I _D = -1A		59		
Turn-off Fall Time	t _f	R _G =3.3Ω		5.5		
Diode Characteristics						
Diode Forward Voltage ^{Note3}	V _{SD}	V _{GS} =0V, I _S = -1A			-1.2	V
Continuous Source Current	I _S	V _G =V _D =0V Force Current			-7	A

Notes :

- 1.The maximum current rating is limited by package.And device mounted on a large heatsink
- 2.Pulse Test : Pulse Width $\leq 10\mu s$, duty cycle $\leq 1\%$.
- 3.EAS condition: $V_{DD}=-25V, V_{GS}=-10V, L=0.1mH, R_G=25\Omega$ Starting $T_J=25^\circ C$.
- 4.Pulse Test : Pulse Width $\leq 300\mu s$, duty cycle $\leq 2\%$.
- 5.The power dissipation P_D is limited by $T_{J(MAX)}=150^\circ C$.And device mounted on a large heatsink
- 6.Device mounted on $1in^2$ FR-4 board with 2oz Copper, in a still air environment with $T_A=25^\circ C$.

Typical Performance Characteristics

Figure 3: Gate Charge

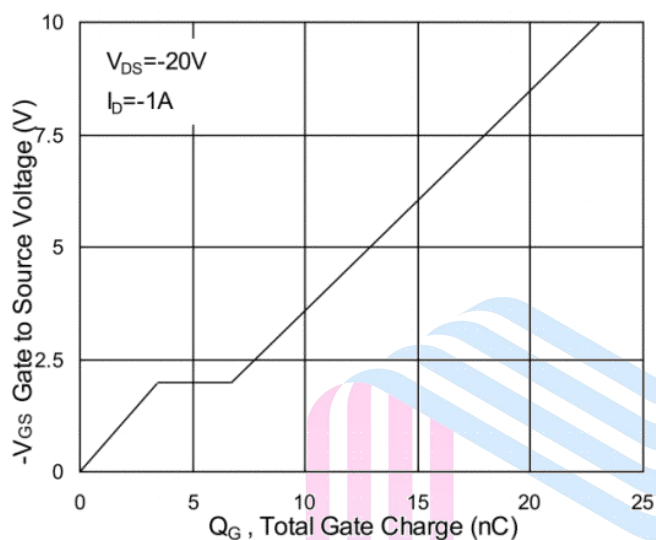


Figure 4: Output Characteristics

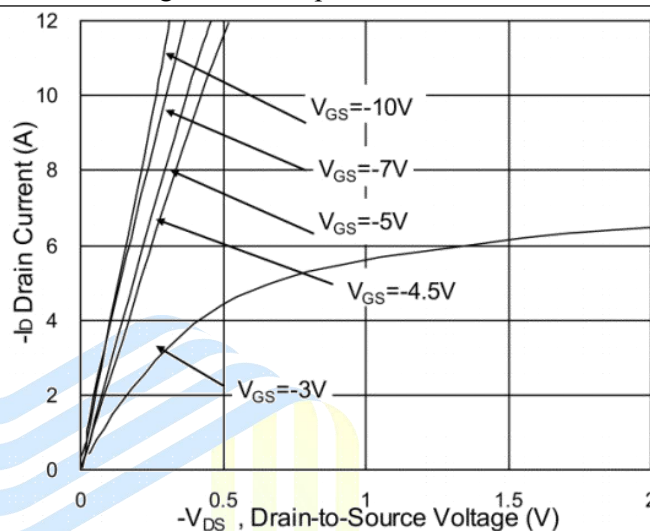


Figure 5: On-Resistance vs. Temperature

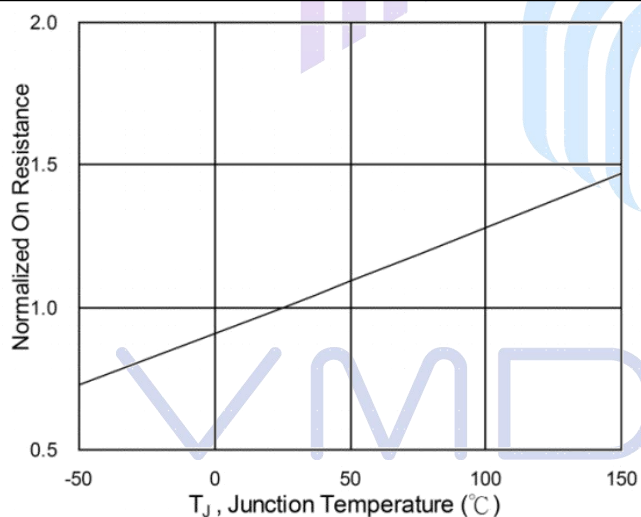


Figure 6: On-Resistance vs. Gate Voltage

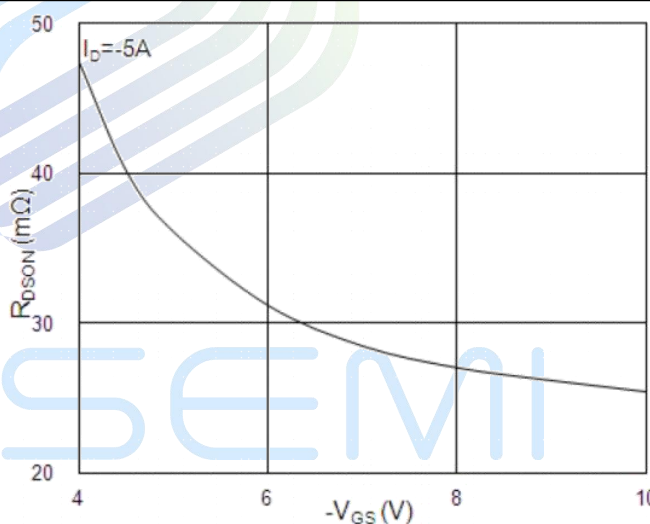


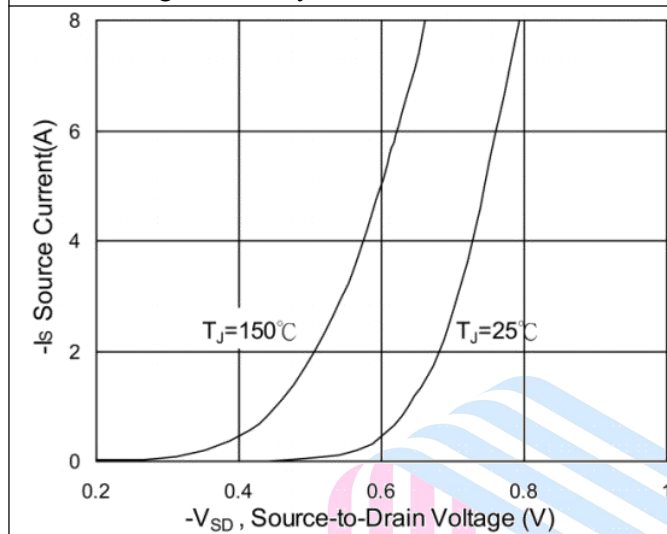
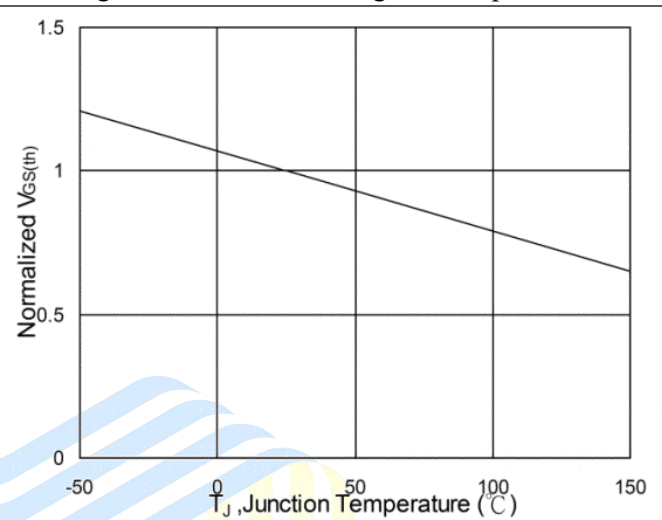
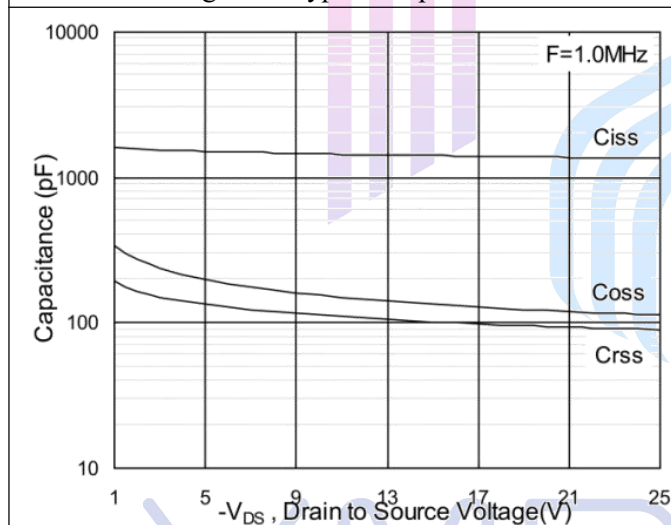
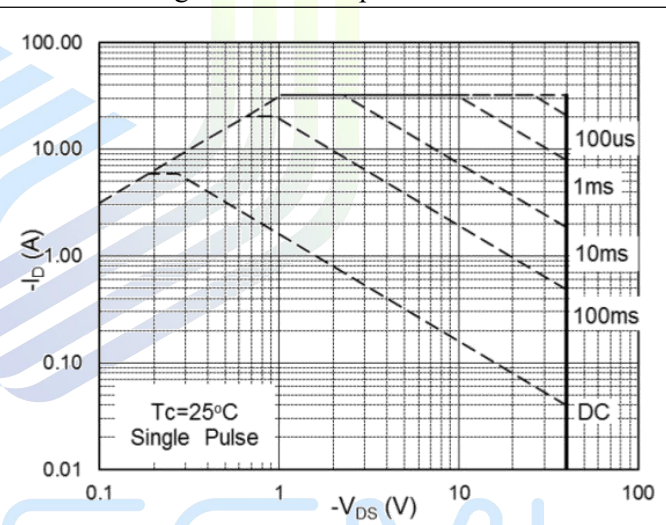
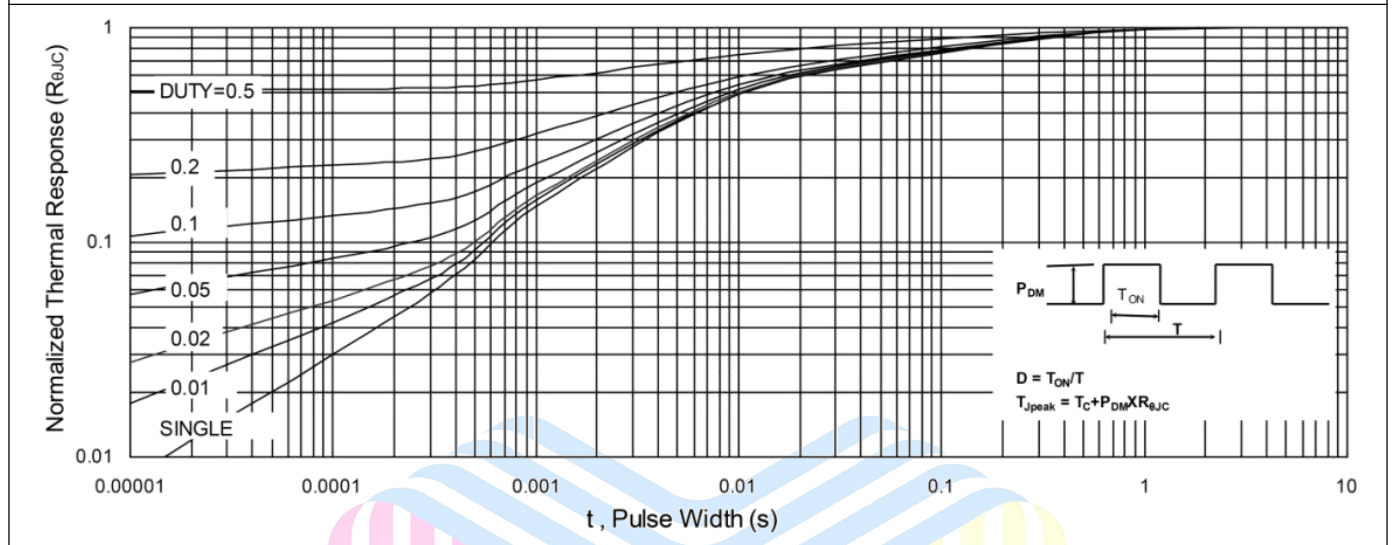
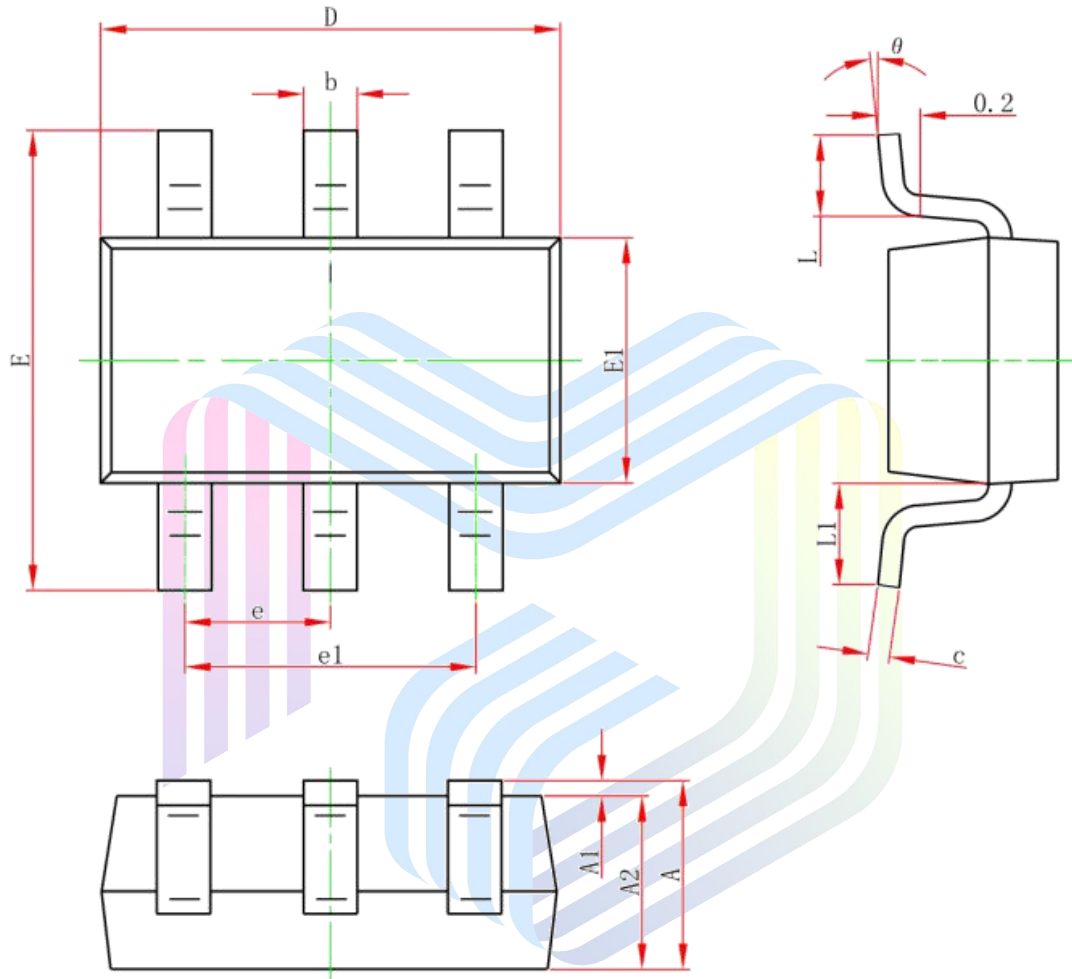
Figure 7: Body Diode Characteristics

Figure 8: Threshold Voltage vs Temperature

Figure 9: Typical Capacitance

Figure 10: Safe Operation Area


Figure 11: Normalized Maximum Transient Thermal Impedance


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Mechanical Dimensions:

SOT-23-6L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0	0.150	0.000	0.006
A2	1.050	1.250	0.041	0.049
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	2.650	2.950	0.104	0.116
E1	1.500	1.700	0.059	0.067
e	0.950TYP		0.037TYP	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
L1	0.600REF		0.024REF	
θ	0°	8°	0°	8°

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