60V N-Channel Enhancement Mode MOSFET

Description

The NP6003 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

General Features

- V_{DS} =60V I_D =3A
  $R_{DS(ON)}$<90mΩ @V_{GS}=10V (Typ:80m Ω)
  $R_{DS(ON)}$<100mΩ @V_{GS}=4.5V (Typ:90m Ω)
- High density cell design for ultra low Rdson.
- Fully characterized avalanche voltage and current.
- Low gate to drain charge to reduce switching losses.

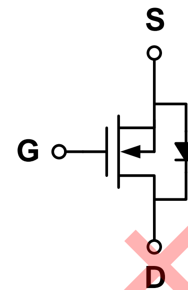
Application

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

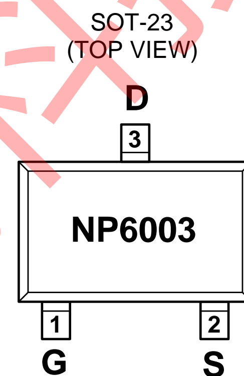
Package

- SOT-23

Schematic diagram



Marking and pin assignment



Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
NP6003VR-G	-55°C to +150°C	SOT-23	3000

Absolute Maximum Ratings (TA=25℃ unless otherwise noted)

parameter		symbol	limit	unit
Drain-source voltage		V_{DS}	60	V
Gate-source voltage		V_{GS}	±20	V
Continuous Drain Current	TC=25°C	I_D	3	A
	TC=70°C		2	
Pulsed Drain Current		I_{DP}	12	A
Maximum power dissipation	TC=25°C	P_D	2	W
Power Dissipation – Derate above 25℃	TC=75°C		1.4	
Operating junction Temperature range		Tj	-55—150	℃

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Electrical Characteristics (TA=25℃ unless otherwise noted)

Parameter	Symbol	Condition		Min	Typ	Max	Unit
Static Characteristics							
Drain-source breakdown voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA		60	-	-	V
BVDSS Temperature Coefficient	$\triangle BV_{DSS}/\triangle T_J$	Reference to 25℃,ID=1mA			33		mV/℃
Zero gate voltage drain current	I_{DSS}	V_{DS}=60V, V_{GS}=0V		-	-	1	μA
			T_J=85°C	-	-	30	
Gate Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±20V		-	-	±100	nA
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA		1.2	1.9	2.5	V
Drain-source on-state resistance[1]	$R_{DS(ON)}$	V_{GS}=10V, I_D=3A		-	80	90	mΩ
		V_{GS}=4.5V, I_D=2A			90	100	
On Status Drain Current	$I_{D(ON)}$	VDS=10V, VGS=10V		3	-	-	A
Diode Characteristics							
Diode Forward Voltage	V_{SD}	I_{SD}=1A,V_{GS}=0V		-	0.75	1.1	V
Diode Continuous Forward Current	I_S			-	-	3	A
Reverse Recovery Time	t_{rr}	I_F=1.5A, dI/dt=100A/us		-	15	-	ns
Reverse Recovery Charge	Q_{rr}			-	12	-	nC
Dynamic Characteristics[2]							
Gate Resistance	R_G	V_{GS}=0V, V_{DS}=0V,f=1MHz		-	2.0	-	Ω
Input capacitance	C_{ISS}	V_{GS}=0V ,V_{DS}=25V f=1.0MHz		-	175	-	pF
Output capacitance	C_{OSS}			-	21	-	
Reverse transfer capacitance	C_{RSS}			-	13	-	
Turn-on delay time	$t_{D(ON)}$	V_{GS}=10V, V_{DD}=30V, R_L=4.7Ω, I_D=1.5A, R_G=3.3Ω		-	15	-	ns
Turn-on Rise time	t_r			-	16	-	
Turn-off delay time	$t_{D(OFF)}$			-	10	-	
Turn-off Fall time	t_f			-	10	-	
Total gate charge	Q_g	V_{GS}=10V,I_D=2A V_{DS}=30V		-	4.1		nC
Gate-source charge	Q_{gs}				0.8		
Gate-drain charge	Q_{gd}			-	1	-	

Note: 1：Pulse test; pulse width ≦ 300ns, duty cycle ≦ 2%.

2：Guaranteed by design, not subject to production testing.

Thermal Characteristics

Parameter	Symbol	Typical	Unit
Thermal Resistance-Junction to Case	Rθjc	60	℃/W
Thermal Resistance junction-to ambient	Rθja	90	

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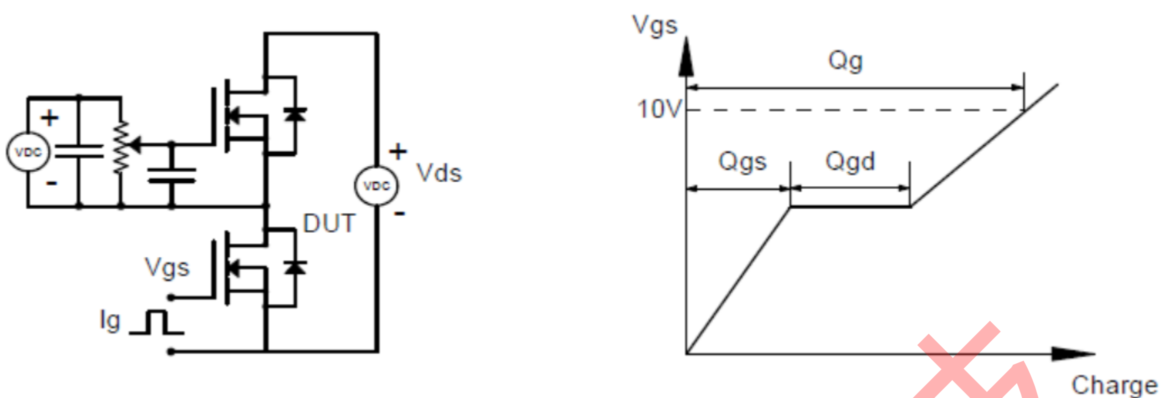

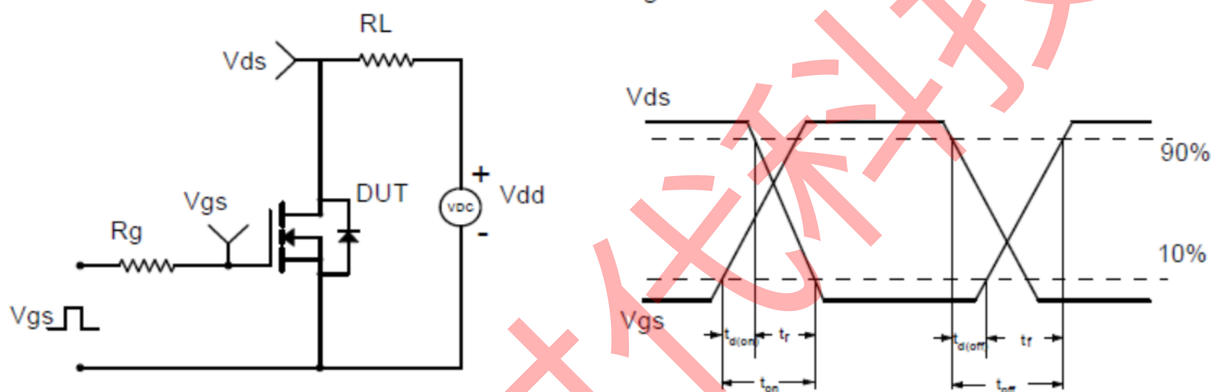

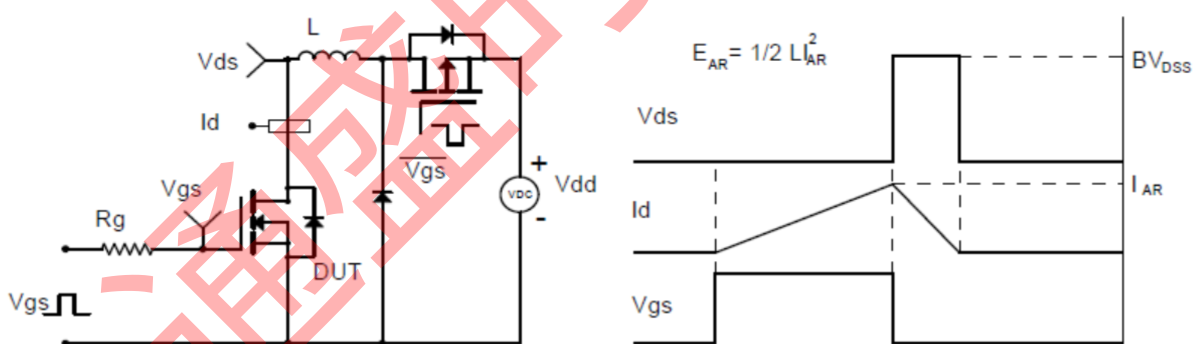

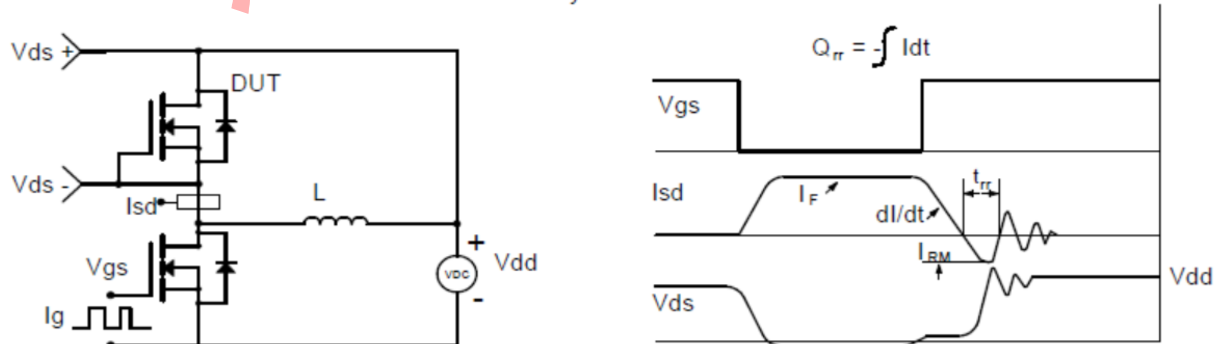

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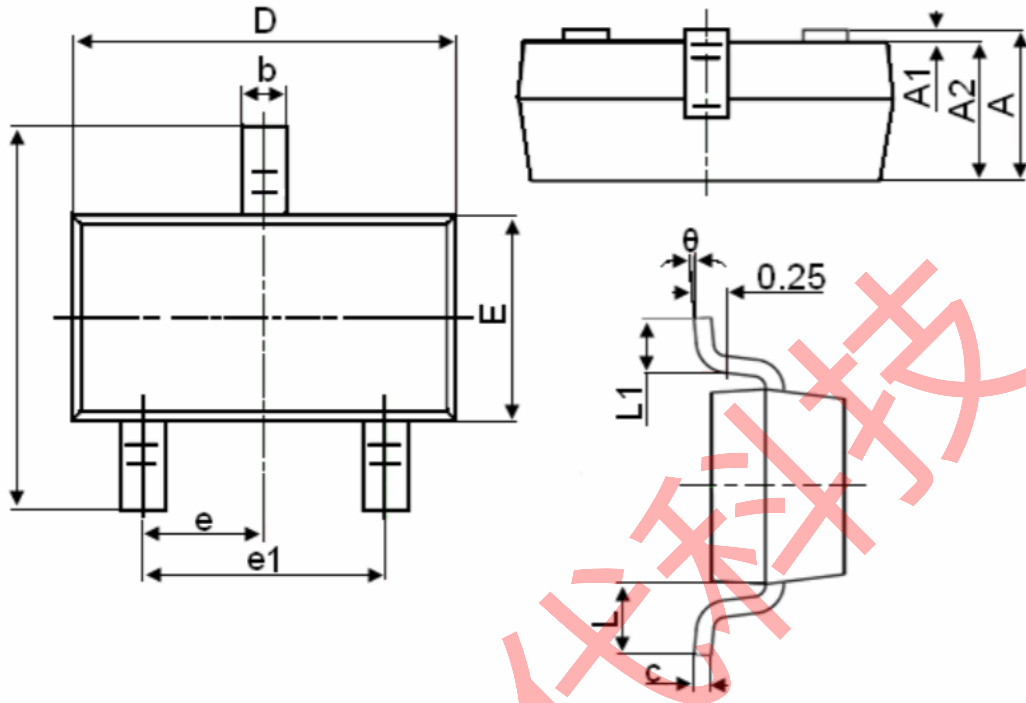
Package Information

- **SOT-23**



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Symbol	Dimensions in Millimeters	
	MIN.	**MAX.**
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
θ	0°	8°