

### Description

The NVTR4503N uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

### Dimensions SOT-23



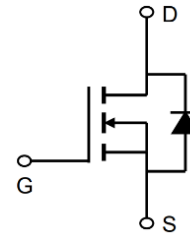
### General Features

$V_{DS} = 30V$   $I_D = 4.2A$   
 $R_{DS(ON)} < 38m\Omega @ V_{GS}=10V$

### Application

- Lithium battery protection
- Wireless impact
- Mobile phone fast charging

### Pin Configuration



### Package Marking and Ordering Information

Device	Device Marking	Device Package	Reel Size	Tape width	Quantity
NVTR4503N	3404B	SOT-23	Ø180mm	8 mm	3000 units

### Absolute Maximum Ratings (TC=25°C unless otherwise noted)

Symbol	Parameter	Max.	Units
VDSS	Drain-Source Voltage	30	V
VGSS	Gate-Source Voltage	±20	V
$I_D @ T_A=25^\circ C$	Continuous Drain Current	4.2	A
$I_D @ T_A=70^\circ C$	Continuous Drain Current	2.6	A
IDM	Pulsed Drain Current	16	A
$P_D$	Power Dissipation $T_A = 25^\circ C$	1	W
RθJA	Thermal Resistance, Junction to Ambient	125	°C/W
TJ, TSTG	Operating and Storage Temperature Range	-55 to +150	°C

## Electrical Characteristics (T<sub>J</sub>=25°C, unless otherwise noted)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
V(BR)DSS	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	30	32	-	V
IDSS	Zero Gate Voltage Drain Current	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V,	-	-	1.0	μA
IGSS	Gate to Body Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> = ±20V	-	-	±100	nA
VGS(th)	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1.2	1.5	2.5	V
RDS(on)	Static Drain-Source on-Resistance note2	V <sub>GS</sub> =10V, I <sub>D</sub> =4A	-	29	38	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =3A	-	45	65	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f=1.0MHz	-	233	-	pF
C <sub>oss</sub>	Output Capacitance		-	44	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		-	33	-	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =15V, I <sub>D</sub> =2A, V <sub>GS</sub> =10V	-	3	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	0.5	-	nC
Q <sub>gd</sub>	Gate-Drain("Miller") Charge		-	0.8	-	nC
td(on)	Turn-on Delay Time	V <sub>DS</sub> =15V, I <sub>D</sub> =4A, R <sub>GEN</sub> =3Ω, V <sub>GS</sub> =10V	-	4	-	ns
t <sub>r</sub>	Turn-on Rise Time		-	2.1	-	ns
td(off)	Turn-off Delay Time		-	15	-	ns
t <sub>f</sub>	Turn-off Fall Time		-	3.2	-	ns
IS	Maximum Continuous Drain to Source Diode Forward Current		-	-	4	A
ISM	Maximum Pulsed Drain to Source Diode Forward Current		-	-	16	A
VSD	Drain to Source Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =4A	-	-	1.2	V

**Note :**

1. The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
2. The data tested by pulsed , pulse width ≅ 300us , duty cycle ≅ 2%
3. The power dissipation is limited by 150°C junction temperature
4. The data is theoretically the same as I<sub>D</sub> and I<sub>DM</sub> , in real applications , should be limited by total power dissipation.

### Typical Characteristics

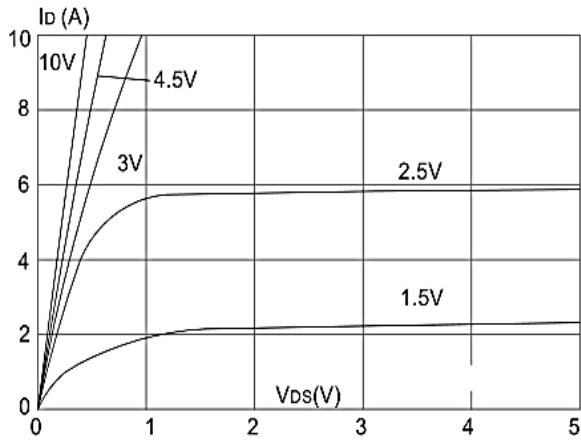


Figure 1: Output Characteristics

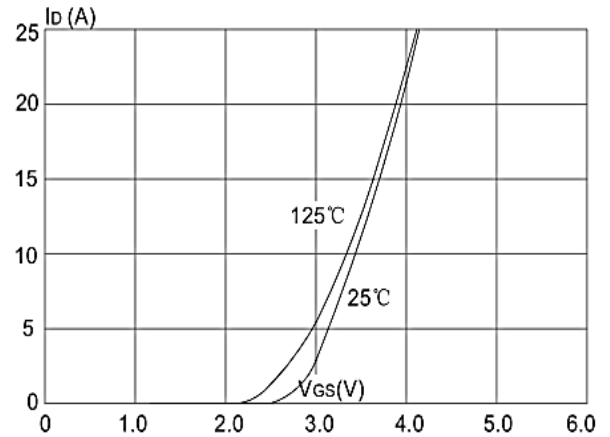


Figure 2: Typical Transfer Characteristics

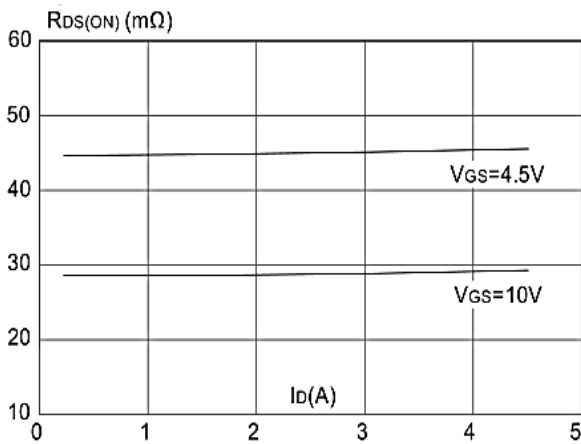


Figure 3: On-resistance vs. Drain Current

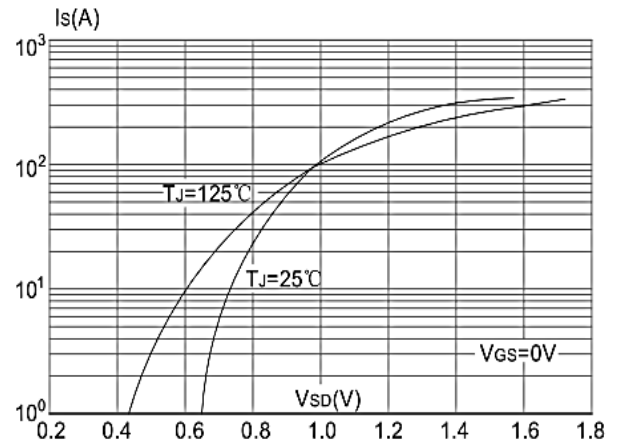


Figure 4: Body Diode Characteristics

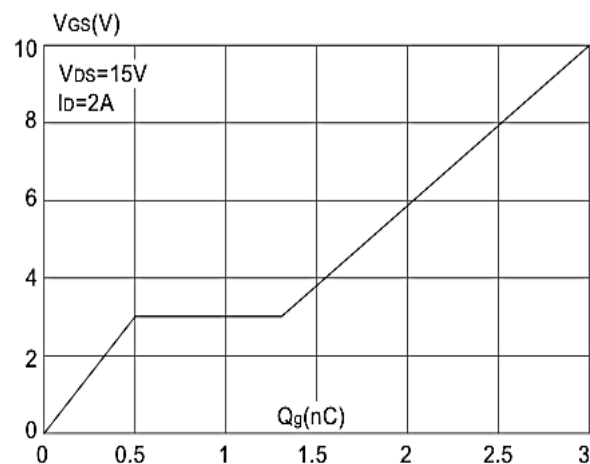


Figure 5: Gate Charge Characteristics

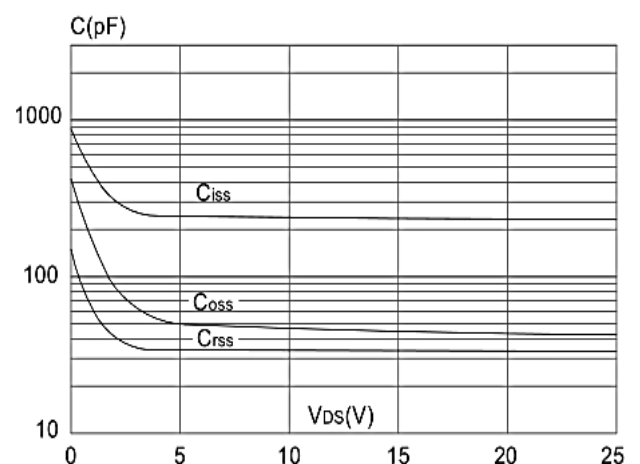


Figure 6: Capacitance Characteristics

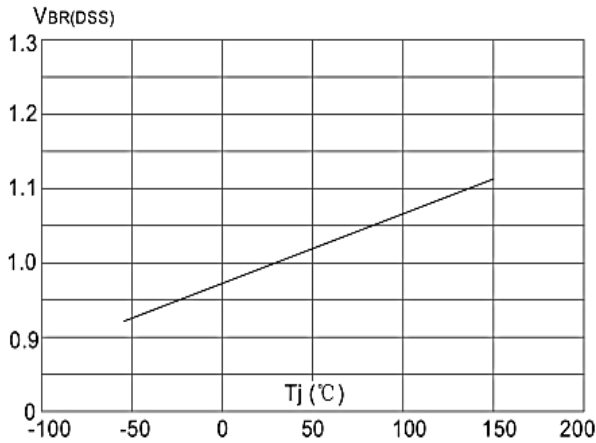


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

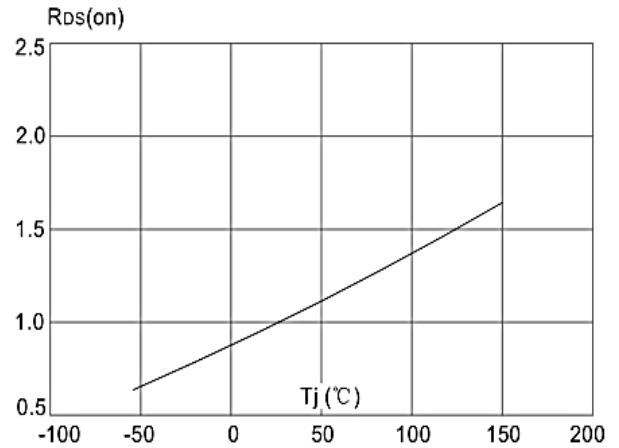


Figure 8: Normalized on Resistance vs. Junction Temperature

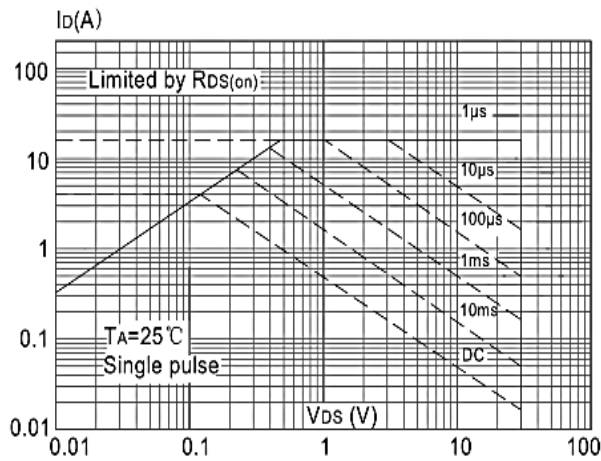


Figure 9: Maximum Safe Operating Area vs. Case Temperature

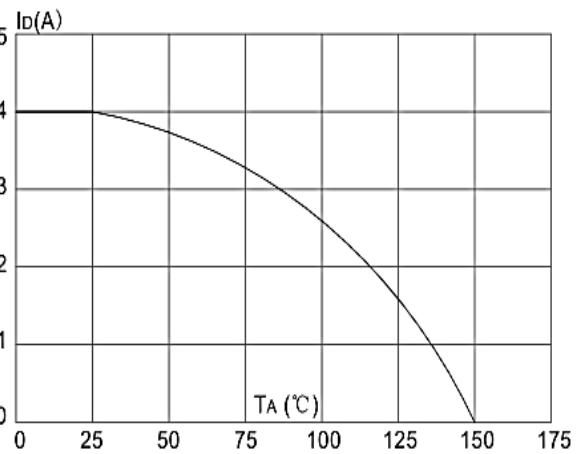


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

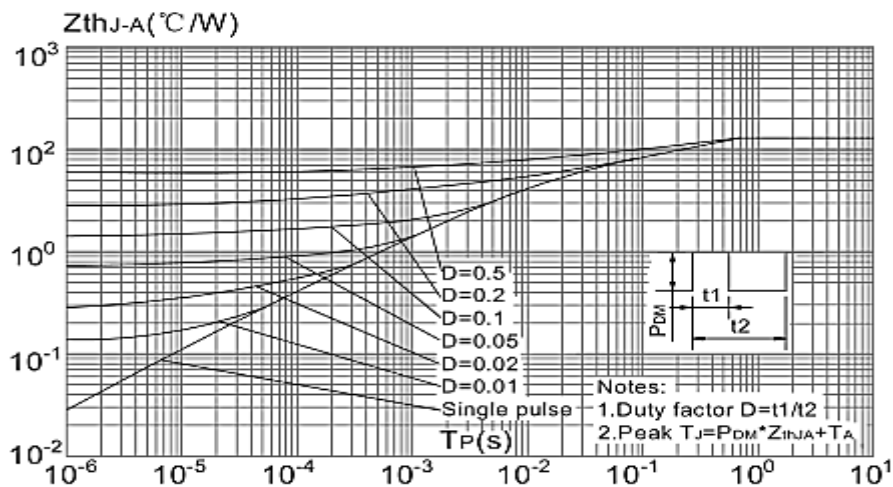
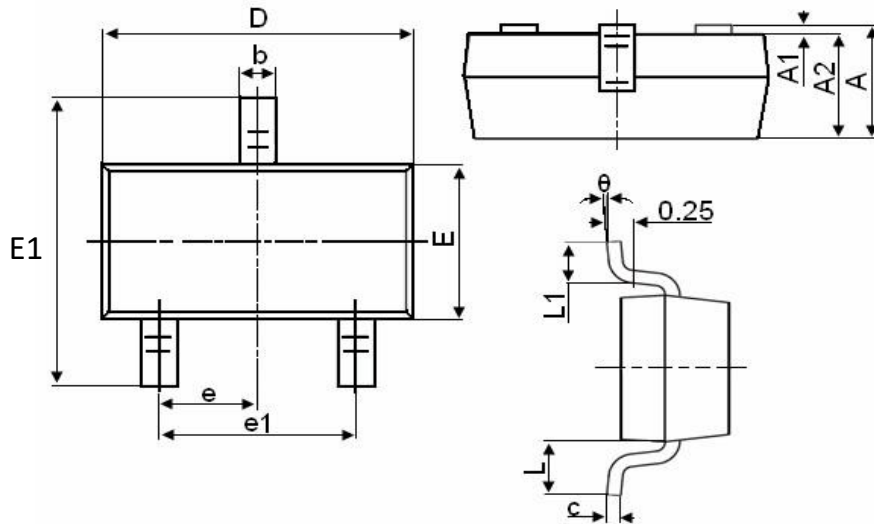


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

Package Mechanical Data:SOT-23



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°