20V N-Channel Enhancement Mode MOSFET

Description

The NP2102EKR has been designed to minimize the on-state resistance (RDS(on)) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

General Features

- V_{DS} =20V，I_D =750mA
  $R_{DS(ON)}$(Typ.)=0.25 Ω @V_{GS}=10V
  $R_{DS(ON)}$(Typ.)=0.35 Ω @V_{GS}=4.5V
- High power and current handing capability
- Lead free product is acquired
- Surface mount package
- ESD Rating: 2000V HBM

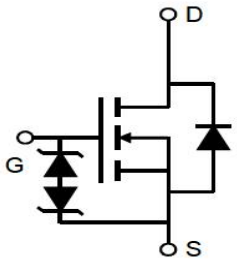
Application

- PWM applications
- Load switch

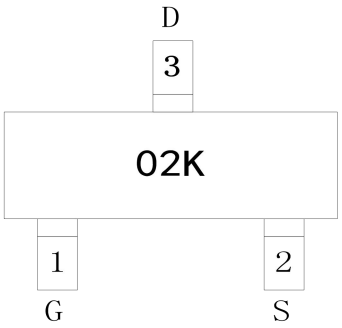
Package

- SOT-523

Schematic diagram



Marking and pin assignment



SOT-523

Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
NP2102EKR-G	-55°C to +150°C	SOT-523	3000

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

parameter		symbol	limit	unit
Drain-source voltage		V_{DS}	20	V
Gate-source voltage		V_{GS}	±12	V
Drain current-continuous[a]@Tj=125℃		I_D	0.75	A
-pulse *d*[b]		I_{DM}	1.8	A
Maximum power dissipation	T_A=25℃	P_D	0.15	W
Operating junction Temperature range		Tj	-55—150	℃

Notes:

a. surface mounted on FR4 board,t≤10sec

b. pulse test: pulse width≤300μs,duty≤2%

Electrical Characteristics (TA=25℃ unless otherwise noted)

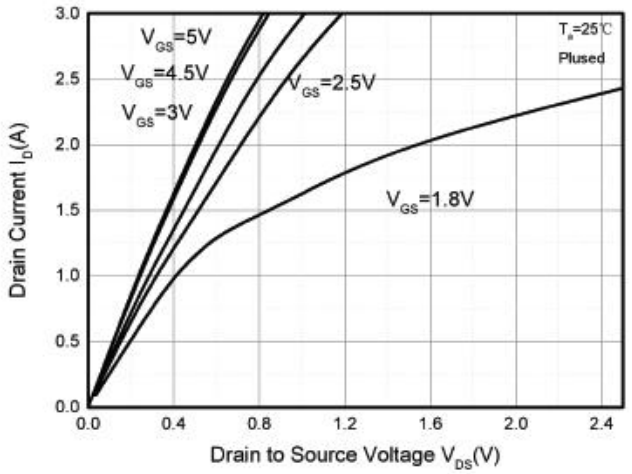
Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF Characteristics						
Drain-source breakdown voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	20	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS}=16V, V_{GS}=0V	-	-	1	μA
Gate-body leakage	I_{GSS}	V_{DS}=0V, V_{GS}=±12V	-	-	±10	μA
ON Characteristics						
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	0.3	0.65	1	V
Drain-source on-state resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=500mA	-	0.25	0.38	Ω
		V_{GS}=10V, I_D=500mA	-	0.35	0.45	
Recovered charge	Q_r	V_{GS}=0V I_S=500mA V_R=25V dI_S/d_t=-100A/uS	-	30	-	nC
Dynamic Characteristics						
Input capacitance	C_{ISS}	V_{DS}=10V ,V_{GS}=0V f=1.0MHz	-	79	-	pF
Output capacitance	C_{OSS}		-	13	-	
Reverse transfer capacitance	C_{RSS}		-	9	-	
Switching Characteristics						
Turn-on delay time	$t_{D(ON)}$	V_{DS}=10V V_{GS}=5V R_L=250ohm R_{GEN}=50ohm	-	6.7	-	ns
Rise time	tr		-	4.8	-	
Turn-off delay time	$t_{D(OFF)}$		-	17.3	-	
Total gate charge	Qg	V_{DS}=10V,I_D=500mA V_{GS}=5V	-	0.3	-	nC
Gate-source charge	Qgs		-	0.2	-	
Gate-drain charge	Qgd		-	0.08	-	
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode forward voltage	V_{SD}	V_{GS}=0V,Is=500mA	-	0.7	1.3	V

Thermal Characteristics

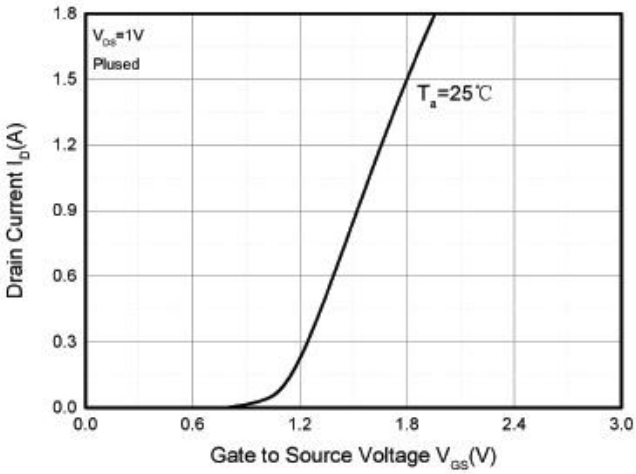
Parameter	Symbol	Typ	max	Unit
Thermal Resistance-Junction to Case	Rθjc	1.7	-	℃/W
Thermal Resistance junction-to ambient	RθJa	833	-	

Typical Performance Characteristics

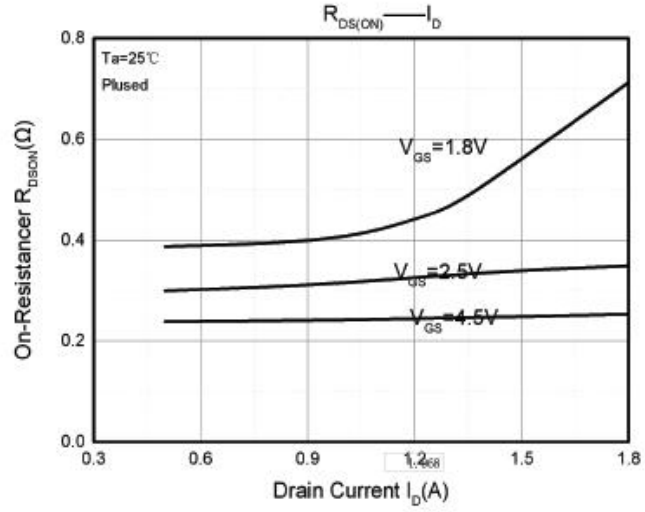
Output Characteristics



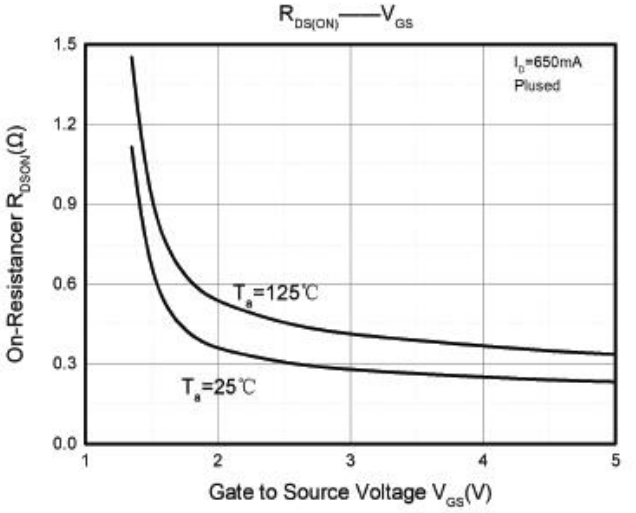
Transfer Characteristics



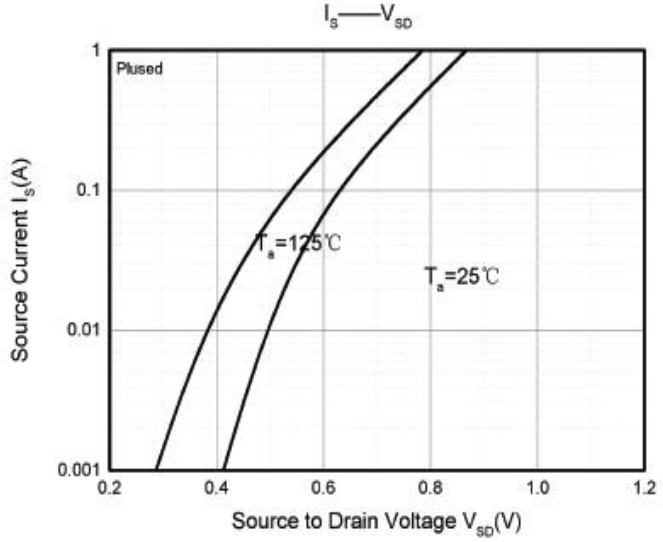
$R_{DS(ON)}$——I_D



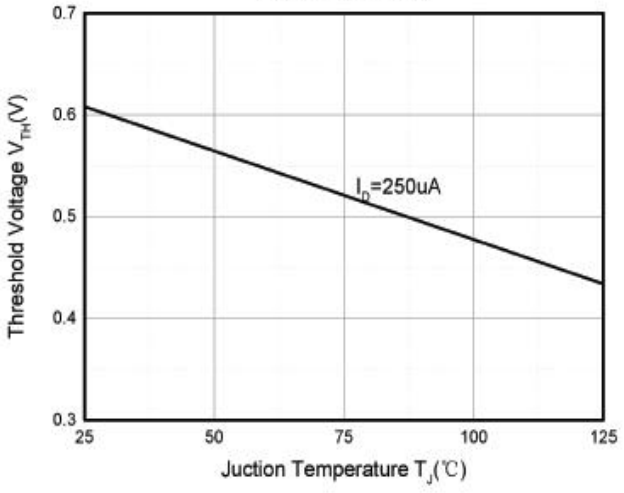
$R_{DS(ON)}$——V_{GS}



I_S——V_{SD}

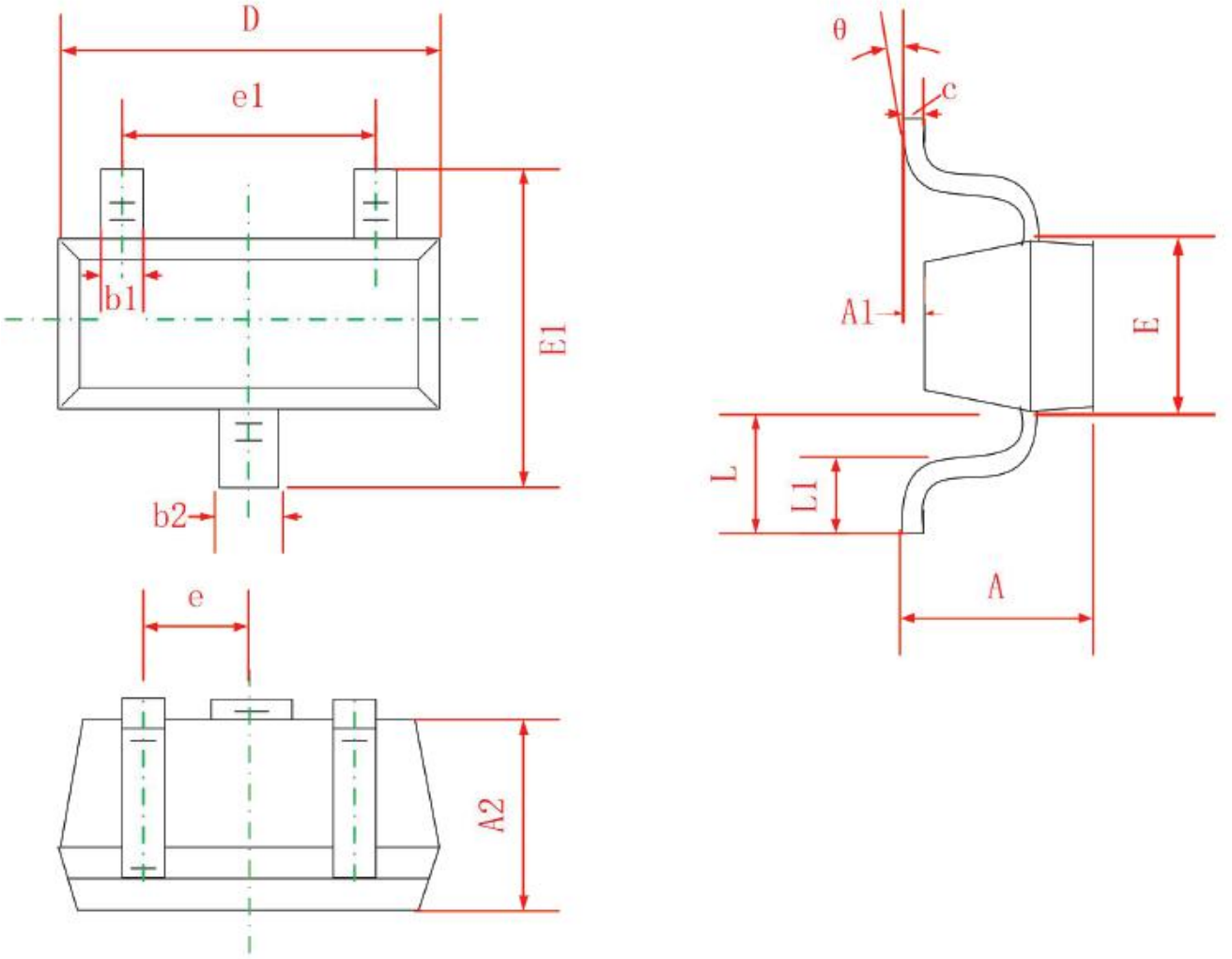


Threshold Voltage



Package Information

- **SOT-523**



Symbol	Dimensions In Millimeters	
	Min	Max
A	0.700	0.900
A1	0.000	0.100
A2	0.700	0.800
b1	0.150	0.250
b2	0.250	0.350
C	0.100	0.200
D	1.500	1.700
E	0.700	0.900
E1	1.450	1.750
e	0.500 TYP	
e1	0.900	1.100
L	0.400 REF	
L1	0.260	0.460
θ	0°	8°