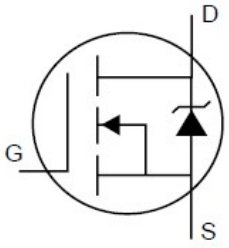
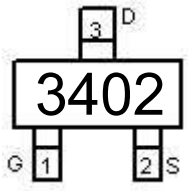
Description

TheAP3402designed by the trench processing techniques to achieve extremely low on-resistance. And fast switching speed and improved transfer effective . These features combine to make this design an extremely efficient and reliable device for variety of DC-DC applications.



Schematic diagram



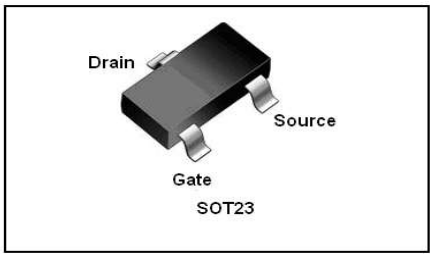
Marking and pin Assignment

Features

- Ron(typ.)=40mΩ @VGS=4.5V
- Ron(typ.)=35mΩ @VGS=10V
- Low On-Resistance
- 150°C Operating Temperature
- Fast Switching
- Lead-Free, RoHS Compliant

Application

- Battery protection
- Load switch
- Power management



Symbol	Parameter		Rating	Unit
Common Ratings (T_C=25°C Unless Otherwise Noted)				
V_{GS}	Gate-Source Voltage		±12	V
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage		30	V
T_J	Maximum Junction Temperature		150	°C
T_{STG}	Storage Temperature Range		-50 to 155	°C
I_S	Diode Continuous Forward Current	T_C=25°C	4.0	A
Mounted on Large Heat Sink				
I_{DM}	Pulse Drain Current Tested	T_C=25°C [1]	15	A
I_D	Continuous Drain Current(VGS=10V)	T_C=25°C	4.0	A
		T_C=100°C	3.0	
P_D	Maximum Power Dissipation	T_C=25°C	1.25	W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient		135	°C/W

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Electrical Characteristics @ T_J = 25°C (unless otherwise stated)						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V I_D=250μA	30	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current (Tc=25℃)	V_{DS}=30V,V_{GS}=0V	--	--	1	μA
	Zero Gate Voltage Drain Current (Tc=125℃)	V_{DS}=30V,V_{GS}=0V	--	--	100	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±12V,V_{DS}=0V	--	--	±100	nA
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	0.5	0.9	1.5	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=4.5V,I_D=3.0A	--	40	50	mΩ
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=4A	--	35	45	mΩ
Dynamic Electrical Characteristics @ T_J = 25°C (unless otherwise stated)						
C_{iss}	Input Capacitance	V_{DS}=15V,V_{GS}=0V, f=1MHz	--	245	--	pF
C_{oss}	Output Capacitance		--	35	--	pF
C_{rss}	Reverse Transfer Capacitance		--	18	--	pF
Q_g	Total Gate Charge	V_{DS}=15V,I_D=2.8A, V_{GS}=4.5V	--	4.8	--	nC
Q_{gs}	Gate-Source Charge		--	1.1	--	nC
Q_{gd}	Gate-Drain Charge		--	1.7	--	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=15V, I_D=1A, R_G=6Ω, V_{GS}=4.5V, RL=5Ω,	--	3.5	--	nS
t_r	Turn-on Rise Time		--	1.5	--	nS
$t_{d(off)}$	Turn-Off Delay Time		--	18	--	nS
t_f	Turn-Off Fall Time		--	2.5	--	nS
Source- Drain Diode Characteristics						
I_{SD}	Source-drain current(Body Diode)	T_C=25℃	--	--	4.0①	A
I_{SDM}	Pulsed Source-drain current (Body Diode)		--	--	15①	A
V_{SD}	Forward on voltage	T_j=25℃,I_{SD}=2.8A, V_{GS}=0V	--	0.85	1.3	V

Typical Electrical and Thermal Characteristics

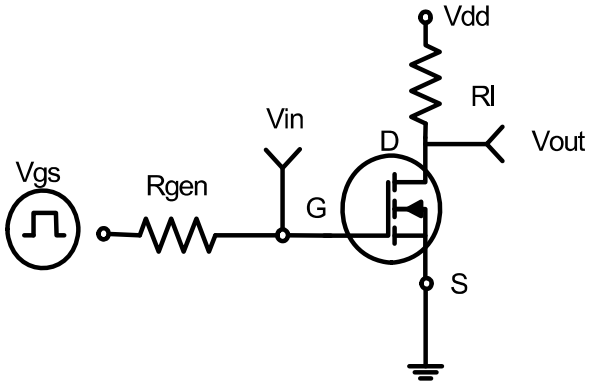


Figure 1:Switching Test Circuit

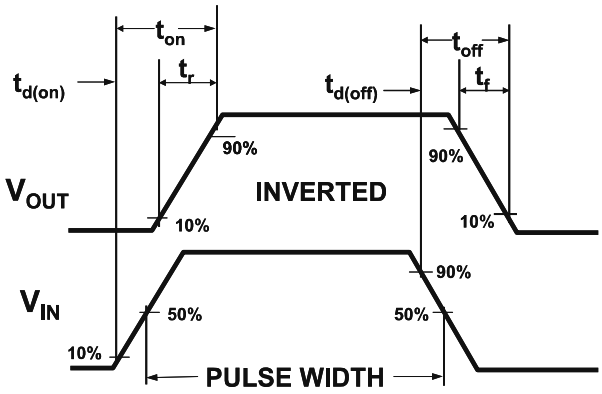


Figure 2:Switching Waveforms

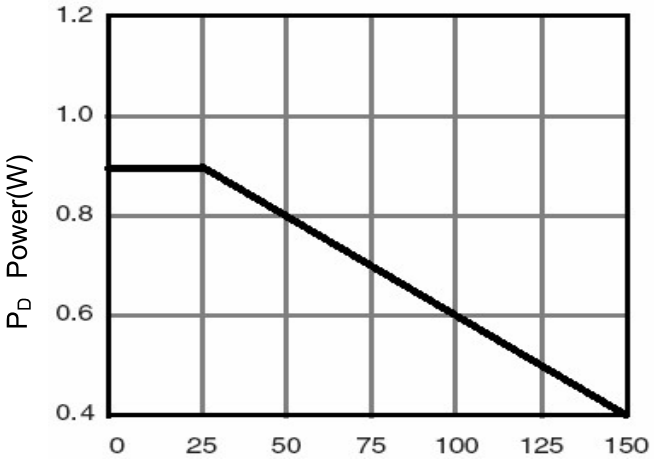


Figure 3 Power Dissipation

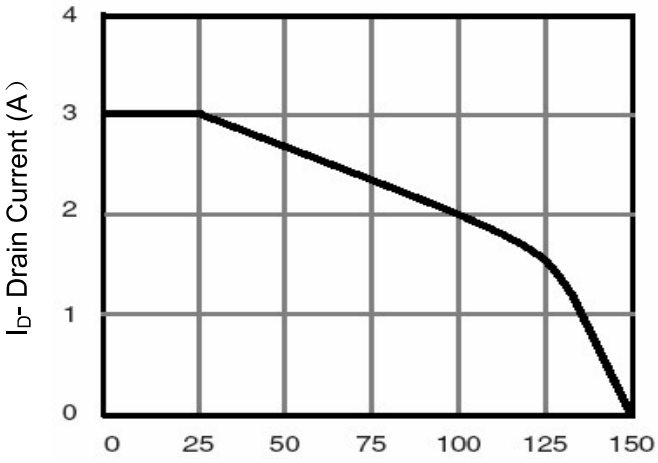


Figure 4 Drain Current

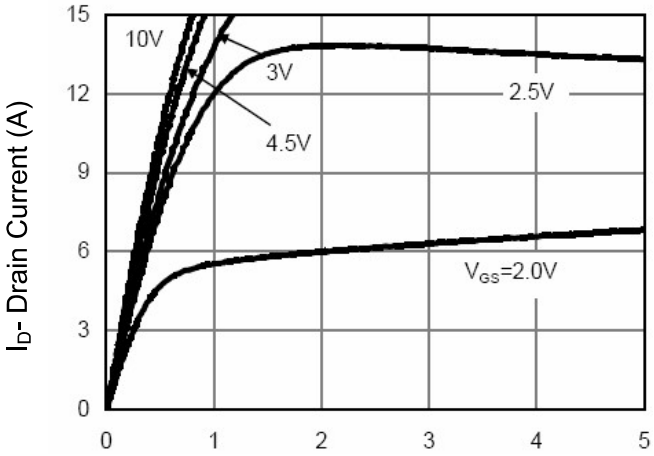


Figure 5 Output Characteristics

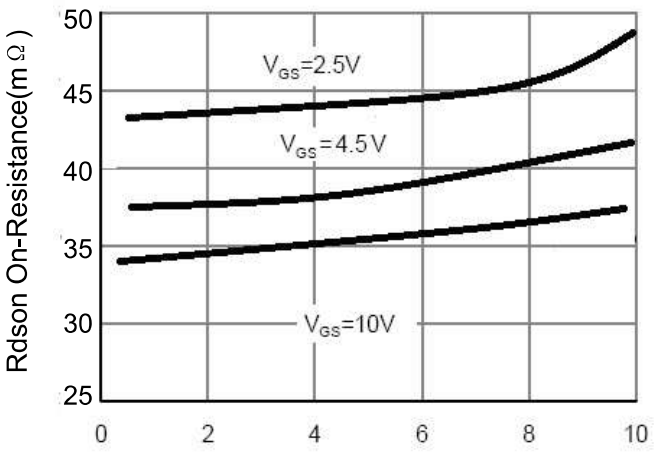


Figure 6 Drain-Source On-Resistance

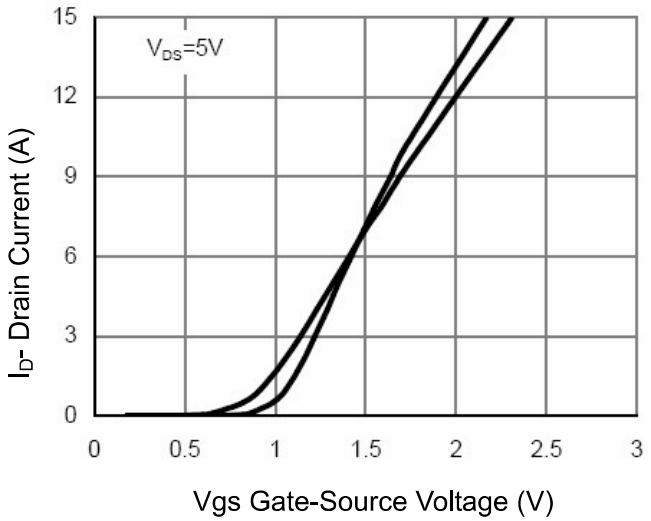


Figure 7 Transfer Characteristics

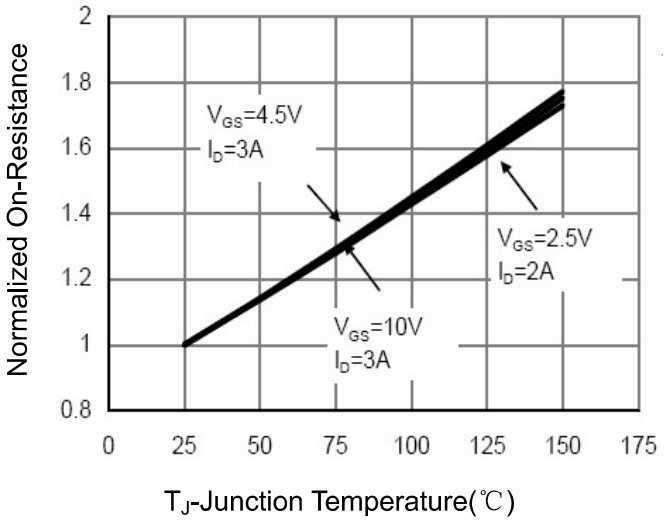


Figure 8 Drain-Source On-Resistance

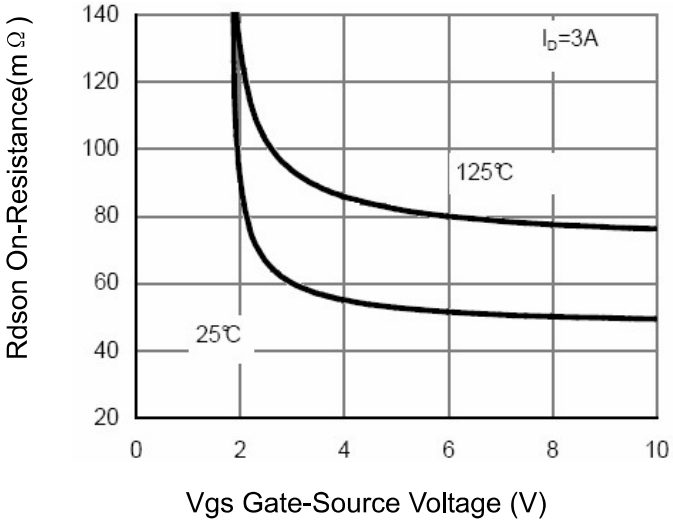


Figure 9 Rdson vs Vgs

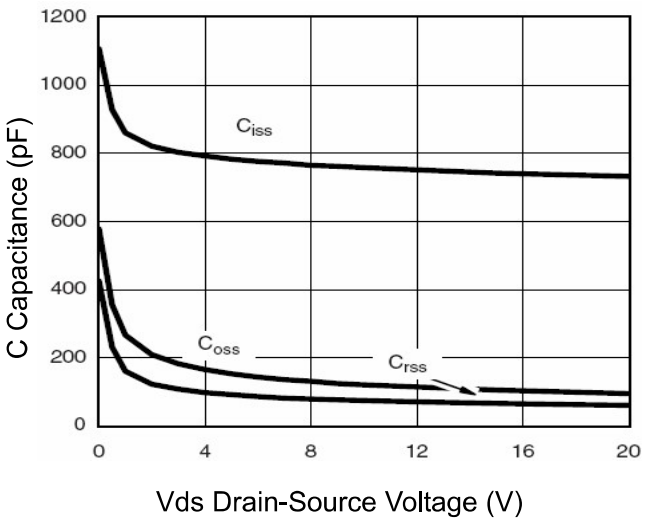


Figure 10 Capacitance vs Vds

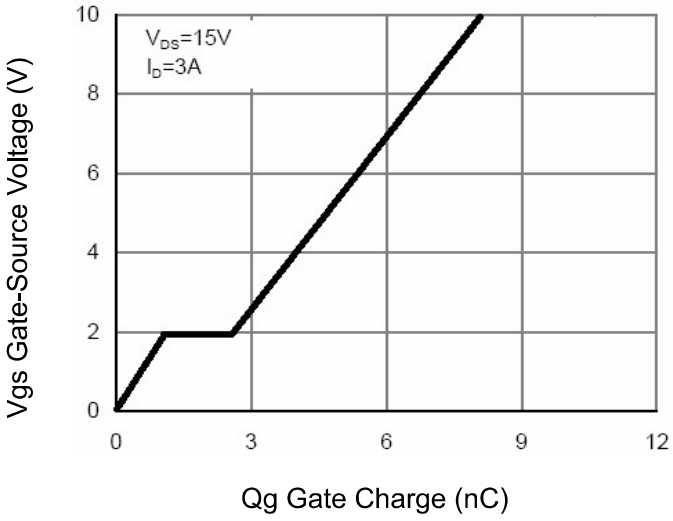


Figure 11 Gate Charge

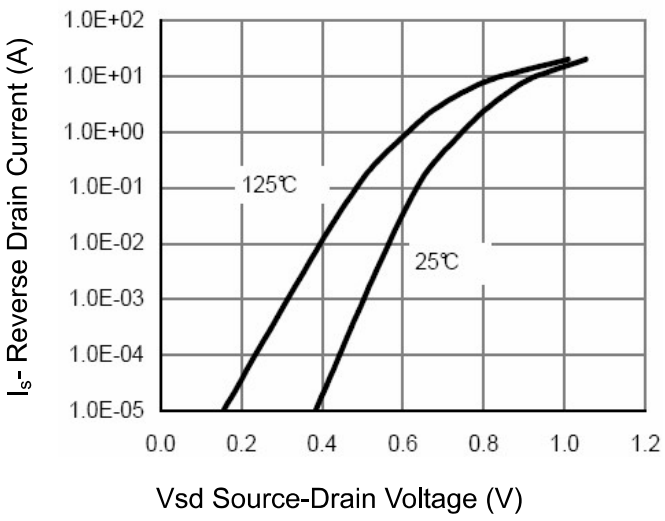
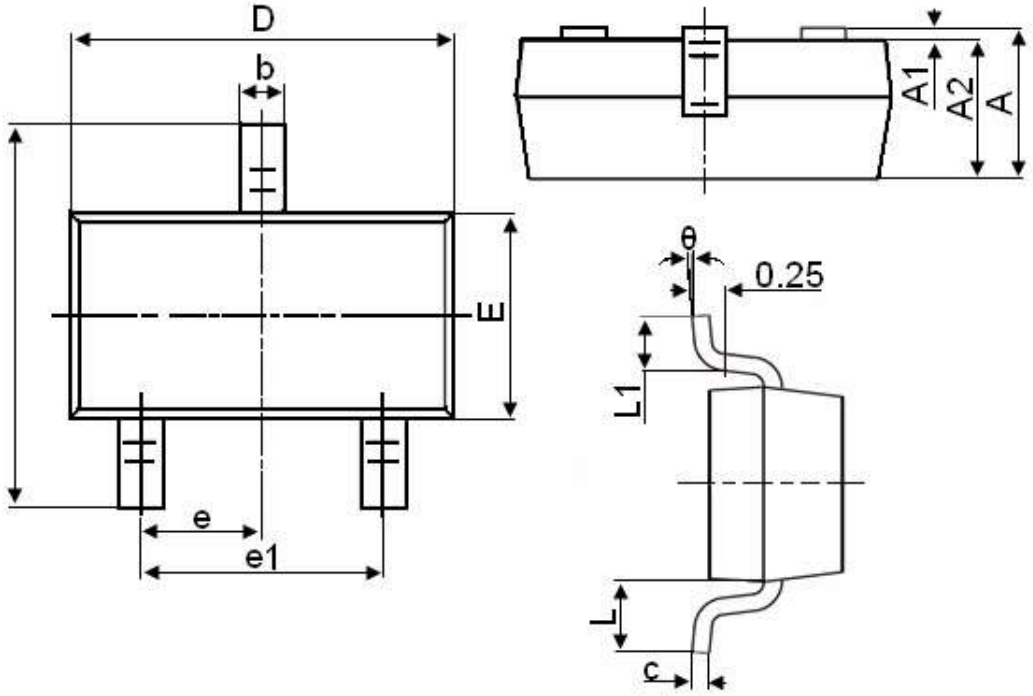


Figure 12 Source- Drain Diode Forward

SOT-23 Package Information



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°