BerSs

AO3400

N-CHANNEL LOW VOLTAGE MOSFET
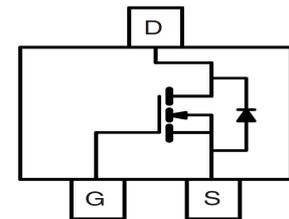
SOT-23

FEATURES

- Ultra low on-resistance:V_{DS}=30V,$R_{DS(ON)}$≤28mΩ@V_{GS}=10V,I_D=5.6A
- For PWM application
- For Load switch application
- Surface Mount device

MECHANICAL DATA

- Case: SOT-23
- Case Material: Molded Plastic. UL flammability
- Classification Rating: 94V-0

TOP VIEW

MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain-source voltage		V_{DS}	30	V
Gate-source voltage		V_{GS}	±12	V
Continuous drain current	T_A=25°C	I_D	5.6	A
	T_A=70°C	I_D	4.9	A
Pulsed drain current		I_{DM}*	30	A
Power dissipation	T_A=25°C	P_D	1.40	W
	T_A=70°C	P_D	0.9	W
Thermal resistance from Junction to ambient		$R_{\theta JA}$	125	°C/W
Junction temperature		T_J	150	°C
Storage temperature		T_{STG}	-55 ~+150	°C

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise specified)

Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Drain-Source breakdown voltage	$V_{(BR)DSS}$*	30			V	V_{GS}=0V, I_D=250µA
Zero gate voltage drain current	I_{DSS}*			1	uA	V_{DS}=30V, V_{GS}=0V
Gate-body leakage current	I_{GSS}*			±100	nA	V_{DS}=0V, V_{GS}=±12V
Gate-threshold voltage	$V_{GS(th)}$*	0.6	0.9	1.5	V	V_{DS}=V_{GS}, I_D=250µA
Drain-source on-resistance	$R_{DS(ON)}$*		21	28	mΩ	V_{GS}=10V, I_D=5.6A
			23	31	mΩ	V_{GS}=4.5V, I_D=5A
			28	45	mΩ	V_{GS}=2.5V, I_D=4A
On-State Drain Current	$I_{D(ON)}$*	30			A	V_{DS}=5V, V_{GS}=4.5V
Forward transconductance	g_{FS}		33		S	V_{DS}=5V, I_D=5.6A
Gate resistance	R_g	1.5	3	4.5	Ω	V_{GS}=0V, V_{DS}=0V, f=1MHz
Input capacitance	C_{iss}		630		pF	V_{DS}=15V, V_{GS}=0V, f=1MHz
Output capacitance	C_{oss}		75		pF	
Reverse transfer capacitance	C_{rss}		50		pF	
Turn-on delay time	$t_{d(on)}$		3		nS	V_{DS}=15V, V_{GS}=10V, R_{GEN}=3Ω, R_L=2.6Ω
Turn-on rise time	t_r		2.5		nS	
Turn-off delay time	$t_{d(off)}$		25		nS	
Turn-off fall time	t_f		4		nS	
Total gate charge	Q_g		6	7	nC	V_{DS}=15V, V_{GS}=4.5V, I_D=5.6A
Gate-source charge	Q_{gs}		1.3		nC	
Gate-drain charge	Q_{gd}		1.8		nC	
Diode forward voltage	V_{SD}		0.7	1	V	I_S=1A, V_{GS}=0V
Diode forward current	I_S			2	A	
Body Diode Reverse Recovery Time	t_{rr}		8.5		nS	I_F=5.6A, dI/dt=100A/ms
Body Diode Reverse Recovery Charge	Q_{rr}		2.6		nC	I_F=5.6A, dI/dt=100A/ms

* Pulse test ; Pulse width ≤300µs, Duty cycle ≤ 0.5% .

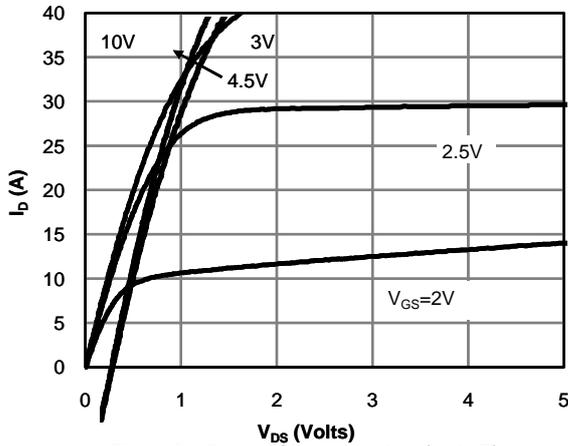## Typical Characteristics

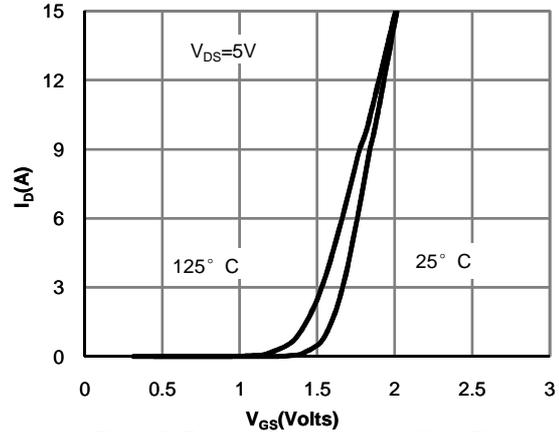**Fig 1: On-Region Characteristics (Note E)**

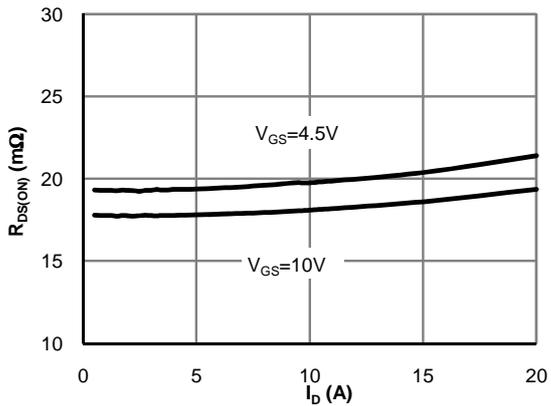**Figure 2: Transfer Characteristics (Note E)**

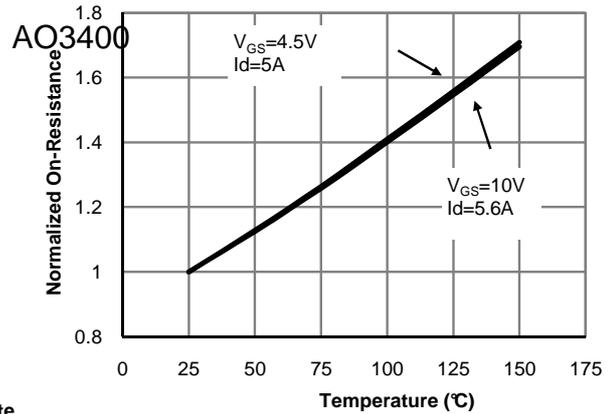**Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)**

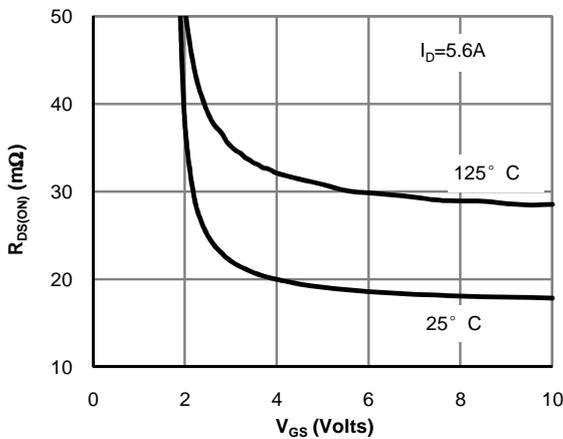**Figure 4: On-Resistance vs. Junction Temperature (Note E)**

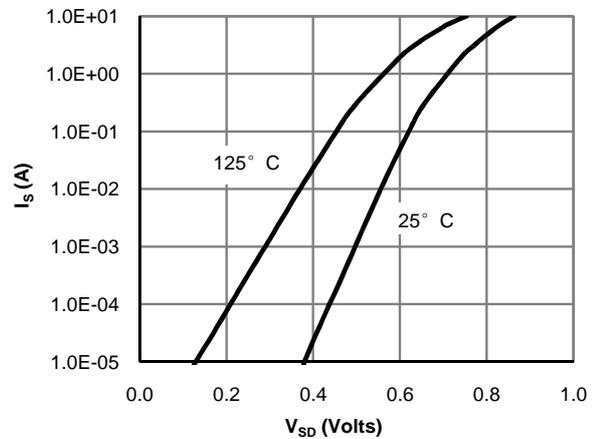**Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)**

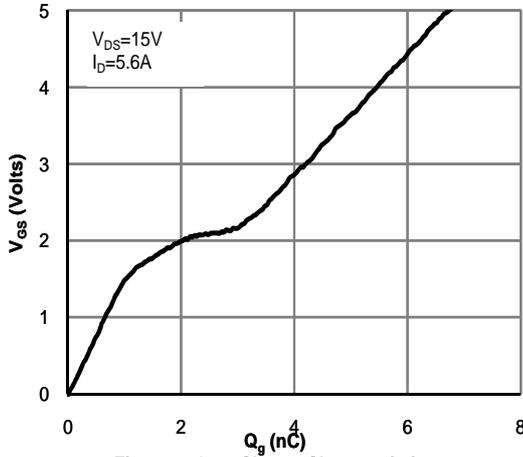**Figure 6: Body-Diode Characteristics (Note E)**
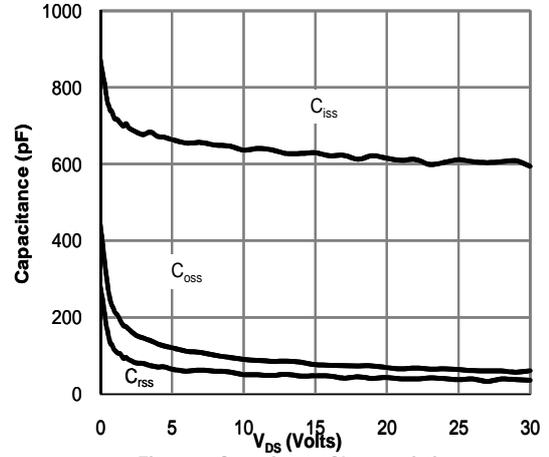
Figure 7: Gate-Charge Characteristics

$V_{DS}=15V$
$I_D=5.6A$

Figure 8: Capacitance Characteristics

C_{iss}
C_{oss}
C_{rss}
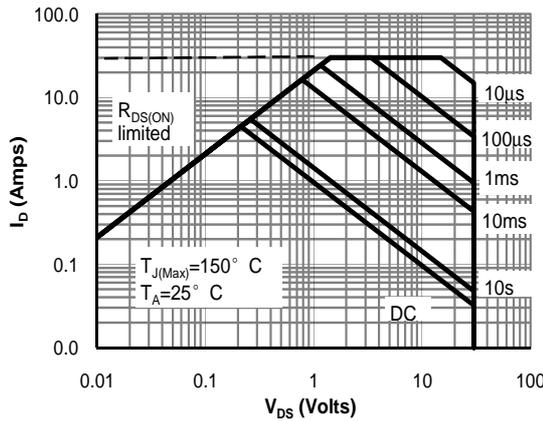
Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

$R_{DS(ON)}$ limited

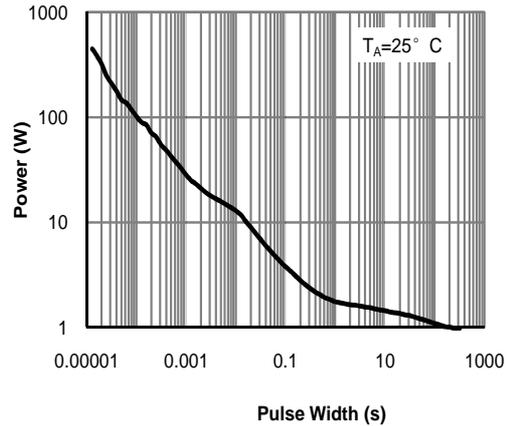$T_{J(Max)}=150°\,C$
$T_A=25°\,C$

10µs
100µs
1ms
10ms
10s
DC

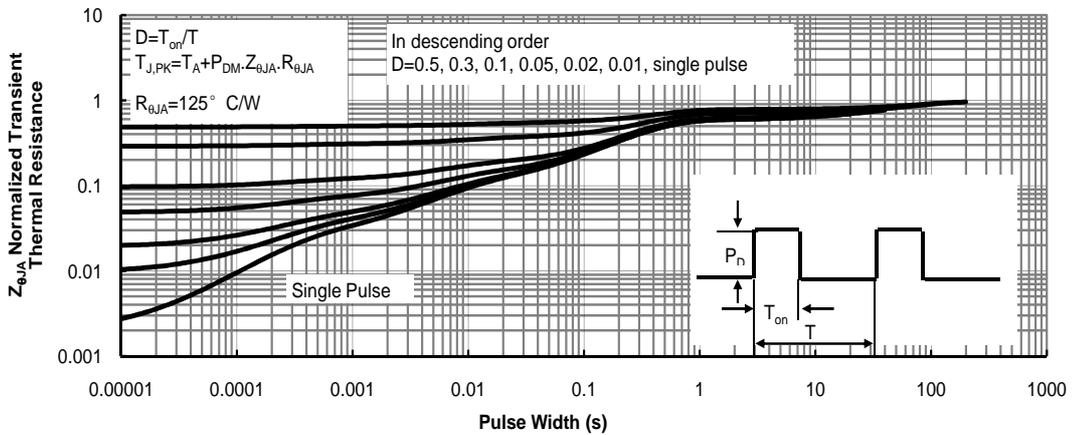**Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)**

$T_A=25°\,C$

Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

$D=T_{on}/T$
$T_{J,PK}=T_A+P_{DM}\cdot Z_{\theta JA}\cdot R_{\theta JA}$
$R_{\theta JA}=125°\,C/W$

In descending order
D=0.5, 0.3, 0.1, 0.05, 0.02, 0.01, single pulse

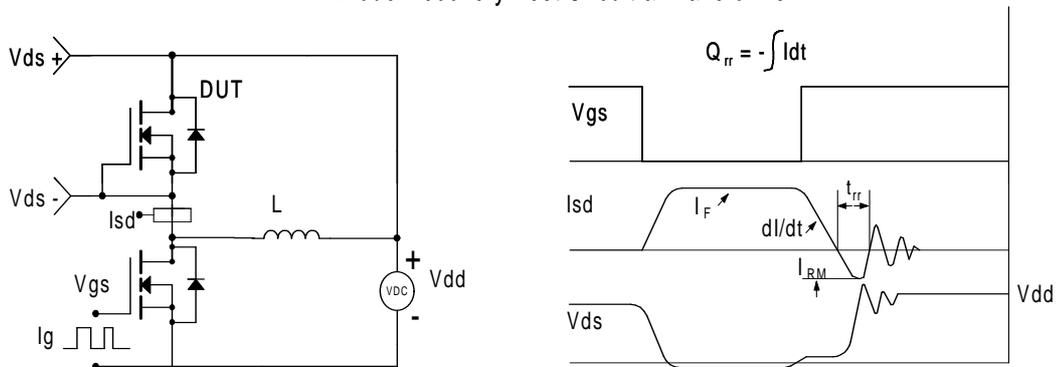Single Pulse

P_n
T_{on}
T

Gate Charge Test Circuit & Waveform
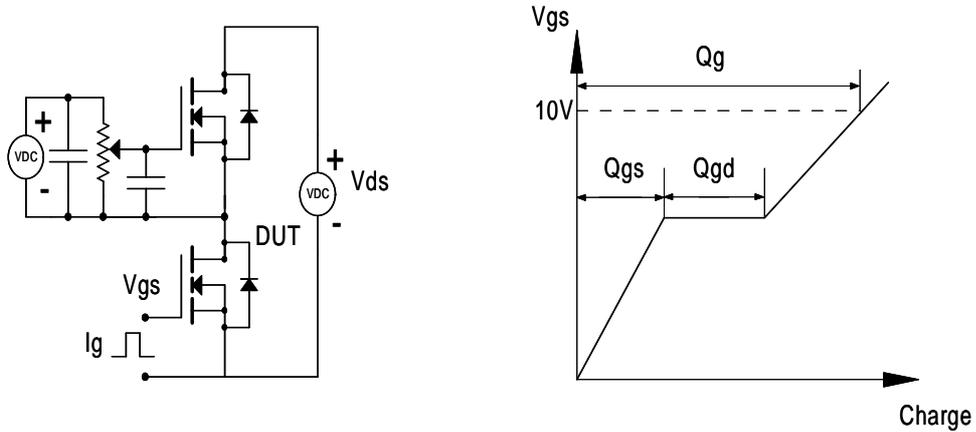
Resistive Switching Test Circuit & Waveforms
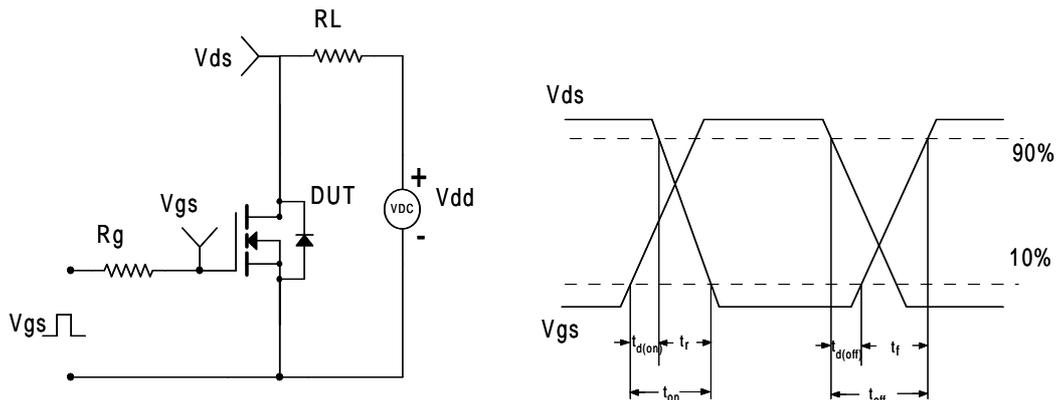
Diode Recovery Test Circuit & Waveforms

$$Q_{rr} = -\int Idt$$

SOT-23 Package Outline Dimensions
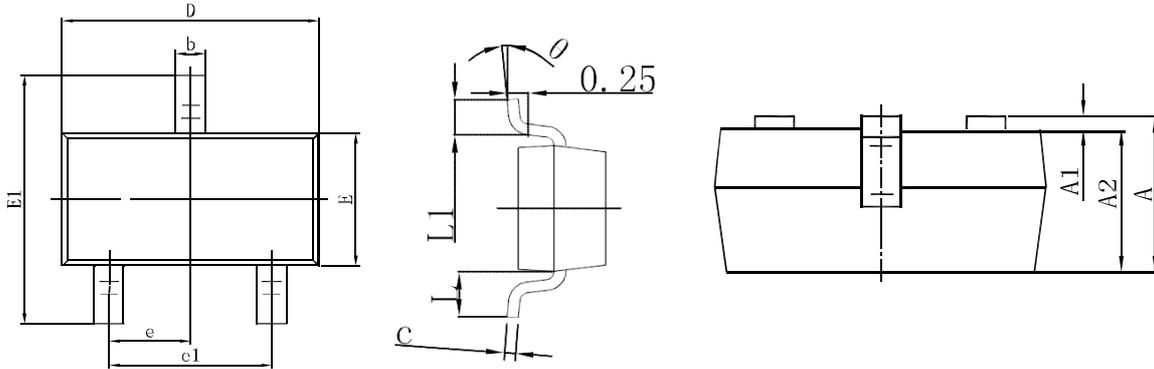
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

SOT-23 Suggested Pad Layout
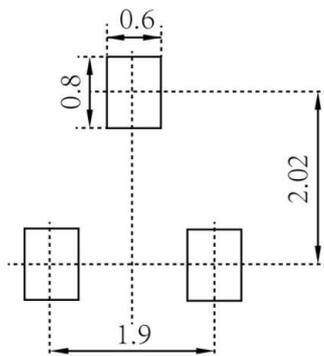
Note:

1.Controlling dimension: in millimeters

2.General tolerance: ±0.05mm

3.The pad layout is for reference purposes only