

General Description

These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

Features

30V, 6.0A, $R_{DS(ON)} = 18m\Omega$ @ $V_{GS} = 10V$

Improved dv/dt capability

Fast switching

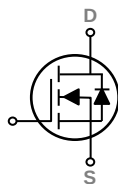
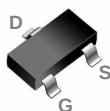
Green Device Available

Applications

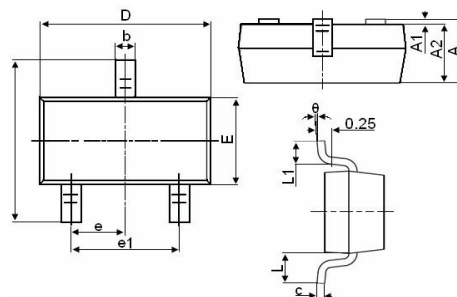
MB / VGA / Vcore

Load Switch

Hand-Held Instrument



SOT23-3L



Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	1.050	1.250
A1	0.000	0.100
A2	1.050	1.150
b	0.300	0.500
c	0.100	0.200
D	2.800	3.000
E	1.500	1.700
E1	2.650	2.950
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.600
θ	0°	8°

BVDSS	RDSON	ID
30V	18mΩ	6.0A

Absolute Maximum Ratings $T_c=25^{\circ}C$ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Drain Current – Continuous ($T_c=25^{\circ}C$)	6.0	A
	Drain Current – Continuous ($T_c=100^{\circ}C$)	3.8	A
I_{DM}	Drain Current – Pulsed ¹	23	A
P_D	Power Dissipation ($T_c=25^{\circ}C$)	1.4	W
	Power Dissipation – Derate above $25^{\circ}C$	0.012	W/ $^{\circ}C$
T_{STG}	Storage Temperature Range	-55 to 150	$^{\circ}C$
T_J	Operating Junction Temperature Range	-55 to 150	$^{\circ}C$

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	80	$^{\circ}C/W$

AO3404A

Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=250\mu A$	30	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , $I_D=1mA$	---	0.04	---	V/ $^\circ\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=30V$, $V_{GS}=0V$, $T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=24V$, $V_{GS}=0V$, $T_J=125^\circ\text{C}$	---	---	10	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance ³	$V_{GS}=10V$, $I_D=5.5A$	---	18	25	m Ω
		$V_{GS}=4.5V$, $I_D=4A$	---	27	40	m Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=250\mu A$	1.0	1.6	2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-4	---	mV/ $^\circ\text{C}$

Dynamic and switching Characteristics

Q_g	Total Gate Charge ^{3,4}	$V_{DS}=15V$, $V_{GS}=4.5V$, $I_D=6A$	---	4.1	---	nC
Q_{gs}	Gate-Source Charge ^{3,4}		---	1	---	
Q_{gd}	Gate-Drain Charge ^{3,4}		---	2.1	---	
$T_{d(on)}$	Turn-On Delay Time ^{3,4}	$V_{DD}=15V$, $V_{GS}=10V$, $R_G=6\Omega$ $I_D=1A$	---	2.8	---	ns
T_r	Rise Time ^{3,4}		---	7.2	---	
$T_{d(off)}$	Turn-Off Delay Time ^{3,4}		---	15.8	---	
T_f	Fall Time ^{3,4}		---	4.6	---	
C_{iss}	Input Capacitance	$V_{DS}=25V$, $V_{GS}=0V$, $F=1MHz$	---	345	---	pF
C_{oss}	Output Capacitance		---	55	---	
C_{rss}	Reverse Transfer Capacitance		---	32	---	

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_G=V_D=0V$, Force Current	---	---	6.0	A
I_{SM}	Pulsed Source Current ³		---	---	12	A
V_{SD}	Diode Forward Voltage ³	$V_{GS}=0V$, $I_S=1A$, $T_J=25^\circ\text{C}$	---	---	1.2	V

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. $V_{DD}=25V$, $V_{GS}=10V$, $L=1mH$, $I_{AS}=8A$, $R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$.
3. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
4. Essentially independent of operating temperature.

RATING AND CHARACTERISTIC CURVES (AO3404A)

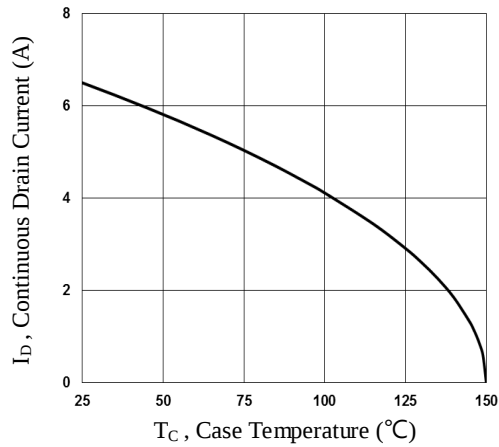


Fig.1 Continuous Drain Current vs. T_C

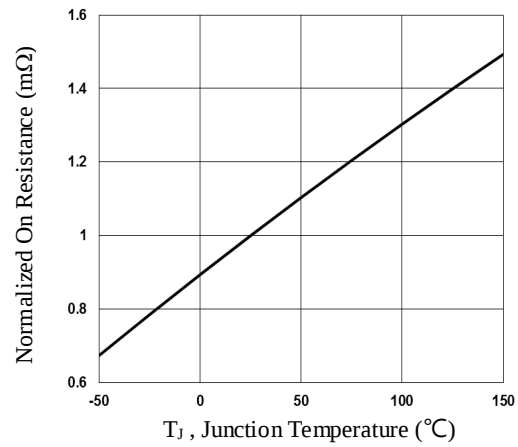


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

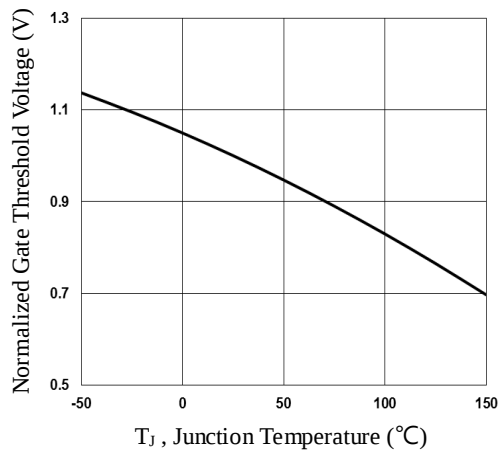


Fig.3 Normalized V_{th} vs. T_J

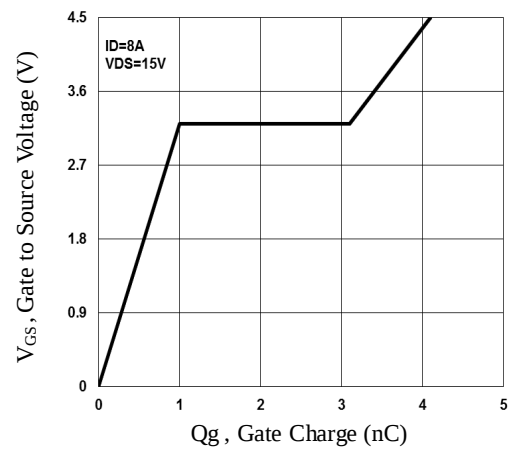


Fig.4 Gate Charge Waveform

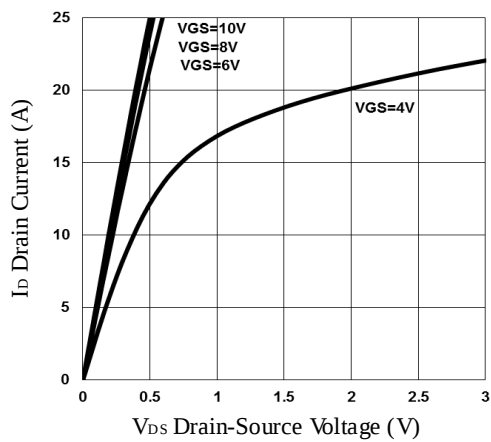


Fig.5 On Region Characteristics

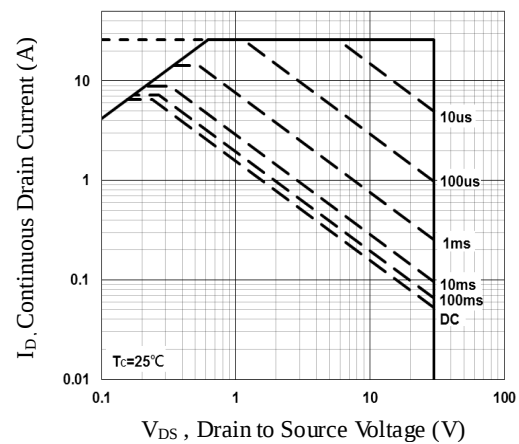


Fig.6 Maximum Safe Operation Area

RATING AND CHARACTERISTIC CURVES (AO3404A)

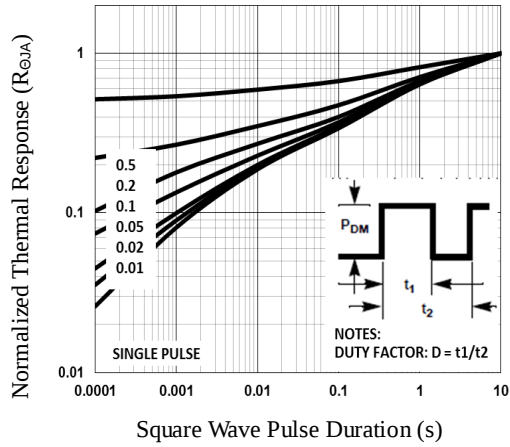


Fig.7 Normalized Transient Response

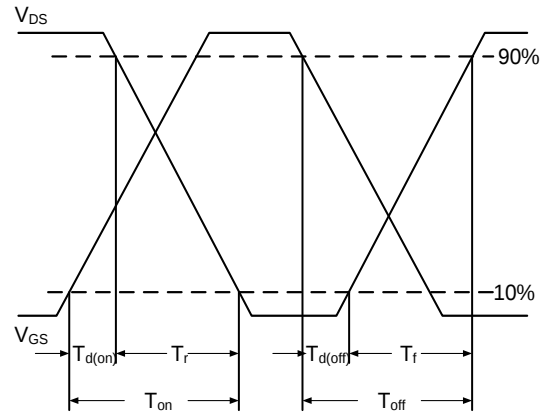


Fig.8 Switching Time Waveform