

60VN-ChannelMOSFETS

SOT-23-3 PinConfiguration

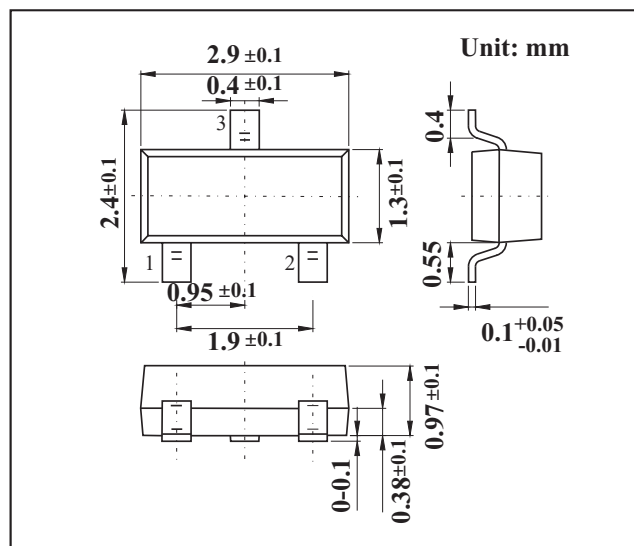
BVDSS	RDSON	ID
60V	75mΩ	3.2A

Features

- 60V,3.2A, $R_{DS(ON)} = 75m\Omega @ V_{GS} = 10V$
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available

Applications

- Motor Drive
- Power Tools
- LED Lighting



MAXIMUM RATINGS AND CHARACTERISTICS

@ 25°C Ambient Temperature (unless otherwise noted)

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current – Continuous ($T_C=25^\circ C$)	I_D	3.2	A
Drain Current – Continuous ($T_C=100^\circ C$)		2	A
Drain Current – Pulsed ¹	I_{DM}	12.8	A
Power Dissipation ($T_C=25^\circ C$)	P_D	1.56	W
Power Dissipation – Derate above 25°C		0.012	W/°C
Storage Temperature Range	T_{STG}	-50 to 150	°C
Operating Junction Temperature Range	T_J	-50 to 150	°C

Thermal Characteristics

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

MOSFET ELECTRICAL CHARACTERISTICS $T_A=25^{\circ}\text{C}$ unless otherwise specified

Off Characteristics

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V$, $I_D=250\mu A$	60	---	---	V
BV_{DSS} Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C , $I_D=1\text{mA}$	---	0.05	---	$V/^{\circ}\text{C}$
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=60V$, $V_{GS}=0V$, $T_J=25^{\circ}\text{C}$	---	---	1	μA
		$V_{DS}=48V$, $V_{GS}=0V$, $T_J=125^{\circ}\text{C}$	---	---	10	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA

On Characteristics

Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V$, $I_D=6A$	---	60	75	$m\Omega$
		$V_{GS}=4.5V$, $I_D=3A$	---	70	90	$m\Omega$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}$, $I_D=250\mu A$	1.2	1.8	2.5	V
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$		---	-5	---	$mV/^{\circ}\text{C}$
Forward Transconductance	g_{fs}	$V_{DS}=10V$, $I_D=3A$	---	7	---	S

Dynamic and switching Characteristics

Total Gate Charge ^{2, 3}	Q_g	$V_{DS}=48V$, $V_{GS}=10V$, $I_D=6A$	---	9.3	14	nC
Gate-Source Charge ^{2, 3}	Q_{gs}		---	2.1	4	
Gate-Drain Charge ^{2, 3}	Q_{gd}		---	1.8	4	
Turn-On Delay Time ^{2, 3}	$T_{d(on)}$	$V_{DD}=30V$, $V_{GS}=10V$, $R_G=3.3\Omega$, $I_D=1A$	---	2.9	6	ns
Rise Time ^{2, 3}	T_r		---	9.5	18	
Turn-Off Delay Time ^{2, 3}	$T_{d(off)}$		---	18.4	35	
Fall Time ^{2, 3}	T_f		---	5.3	10	
Input Capacitance	C_{iss}	$V_{DS}=15V$, $V_{GS}=0V$, $F=1\text{MHz}$	---	500	725	pF
Output Capacitance	C_{oss}		---	45	65	
Reverse Transfer Capacitance	C_{rss}		---	16	30	
Gate resistance	R_g	$V_{GS}=0V$, $V_{DS}=0V$, $F=1\text{MHz}$	---	2	4	Ω

Drain-Source Diode Characteristics and Maximum Ratings

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	I_S	$V_G=V_D=0V$, Force Current	---	---	3.2	A
Pulsed Source Current	I_{SM}		---	---	6.4	A
Diode Forward Voltage	V_{SD}	$V_{GS}=0V$, $I_S=1A$, $T_J=25^{\circ}\text{C}$	---	---	1	V
Reverse Recovery Time ²	t_{rr}	$V_{GS}=30V$, $I_S=1A$, $dI/dt=100A/\mu s$	---	23.2	---	ns
Reverse Recovery Charge ²	Q_{rr}	$T_J=25^{\circ}\text{C}$	---	14.3	---	nC

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
3. Essentially independent of operating temperature.

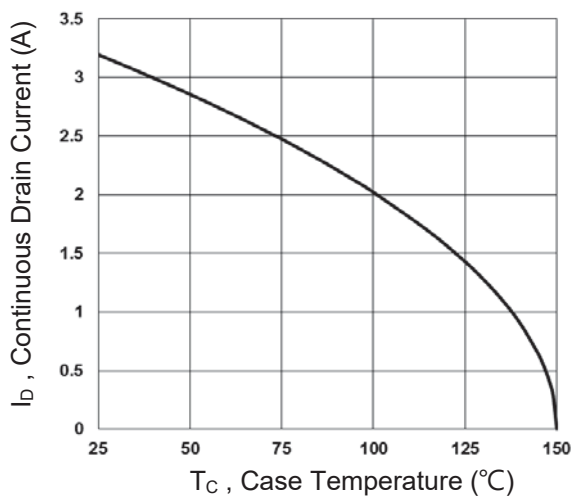


Fig.1 Continuous Drain Current vs. T_c

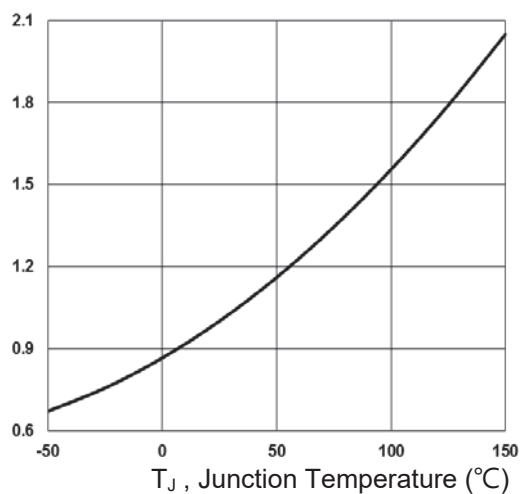


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

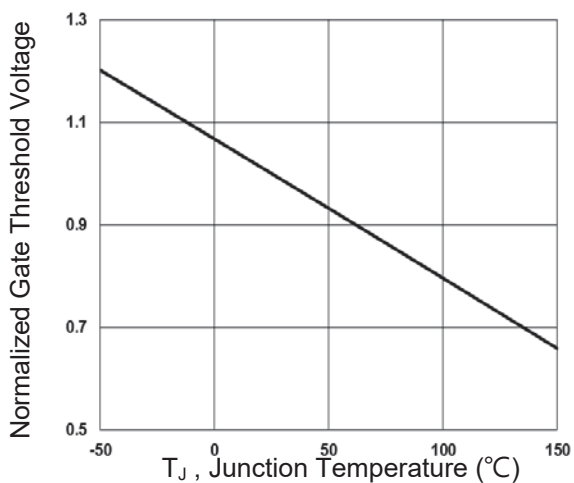


Fig.3 Normalized V_{th} vs. T_J

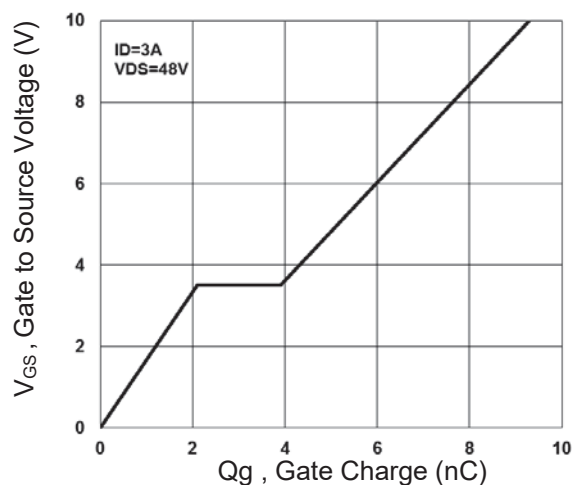


Fig.4 Gate Charge Waveform

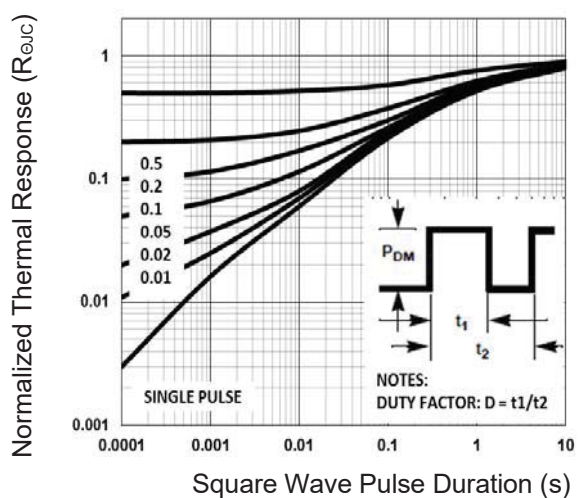


Fig.5 Normalized Transient Response

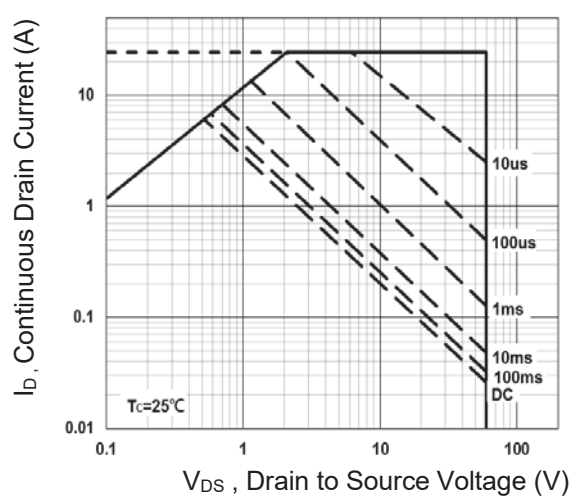


Fig.6 Maximum Safe Operation Area

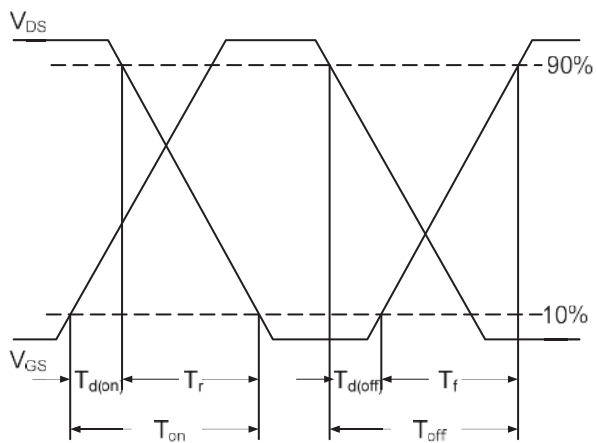


Fig.7 Switching Time Waveform

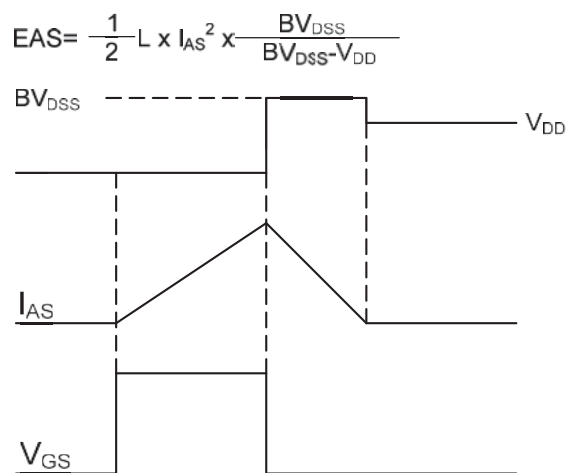


Fig.8 EAS Waveform