

SQA18N50

500V 18A N-channel Enhancement Mode Power MOSFET

Features

- Low on-Resistance: $R_{DS(on)}=0.203\Omega$ (typ.)
- Special Process Technology for high ESD Capability
- 100% Avalanche Test
- Good Stability and Uniformity with High E_{AS}

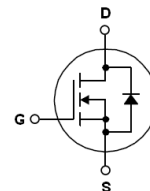
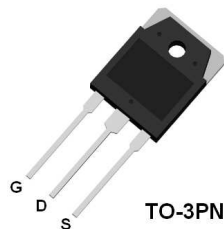
Description

The SQA18N50 is an N-Channel enhancement mode power MOSFET, it has low static on-resistance and high avalanche energy strength. This device provide excellent switching performance for UPS,DC-DC converters and AC-DC power supply.

Applications

- UPS Applications
- DC-DC Converters and AC-DC Power Supply

Package Type & Internal Circuit



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

Symbol	Parameter		Ratings	Unit
V _{DSS}	Drain to Source Voltage		500	V
V _{GSS}	Gate to Source Voltage		±30	V
I _D	Drain Current	T _c =25℃	18	A
		T _c =100℃	10.8	A
I _{DM}	Pulsed Drain Current (Note1)		92	A
P _D	Maximum Power Dissipation	T _c =25℃	235	W
	Derate above 25℃		1.88	W/℃
E _{AS}	Single Pulsed Avalanche Energy (Note 2)		1298	mJ
T _J	Operating Junction Temperature Range		-55~+150	℃
T _{STG}	Storage Temperature Range		-55~+150	℃

Thermal Characteristics

Symbol	Parameter	Ratings	Unit
$R_{th(J-C)}$	Thermal Resistance, Junction to case	0.53	$^\circ\text{C}/\text{W}$
$R_{th(J-A)}$	Thermal Resistance, Junction to Ambient	60	$^\circ\text{C}/\text{W}$

**Electrical Characteristics** @ $T_c=25\text{ }^{\circ}\text{C}$ unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain to Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	500	-	-	V
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	3.0	4.1	5.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=9A$	-	0.223	0.260	Ω
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=V_{DSS}, V_{GS}=0V$	-	-	1	μA
I_{GSS}	Gate to Source Leakage Current	$V_{GS}=V_{GSS}, V_{DS}=0V$	-	-	± 100	nA

D-S Diode Characteristics and Maximum Rating @ $T_c=25\text{ }^{\circ}\text{C}$ unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Maximum Drain to Source Diode Forward Current		-	-	18	A
V_{SD}	Drain-Source Diode Forward Voltage	$V_{GS}=0V, I_S=18A$	-	0.876	1.25	V
T_{rr}	Reverse Recovery Time	$V_{GS}=0V, I_S=18A,$	-	0.55	-	μs
Q_{rr}	Reverse Recovery Charge	$di/dt=-100A/\mu s$	-	5.5	-	μC

Switching Characteristics @ $T_c=25\text{ }^{\circ}\text{C}$ unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Delay Time	$I_D=18A,$ $V_{DD}=250V,$ $R_G=25\Omega$ (Note 3)	-	70	-	ns
t_r	Turn-on Rise Time		-	190	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	100	-	ns
t_f	Turn-off Fall Time		-	100	-	ns
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=25V,$ $f=1.0MHz$	-	2500	-	pF
C_{oss}	Output Capacitance		-	400	-	pF
C_{rss}	Reverse Transfer Capacitance		-	40	-	pF
Q_g	Total Gate Charge	$I_D=18A,$ $V_{DS}=400V$ $V_{GS}=10V$ (Note 3)	-	46	-	nC
Q_{gs}	Gate to Emitter Charge		-	14	-	nC
Q_{gd}	Gate to Collector Charge		-	22	-	nC

Note:

1. Repetitive rating: pulse-width limited by maximum junction temperature
2. $L=8.0mH, I_{AS}=18A, V_{DD}=50V, V_G=10V, @T_c=25^{\circ}C$
3. Essentially independent of operating temperature typical characteristics

Typical Performance Characteristics

Fig. 1. Typical on-Resistance Characteristics

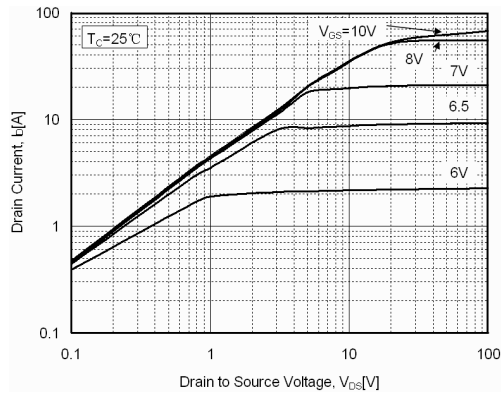


Fig. 2. Typical Transfer Characteristics

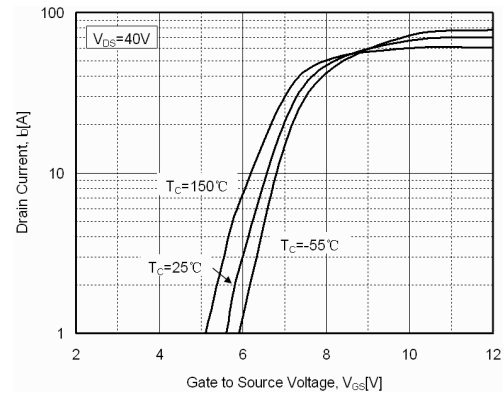


Fig. 3. Static on-Resistance vs. I_D

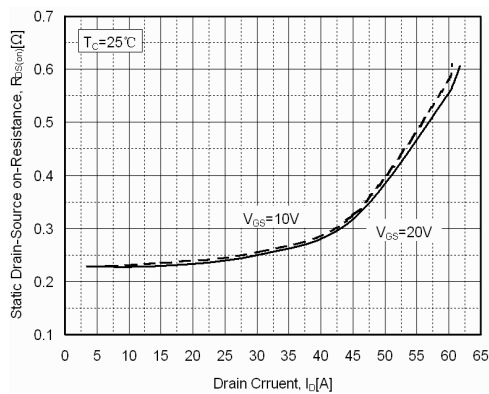


Fig. 4. Body Diode Forward Voltage vs. I_DR

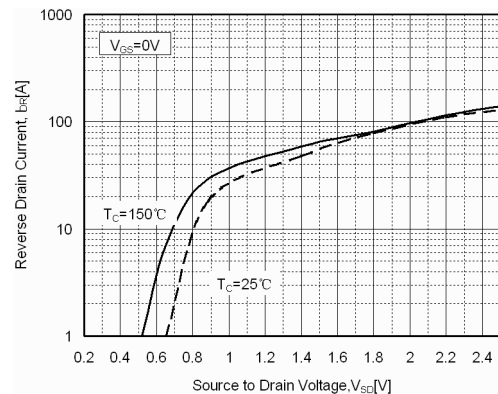


Fig. 5. Capacitance Characteristics

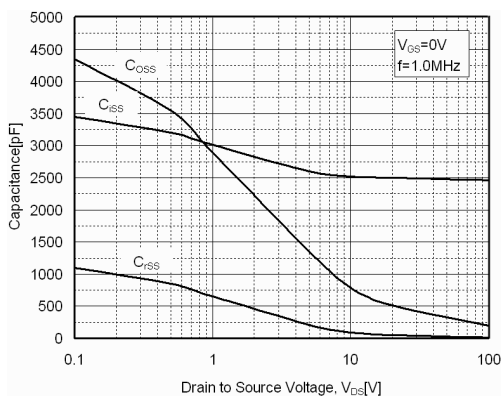
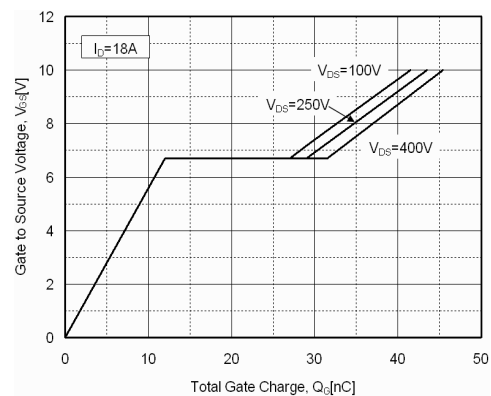


Fig. 6. Gate Charge Characteristics



Typical Performance Characteristics

Fig. 7. Breakdown Voltage vs. Temperature

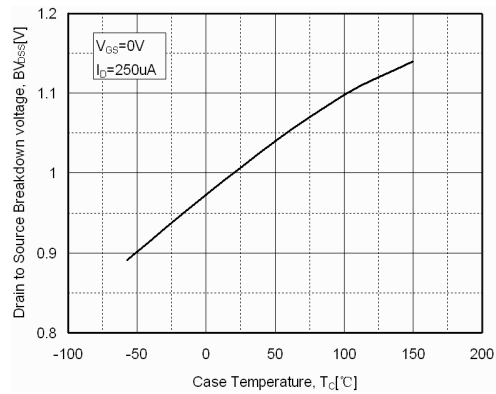


Fig. 8. Static on-Resistance vs. Temperature

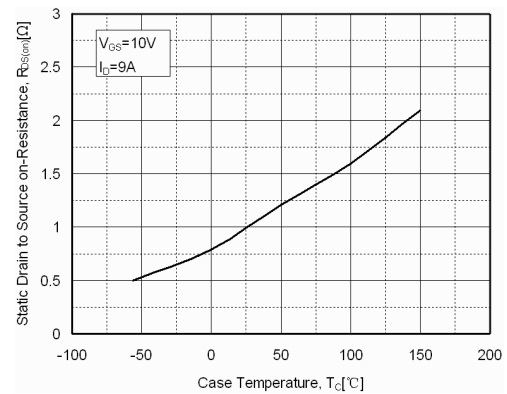


Fig. 9. Maximum Safe Operating Area

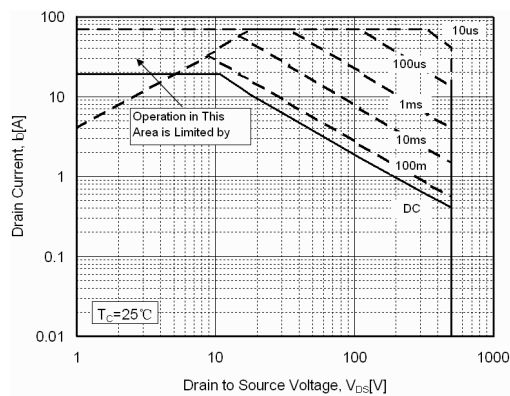


Fig. 10. Maximum Drain Current vs. Temperature

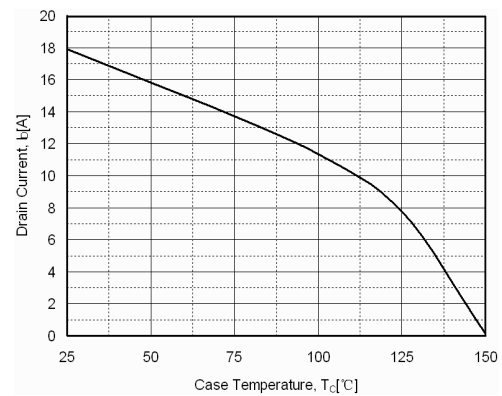
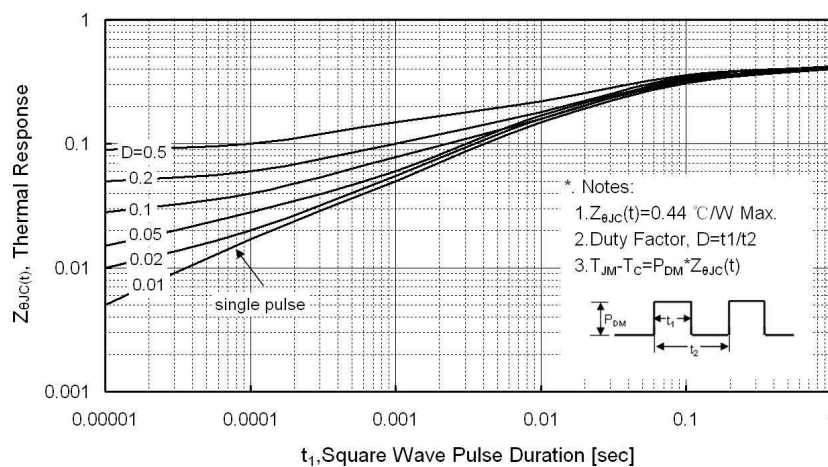


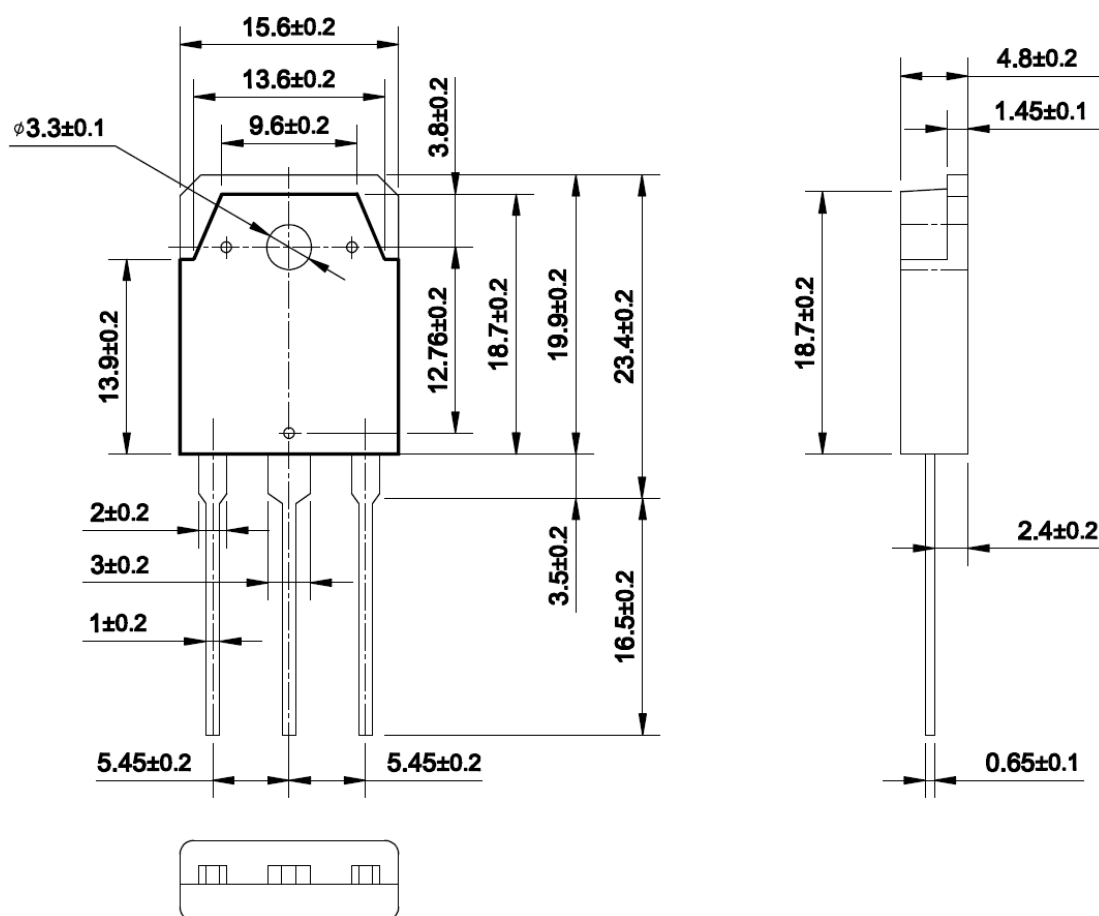
Fig. 11. Transient Thermal Response Curve



Package Dimensions

TO-3PN

(Dimensions in Millimeters)



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