

SQA24N50

500V 24A N-channel Enhancement Mode Power MOSFET

Features

- Low on-Resistance: $R_{DS(on)}=0.17\Omega(\text{typ.})$
- Special Process Technology for High ESD Capability
- 100% Avalanche Test
- Good Stability and Uniformity with High E_{AS}

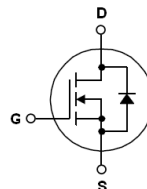
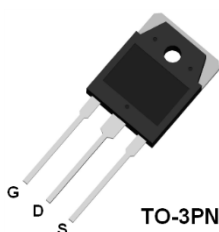
Description

The SQA24N50 is an N-channel enhancement mode power MOSFET, it has low static on-resistance and high avalanche energy strength. This device is well suited for high efficiency switch mode power supply, power factor correction, electronic lamp based on half bridge.

Applications

- Switched Mode Power Supplies
- Active Power Factor Correction, Electronic Ballasts

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℃	24	A
		T _C =100℃	15.6	A
I _{DM}	Pulsed Drain Current (Note1)		96	A
P _D	Maximum Power Dissipation	T _C =25℃	290	W
	Derate above 25℃		2.33	W/℃
E _{AS}	Single Pulsed Avalanche Energy (Note 2)		1872	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	0.43	$^\circ\text{C/W}$
$R_{th(J-A)}$	Thermal Resistance, Junction to Ambient	40	$^\circ\text{C/W}$

Electrical Characteristics @T_c=25 °C unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain to Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	500	-	-	V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	2.0	-	4.0	V
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =12A	-	0.17	0.19	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 °C unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Maximum Drain to Source Diode Forward Current		-	-	24	A
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} =0V, I _S =24A	-	-	1.4	V
t _{rr}	Reverse Recovery Time	V _{GS} =0V, I _S =24A,	-	400	-	ns
Q _{rr}	Reverse Recovery Charge	di/dt=-100A/μs	-	4.3	-	nC

Switching Characteristics @T_c=25 °C unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
t _{d(on)}	Turn-on Delay Time	I _D =24A, V _{DD} =250V, R _G =25Ω (Note 3)	-	84	178	ns
t _r	Turn-on Rise Time		-	262	525	ns
t _{d(off)}	Turn-off Delay Time		-	210	420	ns
t _f	Turn-off Fall Time		-	162	336	ns
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =25V, f=1.0MHz	-	3675	4725	pF
C _{oss}	Output Capacitance		-	546	703	pF
C _{rss}	Reverse Transfer Capacitance		-	57	73	pF
Q _g	Total Gate Charge	I _D =24A, V _{DD} =400V V _{GS} =10V (Note 3)	-	94	126	nC
Q _{ge}	Gate to Emitter Charge		-	24	-	nC
Q _{gc}	Gate to Collector Charge		-	46	-	nC

Note:

1. Repetitive rating: pulse-width limited by maximum junction temperature
2. V_{DD}=50V, L=6.5mH, R_G=25Ω, V_G=10V, I_{AS}=24A, starting T_c=25°C
3. Essentially independent of operating temperature typical characteristics

Typical Performance Characteristics

Fig. 1. Typical on-Resistance Characteristics

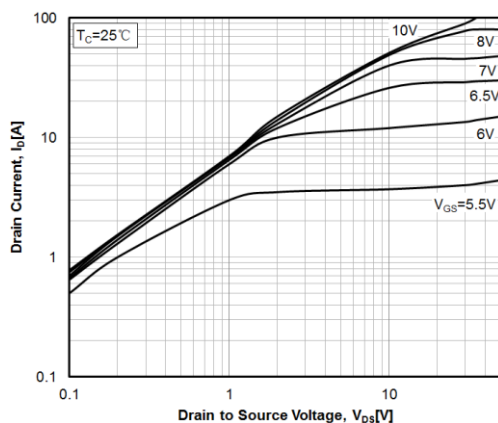


Fig. 2. Typical Transfer Characteristics

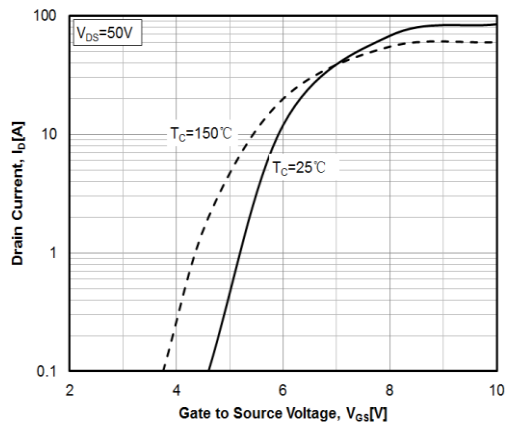


Fig. 3. Static on-Resistance vs. I_D

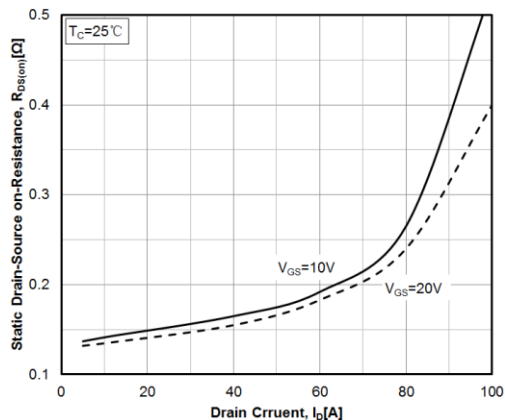


Fig. 4. Body Diode Forward Voltage vs. I_{DR}

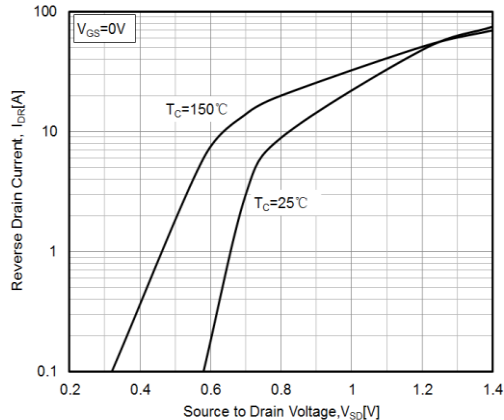


Fig. 5. Capacitance Characteristics

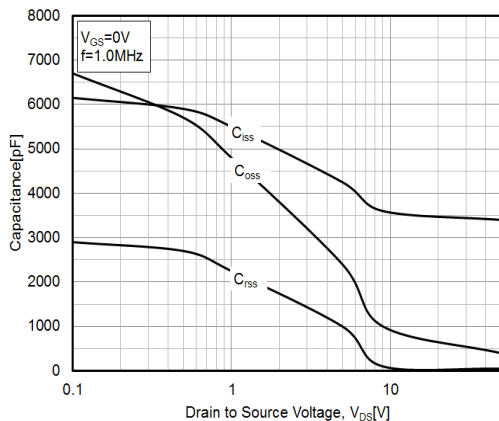
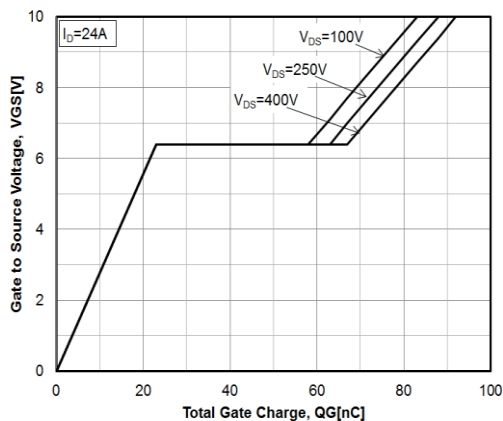


Fig. 6. Gate Charge Characteristics



Typical Performance Characteristics

Fig. 7. Breakdown Voltage vs. Temperature

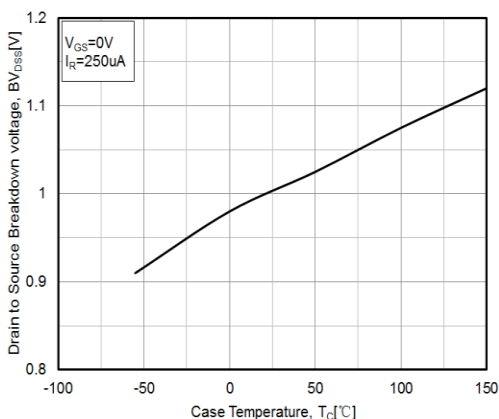


Fig. 8. Static on-Resistance vs. Temperature

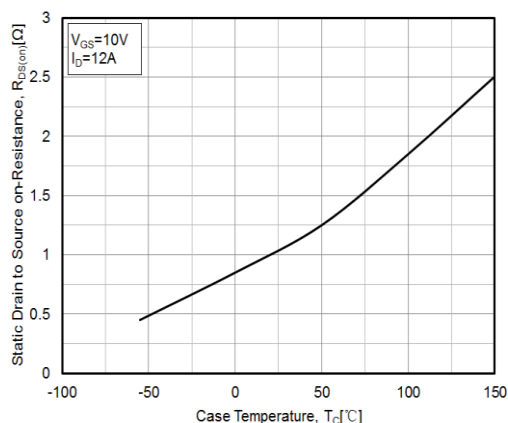


Fig. 9. Maximum Safe Operating Area

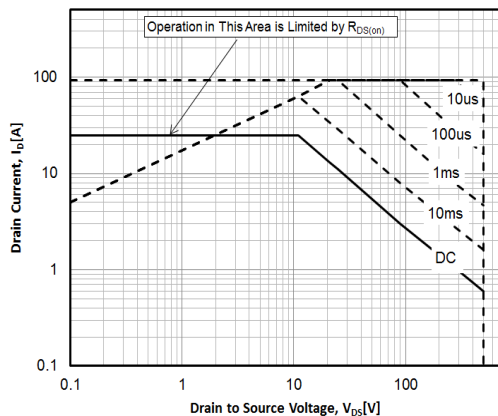


Fig. 10. Maximum Drain Current vs. Temperature

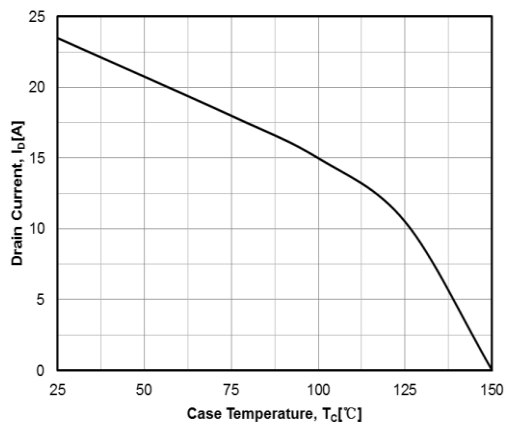
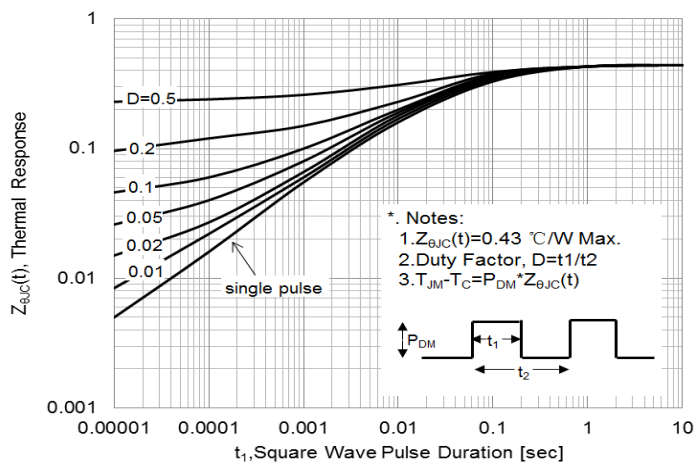


Fig. 11. Transient Thermal Response Curve



Package Dimensions

TO-3PN

(Dimensions in Millimeters)

