

SQP50N06

60V 50A N-channel Enhancement Mode Power MOSFET

Features

- Low on-Resistance: $R_{DS(on)}=0.018\Omega(\text{typ.})$
- Special Process Technology for high ESD Capability
- 100% Avalanche Test
- Good Stability and Uniformity with High E_{AS}

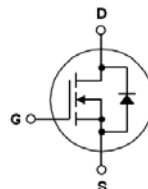
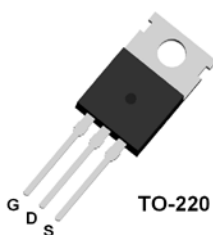
Description

The SQP50N06 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 switched mode power supplies, low voltage applications such as DC/DC converters.

Applications

- Switched Mode Power Supplies
- Low Voltage Applications Such as DC/DC Converters

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	60	V
V_{GSS}	Gate to Source Voltage	± 25	V
I_D	Drain Current	$T_C=25^\circ\text{C}$	A
		$T_C=100^\circ\text{C}$	A
I_{DM}	Pulsed Drain Current (Note1)	200	A
P_D	Maximum Power Dissipation	$T_C=25^\circ\text{C}$	W
	Derate above 25°C	0.8	W/ $^\circ\text{C}$
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	720	mJ
T_J	Operating Junction Temperature Range	$-55\sim+175$	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	$-55\sim+175$	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Ratings	Unit
$R_{th(J-C)}$	Thermal Resistance, Junction to case	1.24	$^\circ\text{C/W}$
$R_{th(J-A)}$	Thermal Resistance, Junction to Ambient	62.5	$^\circ\text{C/W}$

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	60	-	-	V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	2	3.35	4	V
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =25A	-	0.018	-	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		-	-	50	A
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} =0V, I _S =50A	-	1.03	1.5	V
T _{rr}	Reverse Recovery Time	V _{GS} =0V, I _S =50A,	-	50	-	ns
Q _{rr}	Reverse Recovery Charge	di/dt=-100A/μs	-	75	-	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 =25A, V _{DD} =30V, R _G =25Ω (Note 3)	-	15	40	ns
t _r	Turn-on Rise Time		-	105	220	ns
t _{d(off)}	Turn-off Delay Time		-	60	130	ns
t _f	Turn-off Fall Time		-	65	140	ns
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =25V, f=1.0MHz	-	1180	1540	pF
C _{oss}	Output Capacitance		-	440	580	pF
C _{rss}	Reverse Transfer Capacitance		-	65	90	pF
Q _g	Total Gate Charge	I _D =50A, V _{DD} =48V V _{GS} =10V (Note 3)	-	31	41	nC
Q _{gs}	Gate to Emitter Charge		-	8	-	nC
Q _{gd}	Gate to Collector Charge		-	13	-	nC

Note:

1. Repetitive rating: pulse-width limited by maximum junction temperature
2. V_{DD}=25V, L=0.5mH, V_{clamp}=1500V, V_g=10V, I_d=50A
3. Essentially independent of operating temperature typical characteristics

Typical Performance Characteristics

Fig. 1. Typical on-Resistance Characteristics

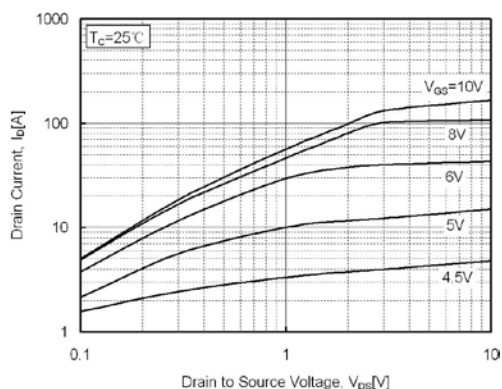
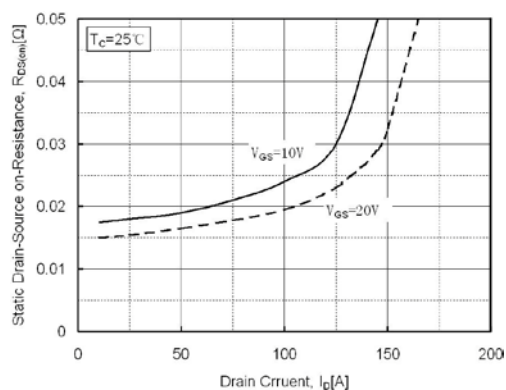

Fig. 3. Static on-Resistance vs. I_D


Fig. 5. Capacitance Characteristics

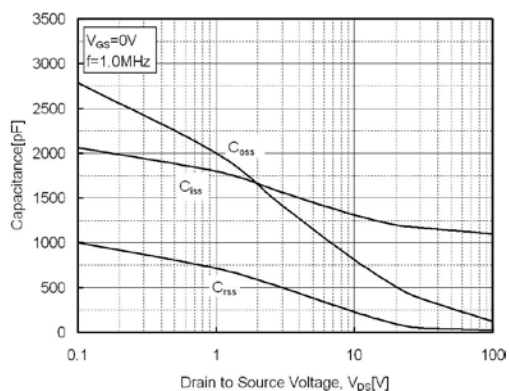


Fig. 2. Typical Transfer Characteristics

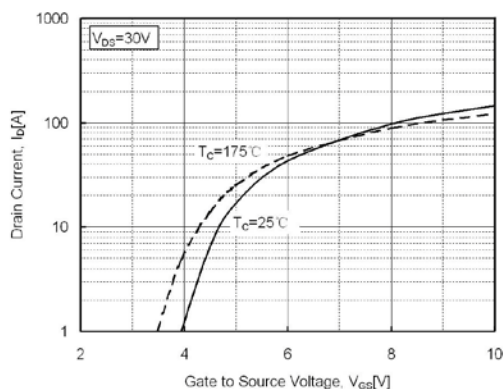
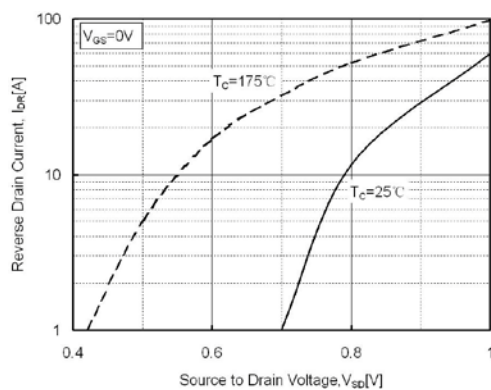
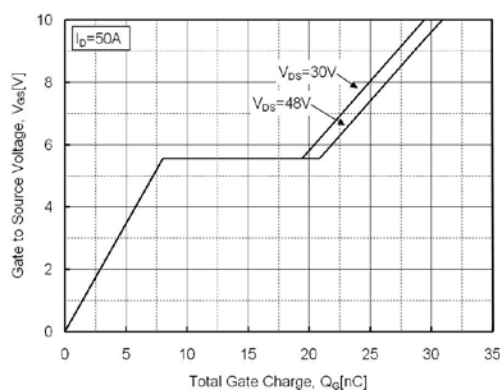

Fig. 4. Body Diode Forward Voltage vs. I_{DR}


Fig. 6. Gate Charge Characteristics



Typical Performance Characteristics

Fig. 7. Breakdown Voltage vs. Temperature

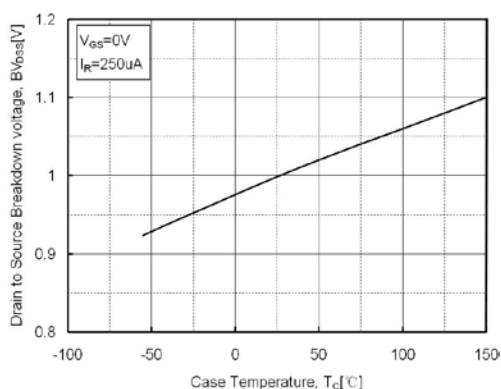


Fig. 8. Static on-Resistance vs. Temperature

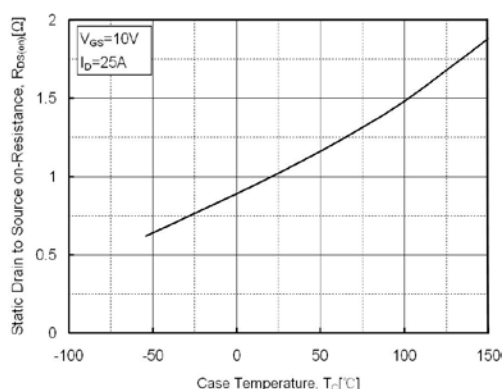


Fig. 9. Maximum Safe Operating Area

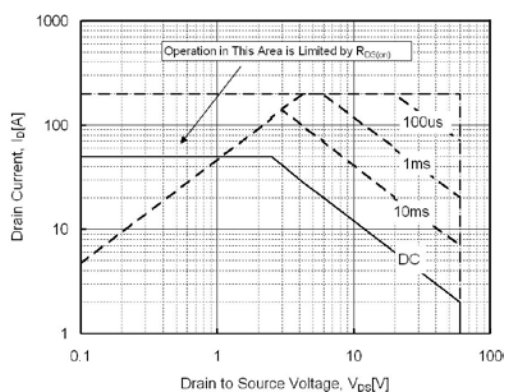


Fig. 10. Maximum Drain Current vs. Temperature

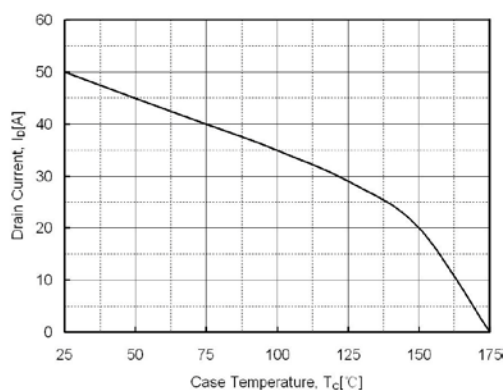
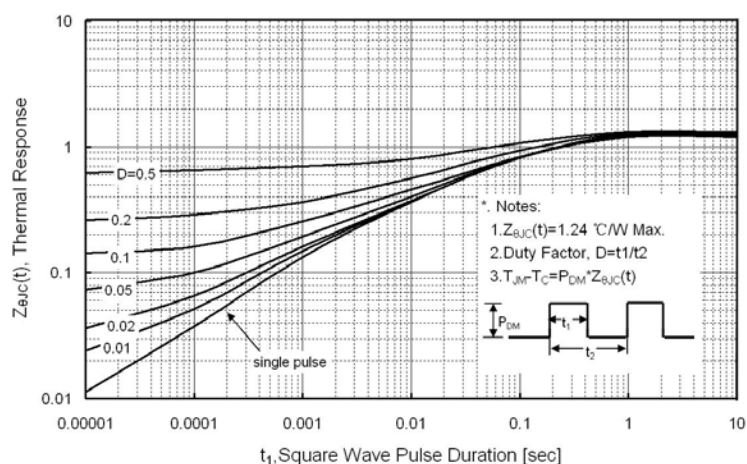


Fig. 11. Transient Thermal Response Curve



TO-220

(Dimensions in Millimeters)

