

SQH47N60CM

600V 47A N-channel MOSFET With Fast-Recovery

Features

- Low on-Resistance: $R_{DS(on)}=0.068\Omega$ (typ.)
- Fast-Recovery body diode
- 100% Avalanche Test
- Extremely Low Reverse Recovery Charge
- Ultra Low Gate Charge (typ. $Q_g=180nC$)

Applications

- DC-DC Converters and AC-DC Power Supply

Description

SQH47N60CM is utilizing an advanced charge balance mechanism for outstanding

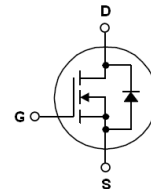
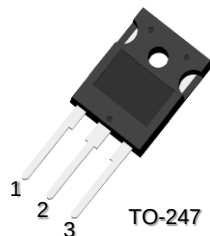
low on-resistance and lower gate charge performance.

This advanced technology has been tailored to minimize conduction

loss, provide superior switching performance, and withstand extreme dv/dt rate and higher avalanche energy.

SQH47N60CM is suitable for AC/DC power conversion in switching mode operation for higher efficiency

Package Type & Internal Circuit



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

Symbol	Parameter		Ratings	Unit
V _{DSS}	Drain to Source Voltage		600	V
V _{GSS}	Gate to Source Voltage		± 30	V
I _D	Drain Current	T _C =25℃	47	A
		T _C =100℃	29	A
I _{DM}	Pulsed Drain Current (Note1)		140	A
P _D	Maximum Power Dissipation	T _C =25℃	391	W
	Derate above 25℃		3.13	W/℃
E _{AS}	Single Pulsed Avalanche Energy (Note 2)		1060	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	0.32	$^\circ C/W$
$R_{th(J-A)}$	Thermal Resistance, Junction to Ambient	62	$^\circ C/W$

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 =250uA	600	-	-	V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250uA	2.5	-	4.5	V
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =23A	-	0.067	0.07	Ω
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =V _{DSS} , V _{GS} =0V	-	-	5	uA
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		-	-	47	A
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} =0V, I _S =47A	-	0.95	1.5	V
t _{rr}	Reverse Recovery Time	V _{GS} =0V, I _S =23A,	-	0.23	-	us
Q _{rr}	Reverse Recovery Charge	di/dt=-100A/us	-	3	-	uC

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 =23A, V _{DD} =480V, R _G =20Ω (Note 3)	-	20	-	ns
t _r	Turn-on Rise Time		-	15	-	ns
t _{d(off)}	Turn-off Delay Time		-	95	-	ns
t _f	Turn-off Fall Time		-	8	-	ns
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =25V, f=1.0MHz	-	3215	-	pF
C _{oss}	Output Capacitance		-	630	-	pF
C _{rss}	Reverse Transfer Capacitance		-	18	-	pF
Q _g	Total Gate Charge	I _D =23A, V _{DS} =480V V _{GS} =10V (Note 3)	-	180	-	nC
Q _{gs}	Gate to Emitter Charge		-	24	-	nC
Q _{gd}	Gate to Collector Charge		-	94	-	nC

Note:

1. Repetitive rating: pulse-width limited by maximum junction temperature
2. I_{AS}=9.5A, V_{DD}=50V, V_G=10V, @T_C=25°C
3. Essentially independent of operating temperature typical characteristics

Typical Performance Characteristics

Fig. 1. Typical on-Resistance Characteristics

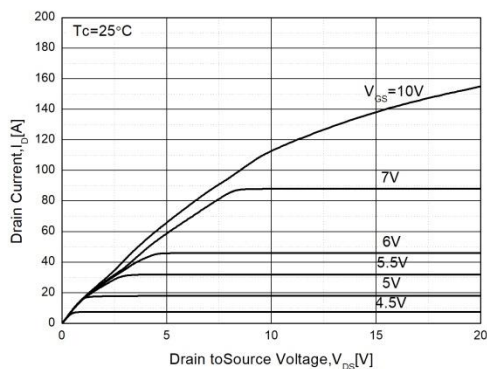


Fig. 3. Static on-Resistance vs. I_D

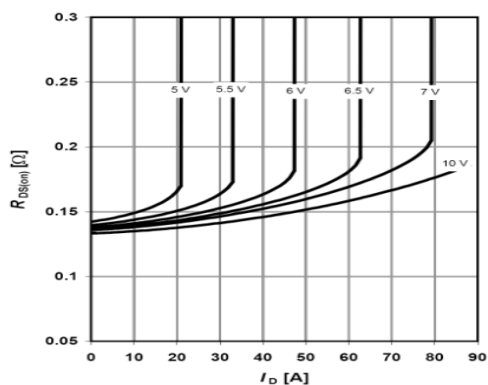
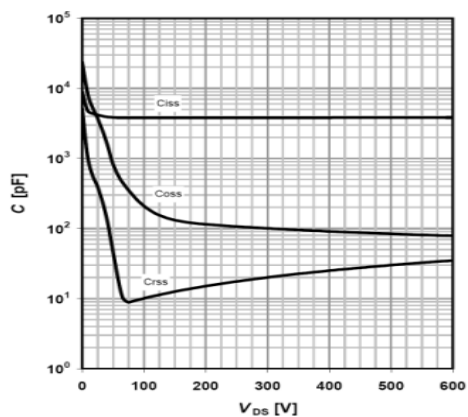


Fig. 5. Capacitance Characteristics



$$C=f(V_{DS}); V_{GS}=0V; f=1MHz$$

Fig. 2. Gate Charge Characteristics

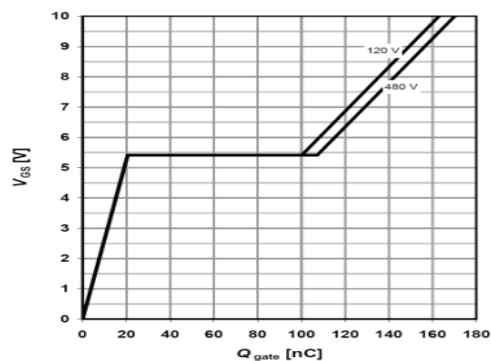


Fig. 4. Body Diode Forward Voltage vs. I_{DR}

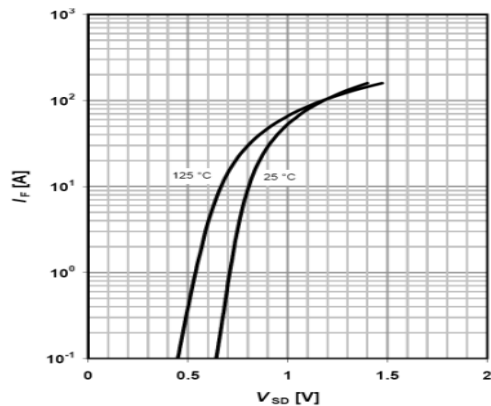
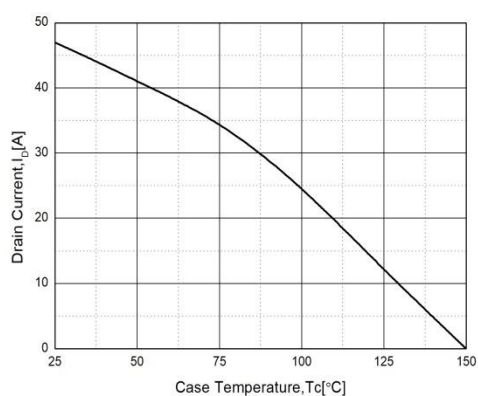


Fig. 6. Maximum Drain Current vs. Temperature



Typical Performance Characteristics

Fig. 7. Breakdown Voltage vs. Temperature

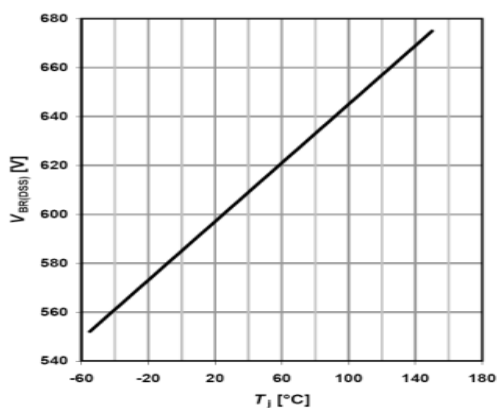


Fig. 8. Static on-Resistance vs. Temperature

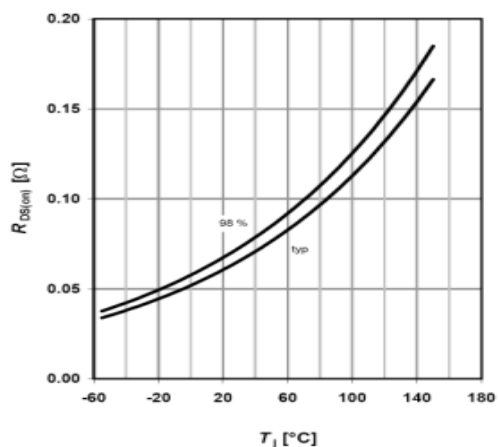


Fig. 9. Maximum Safe Operating Area

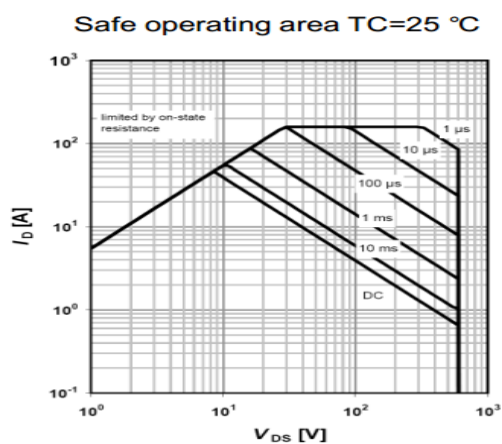
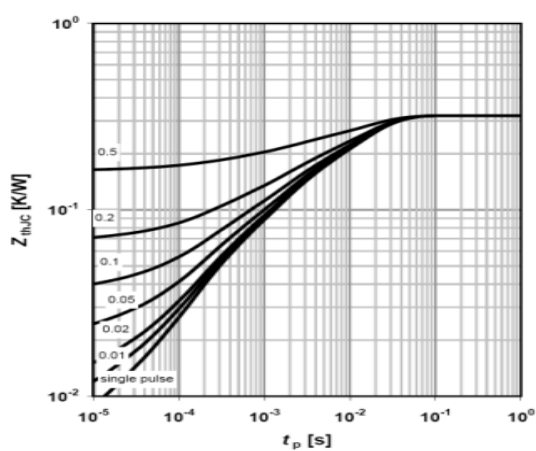


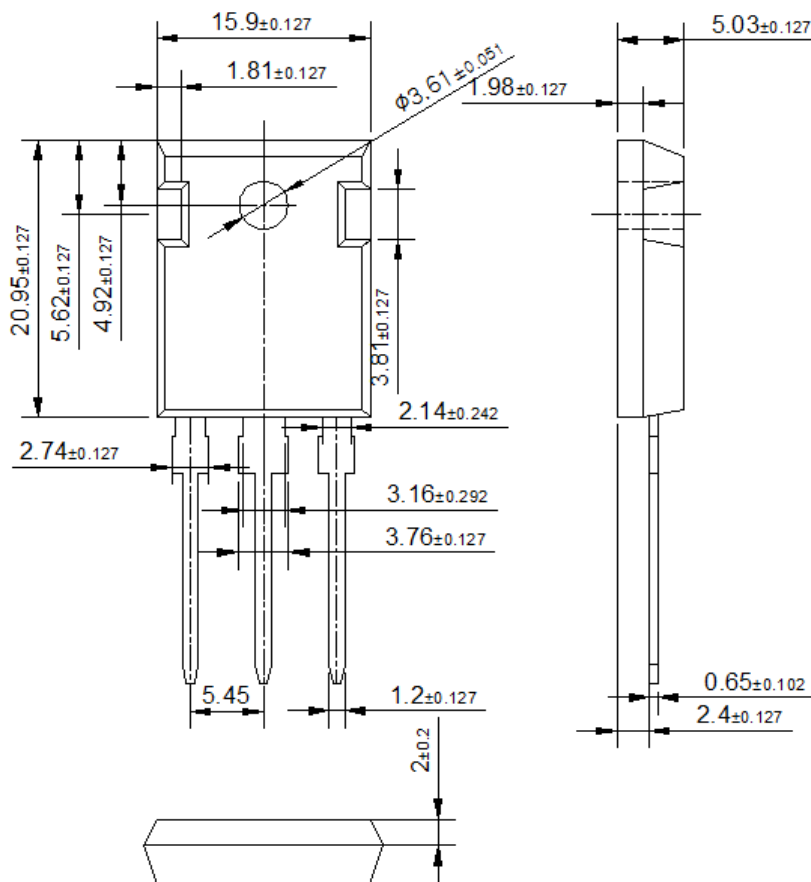
Fig. 10. Transient Thermal Response Curve



Package Dimensions

TO-247

(Dimensions in Millimeters)



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