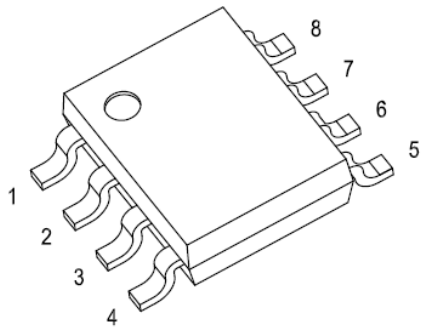
GPT090N06PQ

60V N-Channel MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
60V	9mΩ@10V	12A
	13mΩ@4.5V	

SOP8



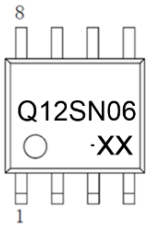
Feature

- Low $R_{DS(ON)}$
- Low Gate Charge
- Optimized for fast-switching applications

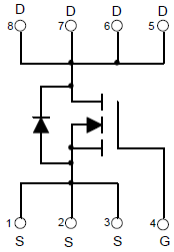
Application

- Synchronus Rectification in DC/DC and AC/DC Converters
- Industrial and Motor Drive application

MARKING:



Equivalent Circuit



ABSOLUTE MAXIMUM RATINGS (T_J=25℃ unless otherwise noted)

Parameter		Symbol	Value	Unit
Continuous Drain Current[G]	T_C=25℃	I_D	12	A
	T_C=100℃		9	
Drain to Source Voltage		V_{DS}	60	V
Gate to Source Voltage		V_{GS}	±20	V
Pulsed Drain Current[C]		I_{DM}	48	A
Avalanche Energy[C]	L=0.5mH	E_{AS}	195	mJ
Power Dissipation[A]	T_C=25℃	P_D	3.1	W
	T_C=100℃		2.0	
Thermal Resistance Junction to Ambient[A]	T≤10s	$R_{\theta JA}$	40	℃/W
Thermal Resistance Junction to Ambient[A,D]	Steady-State		75	
Thermal Resistance Junction to Case	Steady-State	$R_{\theta JC}$	24	℃/W
Operating and Storage Temperature		T_J,T_{stg}	-55 ~150	℃

MOSFET ELECTRICAL CHARACTERISTICS(T_a=25℃ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D =250μA	60			V
Zero gate voltage drain current	I_{DSS}	V_{DS} =60V,V_{GS} = 0V,T_J=25℃			1	μA
		V_{DS} =60V,V_{GS} = 0V,T_J=100℃			100	
Gate-body leakage current	I_{GSS}	V_{GS} =±20V, V_{DS} = 0V			±100	nA
Gate threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA	1.1	1.7	2.5	V
Drain-source on-resistance	$R_{DS(on)}$	V_{GS} =10V, I_D =12A		8.2	9.0	mΩ
		V_{GS} =4.5V, I_D =12A		10.5	13.0	mΩ
Forward tranconductance	g_{FS}	V_{DS} =5V, I_D =12A		70		S
Gate Resistance	R_G	V_{GS}=0V, V_{DS} Open, f=1MHz		1.6		Ω
Dynamic characteristics						
Input Capacitance	C_{iss}	V_{DS} =30V,V_{GS} =0V,f =1MHz		1988		pF
Output Capacitance	C_{oss}			470		
Reverse Transfer Capacitance	C_{rss}			14		
Total gate charge(10V)	Q_g	V_{DD} =30V,V_{GS} =10V,I_D =12A		31		nC
Gate-source charge	Q_{gs}			6		
Gate-drain charge	Q_{gd}			5		
Turn-on delay time	$t_{d(on)}$	V_{GS}=10V,V_{DS}=15V,R_L=2.5Ω, R_{GEN}=3Ω		10.5		ns
Turn-on rise time	t_r			4.5		
Turn-off delay time	$t_{d(off)}$			29.5		
Turn-off fall time	t_f			8		
Source-Drain Diode characteristics						
Body Diode Voltage	V_{DS}	T_J=25℃,I_S=12A, V_{GS} = 0V		0.9	1.2	V
Body-Diode Continuous Current[G]	I_S				12	A
Reverse Recovey Time	t_{rr}	I_F=12A, dI/dt=500A/μs		17		ns
Reverse Recovey Charge	Q_{rr}			58		nC

A. The value of $R_{\theta JA}$ is measured with the device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with T_A =25°C. The Power dissipation P_D is based on $R_{\theta JA}$ t≤ 10s and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.

B. The power dissipation P_D is based on $T_{J(MAX)}$=150°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

C. Single pulse width limited by junction temperature $T_{J(MAX)}$=150°C.

D. The $R_{\theta JA}$ is the sum of the thermal impedance from junction to case $R_{\theta JC}$ and case to ambient.

E. The static characteristics in Figures 1 to 6 are obtained using <300μs pulses, duty cycle 0.5% max.

F. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of $T_{J(MAX)}$=150°C. The SOA curve provides a single pulse rating.

G. The maximum current rating is package limited.

Typical Electrical and Thermal Characteristics

Fig 1: Output Characteristics

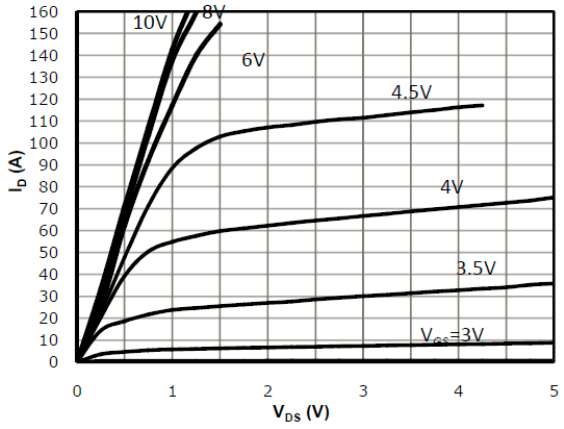


Fig 2: Transfer Characteristics

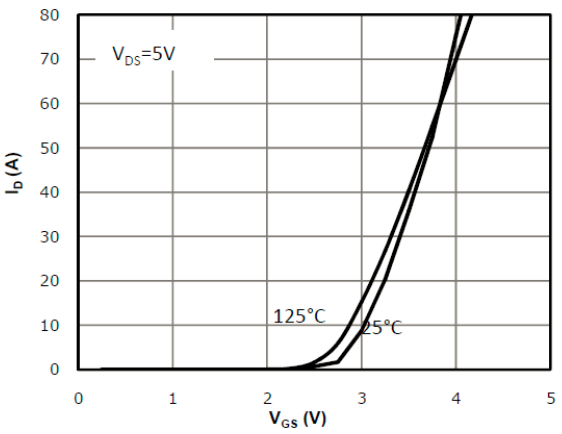


Fig 3: Rds(on) vs Drain Current and Gate Voltage

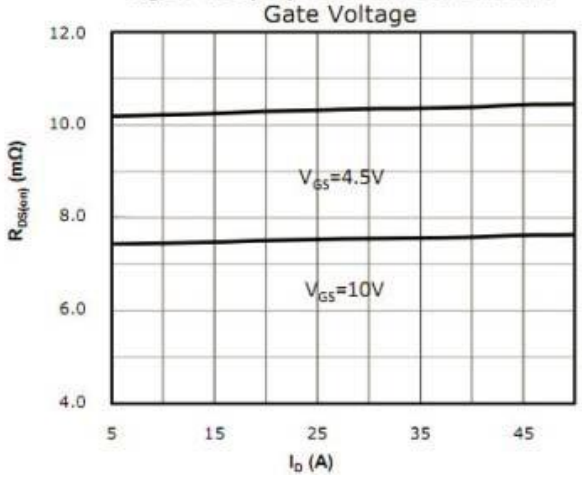


Fig 4: Rds(on) vs Gate Voltage

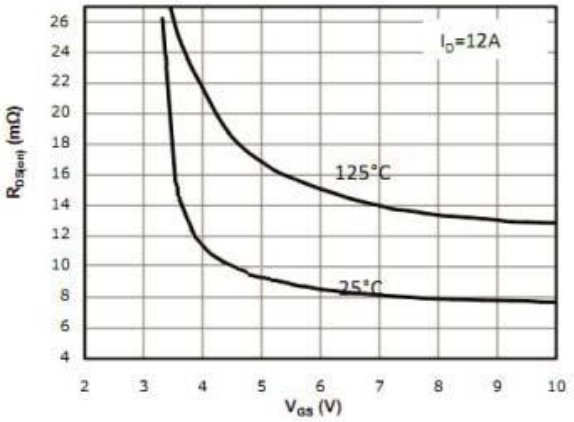


Fig 5: Rds(on) vs. Temperature

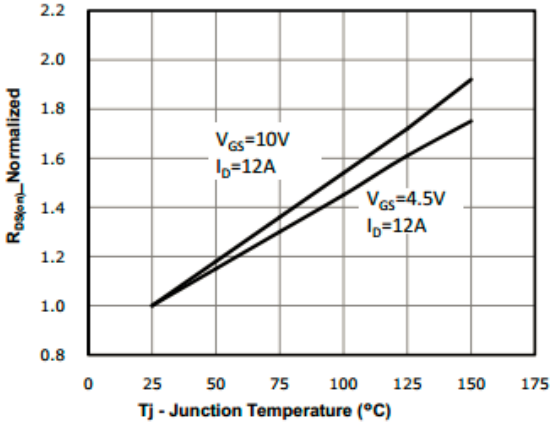


Fig 6: Capacitance Characteristics

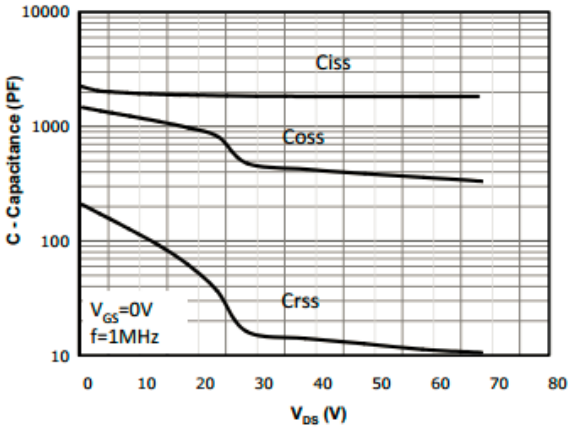


Fig 7: Gate Charge Characteristics

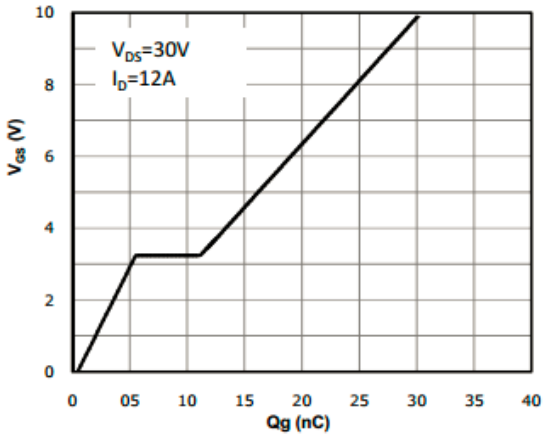


Fig 8: Body-diode Forward Characteristics

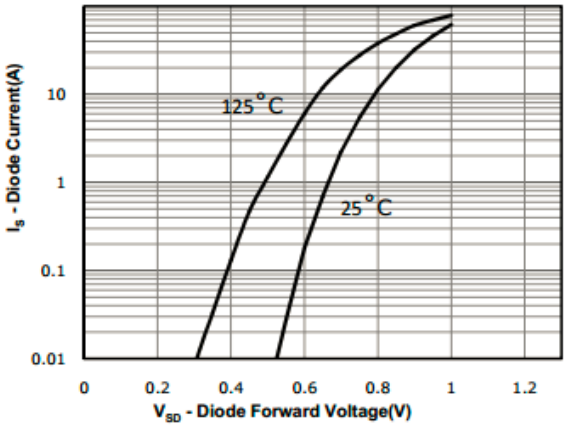


Fig 9: Power Dissipation

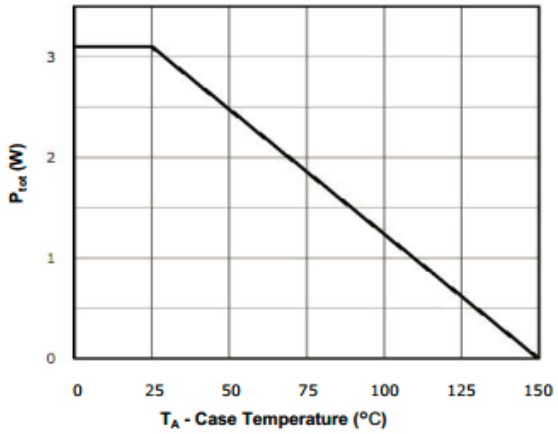
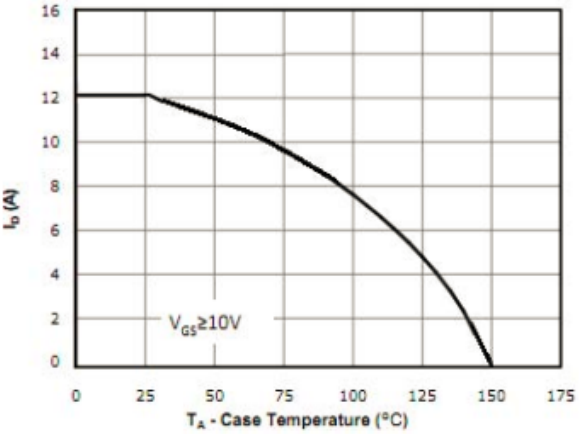
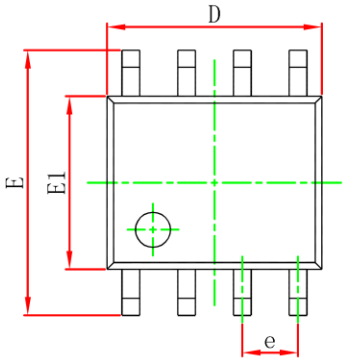
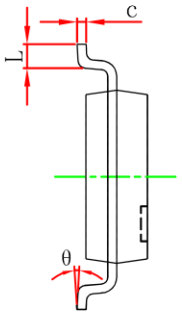


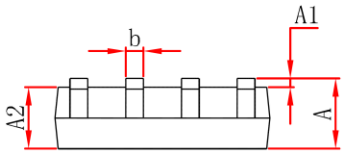
Fig 10: Drain Current Derating



SOP8 Package Information







Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	**Max**	**Min**	**Max**
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.800	5.000	0.189	0.197
e	1.270 (BSC)		0.050 (BSC)	
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°