

P-Channel Enhancement MOSFET

Features

- High density cell design for low RDS(on)
- Trench Power LV MOSFET technology
- High speed switching

Application

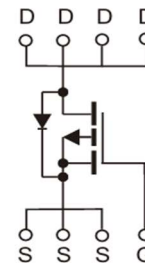
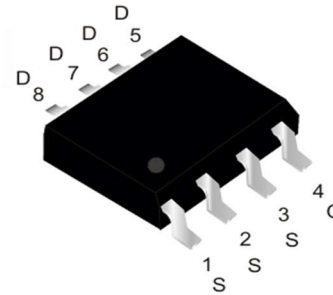
- Load switching
- PWM application
- Power management

Mechanical Data

- Case: SOP-8 Package
- Marking: Q04P03

SOP-8 PIN Configuration

Top View



Absolute Maximum Ratings (T_C = 25°C, unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V _{DS}	-30	V
Gate-Source Voltage	V _{GS}	±20	V
Continuous drain current (T _A =25 °C)	I _D	-4	A
Continuous drain current (T _A =100 °C)	I _D	-2.5	A
Pulsed Drain Current ¹⁾	I _{DM}	-30	A
Power Dissipation (T _A =25 °C)	P _D	1.25	W
Operating Junction and Storage Temperature Range	T _J , T _{stg}	-55~150	°C

Thermal Characteristics

Parameter	Symbol	Max.	Unit
Thermal Resistance from Junction to Ambient ²⁾	R _{θJA}	100	°C/W

Note: 1. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.

2 The value of R_{θJA} is measured with the device mounted on 1 in2 FR-4 board with 2oz. Copper, in the still air environment with T_A =25°C.

The maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.

Characteristics ($T_J = 25^\circ\text{C}$, unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit
STATIC PARAMETERS					
Drain-Source Breakdown Voltage at $I_D = -250\mu\text{A}$, $V_{GS} = 0\text{V}$	BV_{DSS}	-30			V
Drain-Source Leakage Current at $V_{DS} = -30\text{V}$, $V_{GS} = 0\text{V}$	I_{DSS}			-1	μA
Gate Leakage Current at $V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$	I_{GSS}			± 100	nA
Gate-Source Threshold Voltage at $V_{DS} = V_{GS}$, $I_D = -250\mu\text{A}$	$V_{GS(th)}$	-1.0	-1.5	-2.4	V
Drain-Source On-State Resistance at $V_{GS} = -10\text{V}$, $I_D = -4\text{A}$ at $V_{GS} = -4.5\text{V}$, $I_D = -3.2\text{A}$	$R_{DS(on)}$		50 80	65 110	$\text{m}\Omega$
DYNAMIC PARAMETERS					
Input Capacitance at $V_{DS} = -15\text{V}$, $V_{GS} = 0\text{V}$, $f = 1\text{MHz}$	C_{iss}		260		pF
Output Capacitance at $V_{DS} = -15\text{V}$, $V_{GS} = 0\text{V}$, $f = 1\text{MHz}$	C_{oss}		50		pF
Reverse Transfer Capacitance at $V_{DS} = -15\text{V}$, $V_{GS} = 0\text{V}$, $f = 1\text{MHz}$	C_{rss}		40		pF
Gate charge total at $V_{DS} = -15\text{V}$, $I_D = -3\text{A}$, $V_{GS} = -10\text{V}$	Q_g		7		nC
Gate to Source Charge at $V_{DS} = -15\text{V}$, $I_D = -3\text{A}$, $V_{GS} = -10\text{V}$	Q_{gs}		2		nC
Gate to Drain Charge at $V_{DS} = -15\text{V}$, $I_D = -3\text{A}$, $V_{GS} = -10\text{V}$	Q_{gd}		1		nC
Turn-On Delay Time at $V_{DD} = -15\text{V}$, $I_D = -3\text{A}$, $R_G = 3\Omega$, $V_{GS} = -10\text{V}$	$t_{d(on)}$		5		nS
Turn-On Rise Time at $V_{DD} = -15\text{V}$, $I_D = -3\text{A}$, $R_G = 3\Omega$, $V_{GS} = -10\text{V}$	t_r		23		nS
Turn-Off Delay Time at $V_{DD} = -15\text{V}$, $I_D = -3\text{A}$, $R_G = 3\Omega$, $V_{GS} = -10\text{V}$	$t_{d(off)}$		21		nS
Turn-Off Fall Time at $V_{DD} = -15\text{V}$, $I_D = -3\text{A}$, $R_G = 3\Omega$, $V_{GS} = -10\text{V}$	t_f		30		nS
Drain-Source Diode Characteristics					
Drain-Source Diode Forward Voltage at $I_S = -4\text{A}$, $V_{GS} = 0\text{V}$	V_{SD}			-1.2	V
Maximum Continuous Drain-Source Diode Forward Current	I_S			-4	A
Reverse Recovery Time at $V_{GS} = 0\text{V}$, $I_F = -3\text{A}$, $dI_F/dt = 100\text{A}/\mu\text{s}$	t_{rr}		12		nS
Reverse Recovery Charge at $V_{GS} = 0\text{V}$, $I_F = -3\text{A}$, $dI_F/dt = 100\text{A}/\mu\text{s}$	Q_{rr}		4		nC

Electrical Characteristics Curves

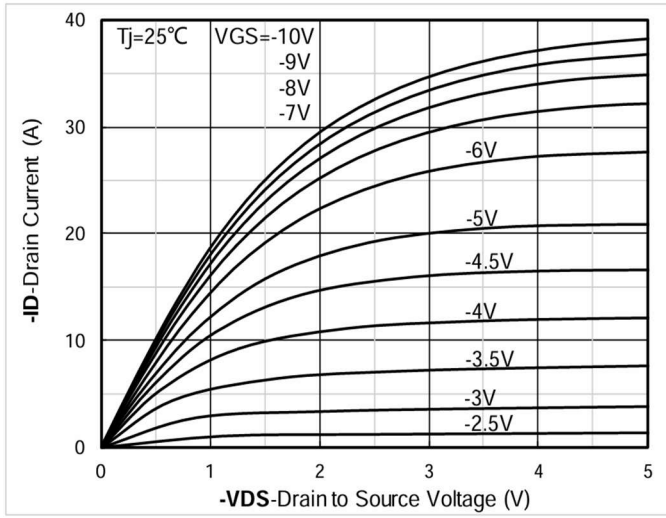


Figure 1. Output Characteristics

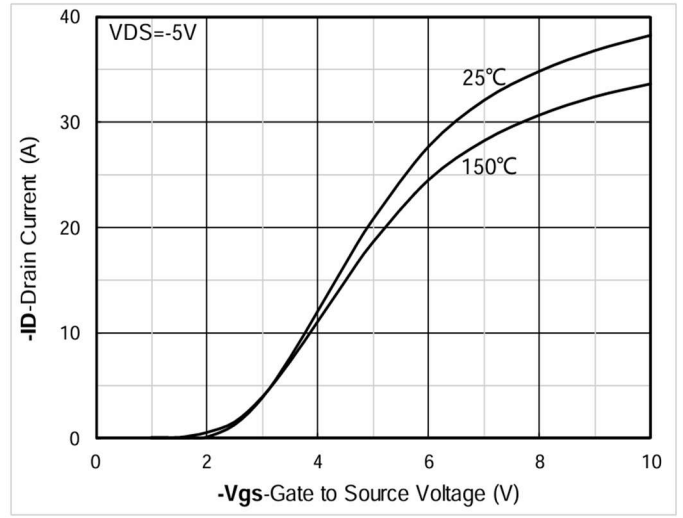


Figure 2. Transfer Characteristics

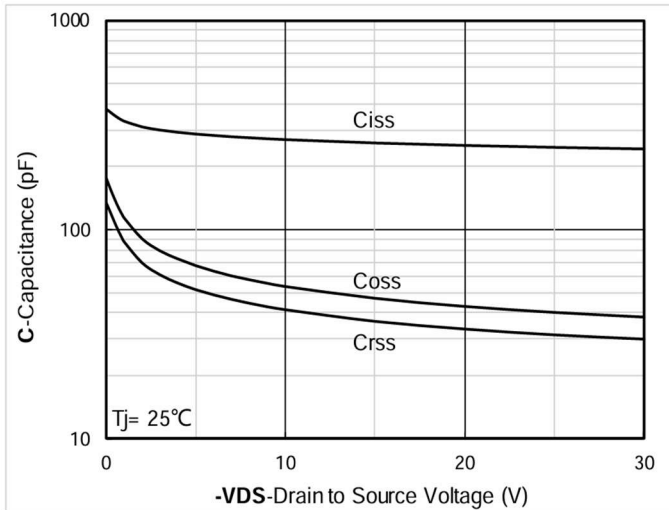


Figure 3. Capacitance Characteristics

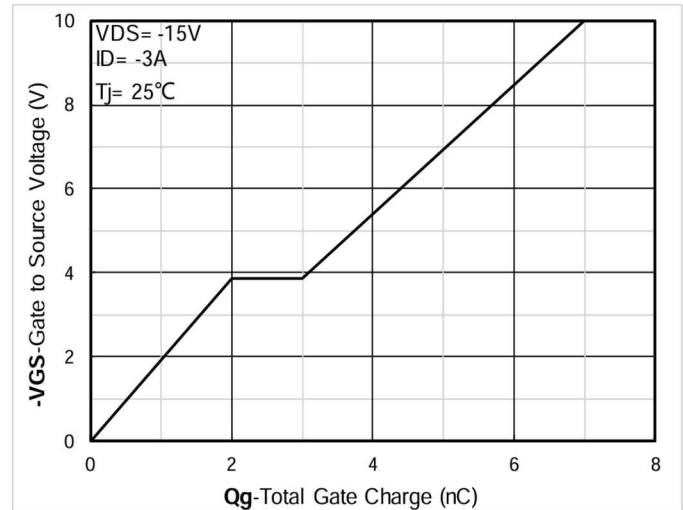


Figure 4. Gate Charge

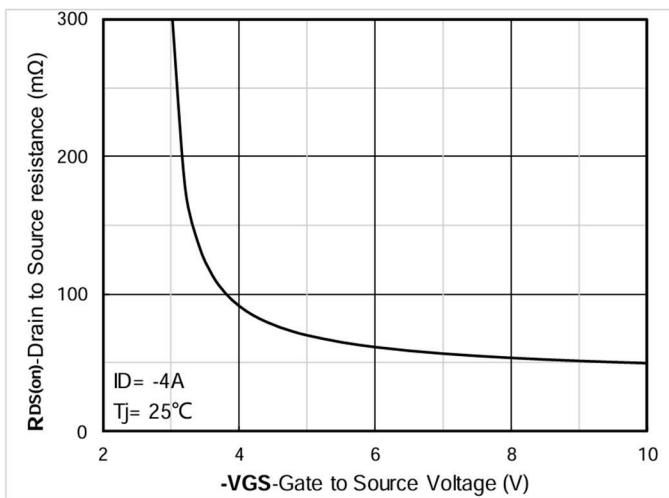


Figure 5. On-Resistance vs Gate to Source Voltage

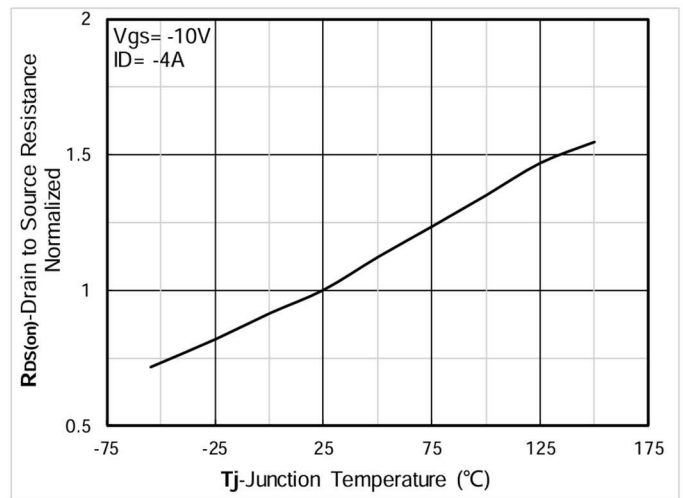


Figure 6. Normalized On-Resistance

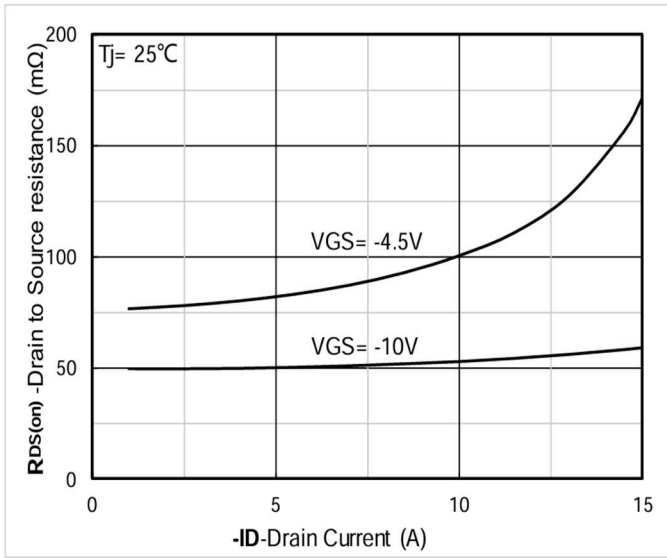


Figure 7. RDS(on) VS Drain Current

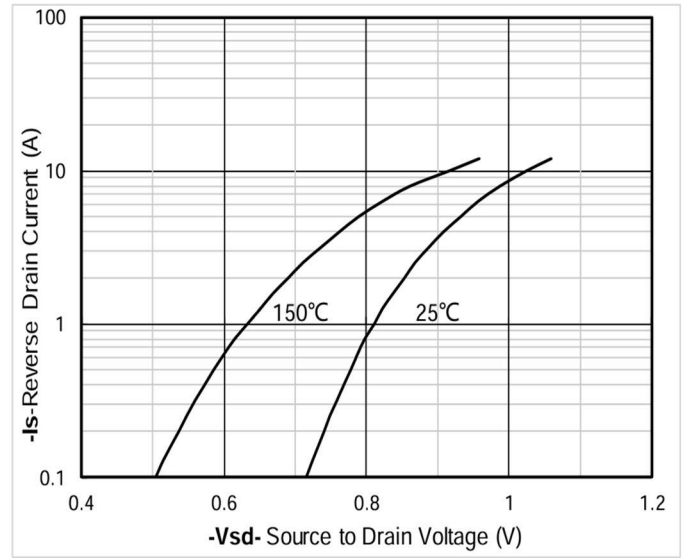


Figure 8. Forward characteristics of reverse diode

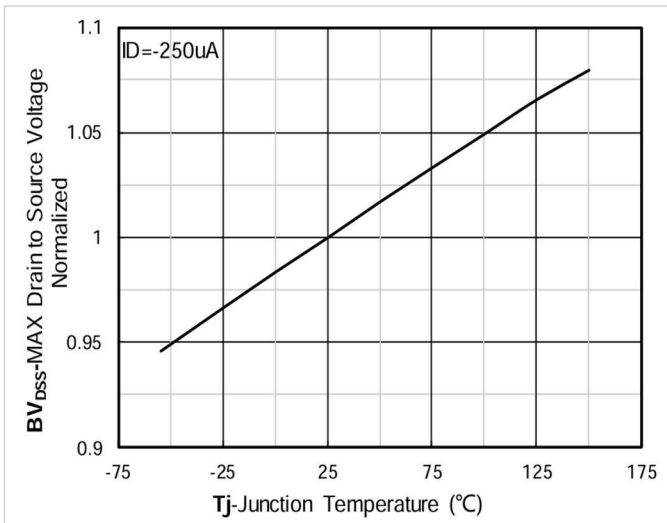


Figure 9. Normalized breakdown voltage

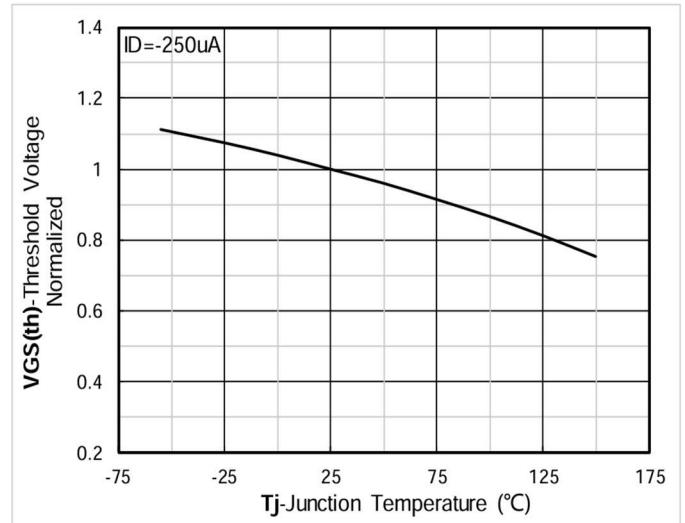


Figure 10. Normalized Threshold voltage

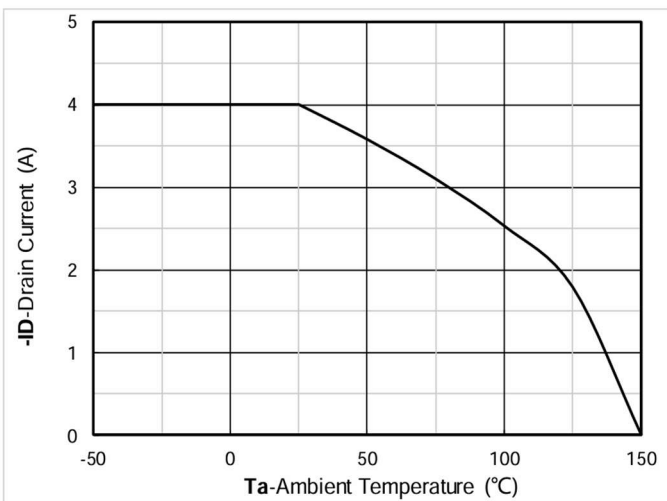


Figure 11. Current dissipation

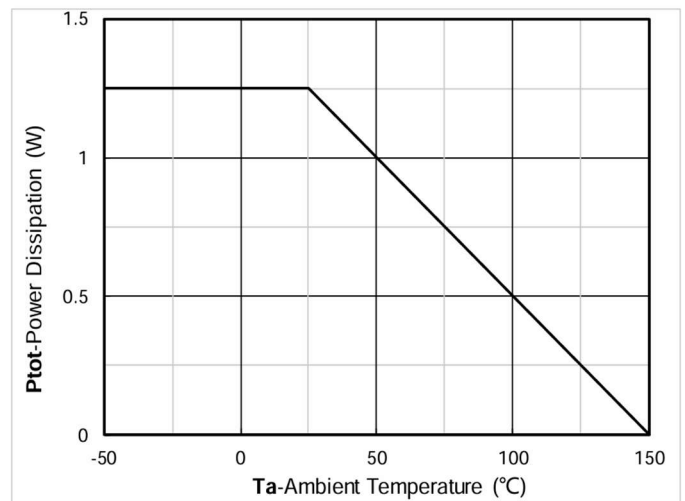


Figure 12. Power dissipation

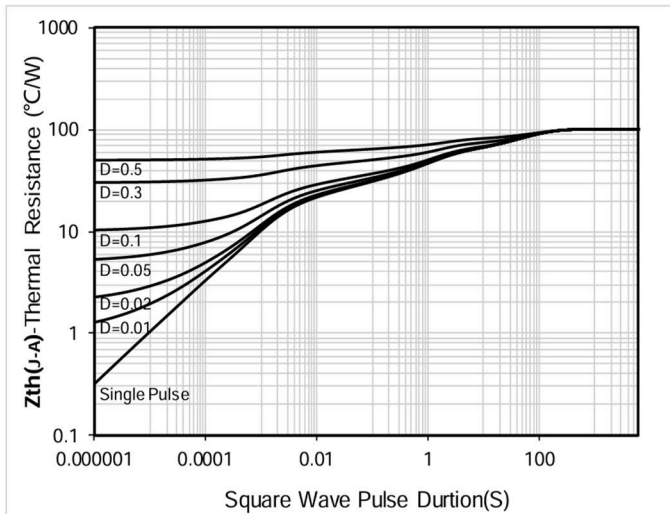


Figure 13. Maximum Transient Thermal Impedance

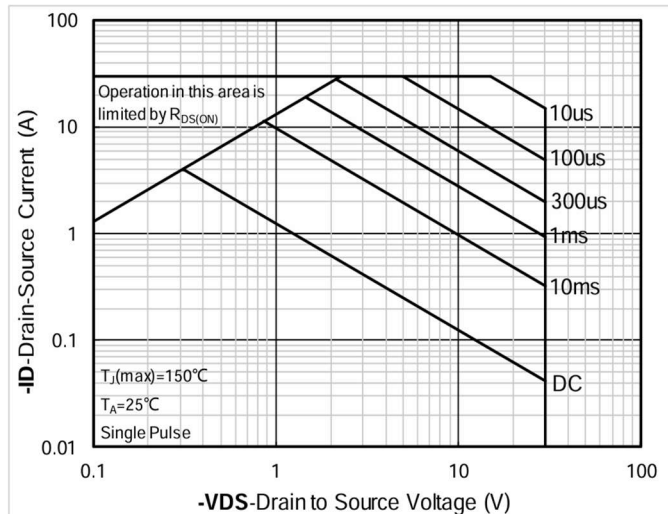
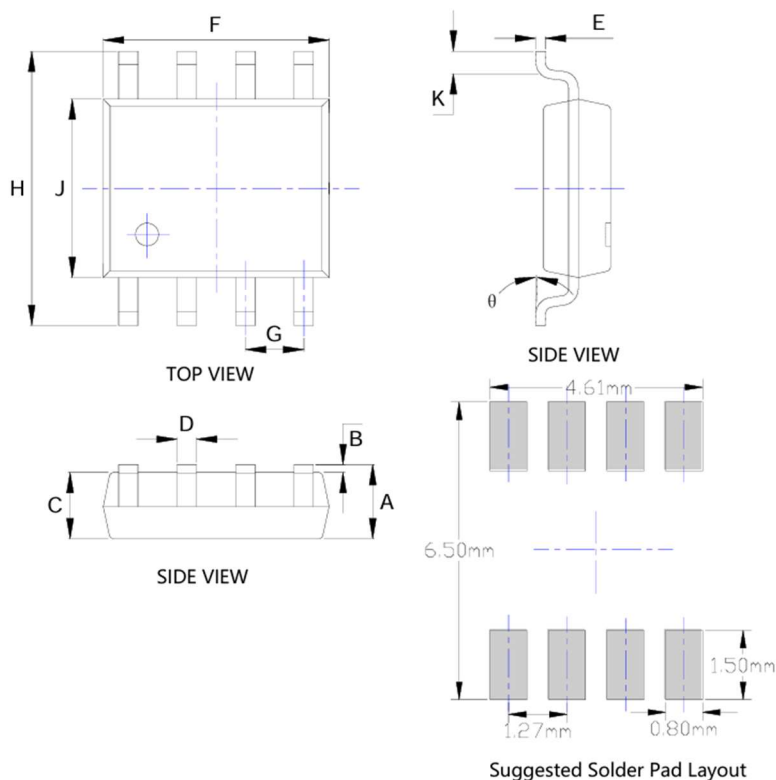


Figure 14. Safe Operation Area

Package Outline Dimensions (Units: mm) SOP-8



SYMBOL	DIMENSIONS			
	INCHES		Millimeter	
	MIN.	MAX.	MIN.	MAX.
A	0.053	0.069	1.350	1.750
B	0.004	0.010	0.100	0.250
C	0.053	0.061	1.350	1.550
D	0.013	0.020	0.330	0.510
E	0.007	0.010	0.170	0.250
F	0.189	0.197	4.800	5.000
G	0.050BSC		1.270BSC	
H	0.228	0.244	5.800	6.200
J	0.150	0.157	3.800	4.000
K	0.016	0.050	0.400	1.270
θ	0°	8°	0°	8°

Note:
 1. Controlling dimension: in millimeters.
 2. General tolerance: +/-0.05mm.
 3. The pad layout is for reference purposes only.

Order Information

Part Number	Package	Quantity
ShS04P03A	SOP-8	4000