



#### Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	$I_D$
-40V	31mΩ@-10V	-7A
	39mΩ@-4.5V	
40V	16mΩ@10V	9A
	27mΩ@4.5V	

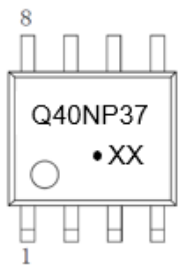
#### Feature

- Low drain-source ON-resistance
- High forward transfer admittance
- Low leakage current

#### Application

- Low voltage applications

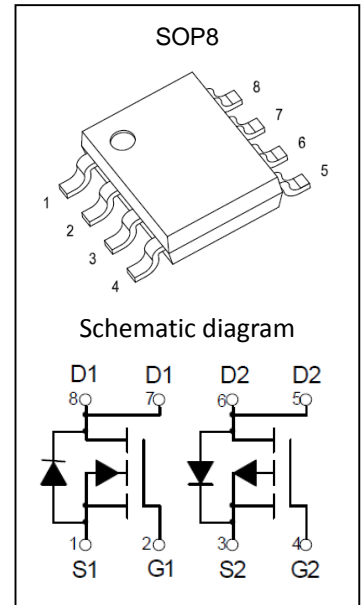
#### MARKING:



Q40NP37 = Device Code

XX = Date Code

Solid dot = Green Device



#### ABSOLUTE MAXIMUM RATINGS ( $T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
<b>P-MOSFET</b>			
Drain-Source Voltage	$V_{DS}$	-40	V
Gate-Source Voltage	$V_{GS}$	±20	V
Continuous Drain Current <sup>(1)</sup>	$I_D$	-7	A
Pulsed Drain Current	$I_{DM}$	-21	A
Power Dissipation	$P_D$	1.4	W
<b>N-MOSFET</b>			
Drain-Source Voltage	$V_{DS}$	40	V
Gate-Source Voltage	$V_{GS}$	±20	V
Continuous Drain Current	$I_D$	9	A
Pulsed Drain Current <sup>(1)</sup>	$I_{DM}$	27	A
Power Dissipation	$P_D$	1.4	W
<b>Temperature and Thermal Resistance</b>			
Thermal Resistance from Junction to Ambient <sup>(2)</sup>	$R_{\theta JA}$	89	°C/W
Junction Temperature	$T_J$	150	°C
Storage Temperature	$T_{STG}$	-55~ +150	°C

## P-channel MOSFET ELECTRICAL CHARACTERISTICS( $T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
<b>Static Characteristics</b>						
Drain-source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-40			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -32V, V_{GS} = 0V$			-1	$\mu A$
Gate-body Leakage Current	$I_{GSS}$	$V_{GS} = \pm 20V, V_{DS} = 0V$			$\pm 100$	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-1.0	-1.6	-3.0	V
Drain-source On-resistance <sup>(3)</sup>	$R_{DS(on)}$	$V_{GS} = -10V, I_D = -5.0A$		31	37	m $\Omega$
		$V_{GS} = -4.5V, I_D = -5.0A$		39	47	
Forward Transconductance	$g_{FS}$	$V_{DS} = -5V, I_D = -5.0A$	5			S
<b>Dynamic Characteristics<sup>(4)</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS} = -20V, V_{GS} = 0V, F = 1.0MHz$		850		pF
Output Capacitance	$C_{oss}$			101		
Reverse Transfer Capacitance	$C_{rss}$			65		
Total Gate Charge	$Q_g$	$V_{DS} = -20V, I_D = -5A, V_{GS} = -4.5V$		9.5		nC
Gate-source Charge	$Q_{gs}$			2		
Gate-drain Charge	$Q_{gd}$			3		
<b>Switching Characteristics<sup>(4)</sup></b>						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = -20V, I_D = -5A$ $V_{GS} = -10V, R_{GEN} = 6\Omega$		7		ns
Turn-on Rise Time	$t_r$			3		
Turn-off Delay Time	$t_{d(off)}$			20		
Turn-off Fall Time	$t_f$			12		
<b>Source - Drain Diode Characteristics</b>						
Diode Forward Voltage <sup>(3)</sup>	$V_{SD}$	$I_S = -1.0A, V_{GS} = 0V$			-1.2	V
Reverse Recovery Time	$t_{rr}$	$I_F = -10A, di/dt = 100A/\mu s$		32		ns

## N-channel MOSFET ELECTRICAL CHARACTERISTICS( $T_A=25^{\circ}\text{C}$ unless otherwise noted)

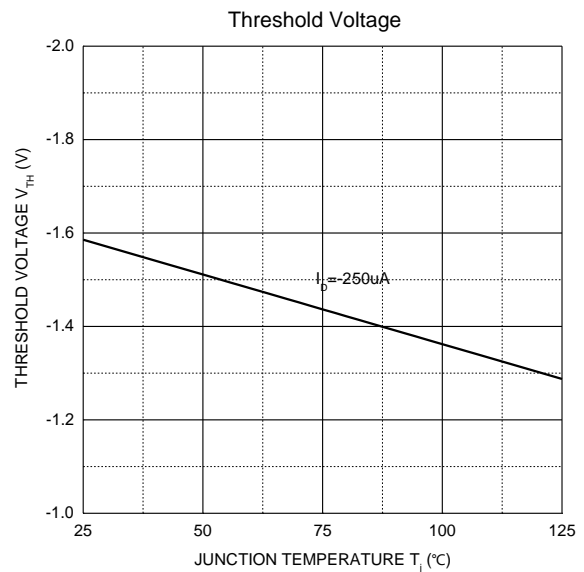
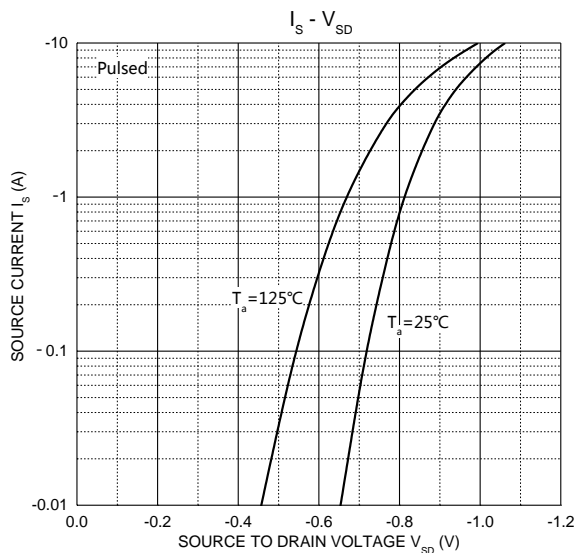
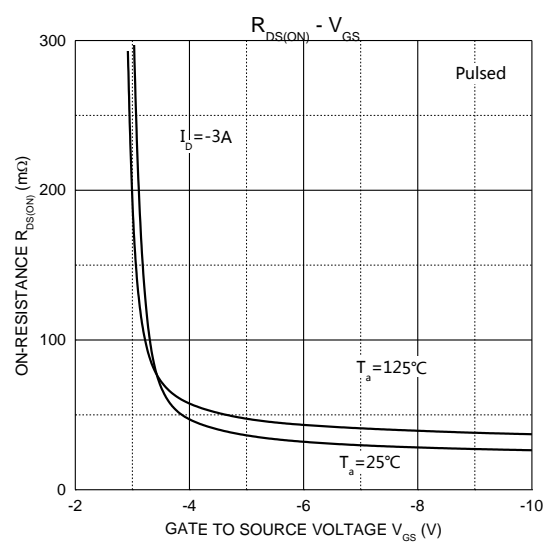
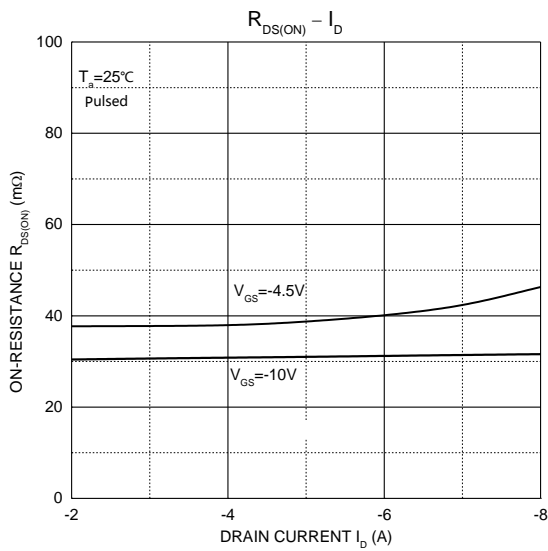
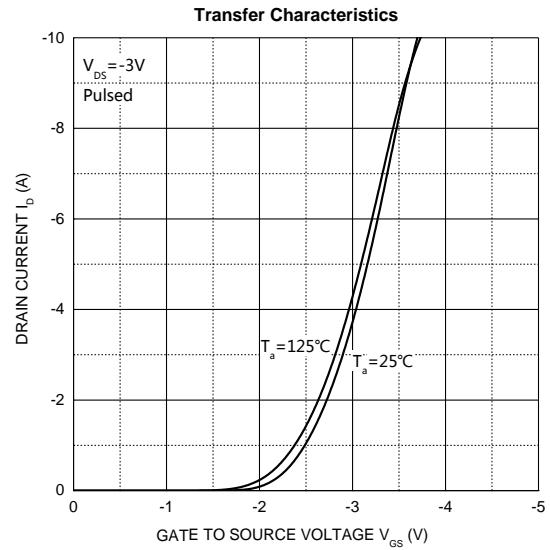
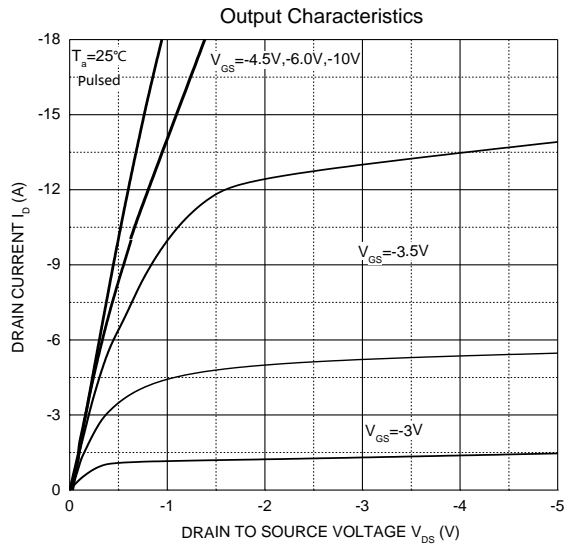
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
<b>Static Characteristics</b>						
Drain-source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	40			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 32V, V_{GS} = 0V$			1	$\mu A$
Gate-body Leakage Current	$I_{GSS}$	$V_{GS} = \pm 20V, V_{DS} = 0V$			$\pm 100$	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.0	1.6	3.0	V
Drain-source On-resistance <sup>(3)</sup>	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 6.0A$		16	21	m $\Omega$
		$V_{GS} = 4.5V, I_D = 6.0A$		27	32	
Forward Transconductance	$g_{FS}$	$V_{DS} = 5V, I_D = 6.0A$	10			S
<b>Dynamic Characteristics<sup>(4)</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 20V, V_{GS} = 0V, F = 1.0MHz$		633		pF
Output Capacitance	$C_{oss}$			65		
Reverse Transfer Capacitance	$C_{rss}$			55		
Total Gate Charge	$Q_g$	$V_{DS} = 20V, I_D = 6.0A, V_{GS} = 4.5V$		9.5		nC
Gate-source Charge	$Q_{gs}$			1.5		
Gate-drain Charge	$Q_{gd}$			3		
<b>Switching Characteristics<sup>(4)</sup></b>						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 20V, R_L = 2.7\Omega$ $V_{GS} = 10V, R_{GEN} = 3\Omega$		3.3		ns
Turn-on Rise Time	$t_r$			4.8		
Turn-off Delay Time	$t_{d(off)}$			26		
Turn-off Fall Time	$t_f$			4		
<b>Source - Drain Diode Characteristics</b>						
Diode Forward Voltage <sup>(3)</sup>	$V_{SD}$	$I_S = 1.0A, V_{GS} = 0V$			1.2	V
Reverse Recovery Time	$t_{rr}$	$I_F = 4A, di/dt = 100A/\mu s$		16		ns

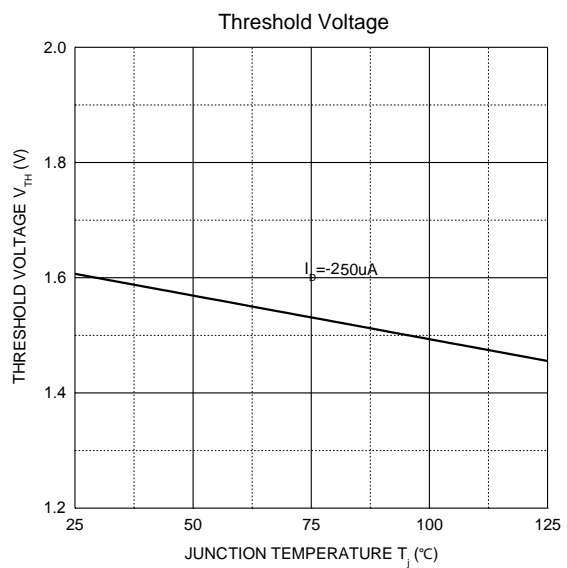
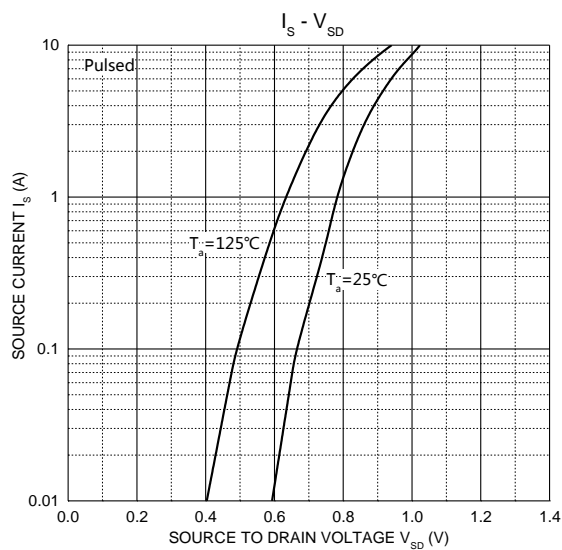
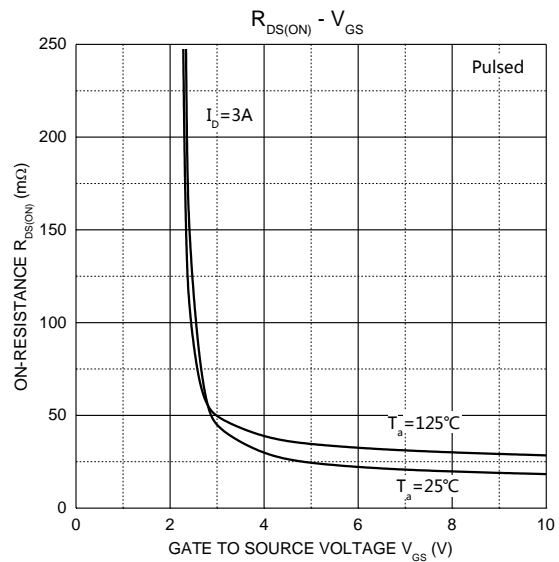
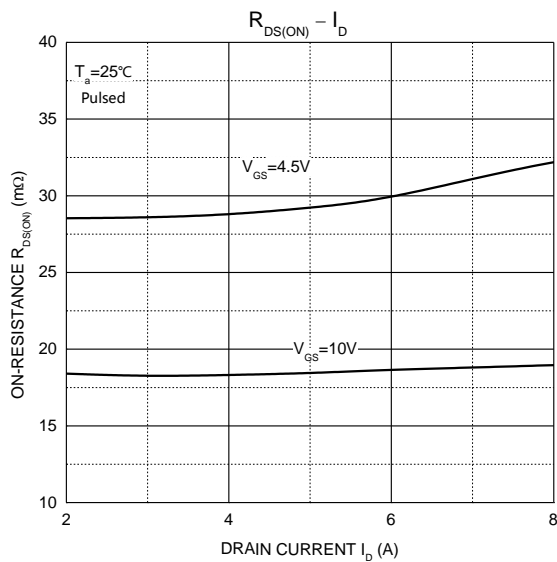
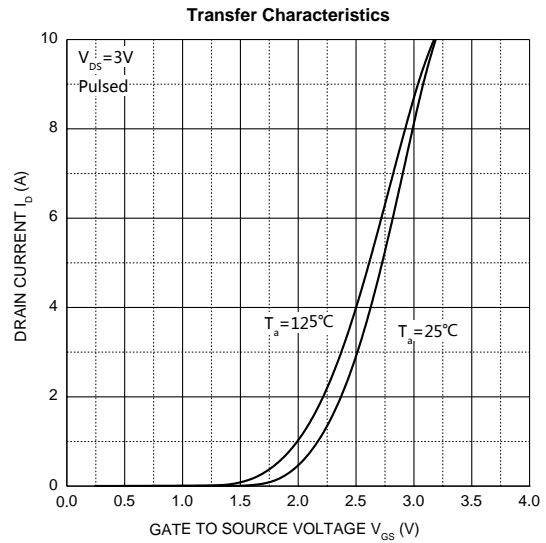
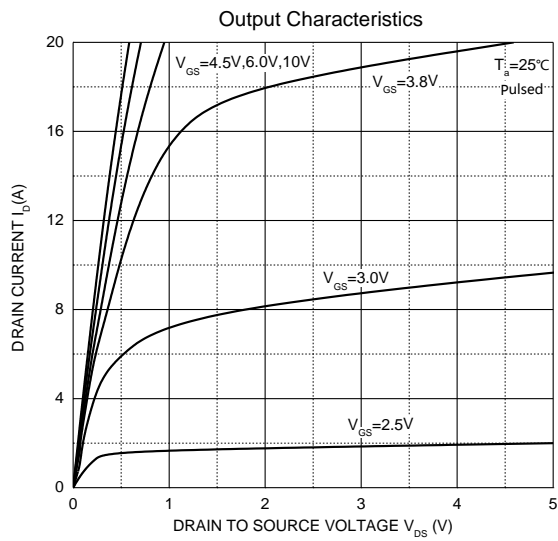
### Notes:

1. Repetitive Rating : Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t < 5$  sec.
3. Pulse Test : Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production testing.

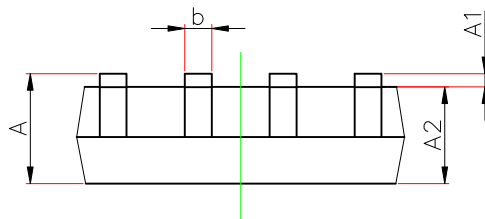
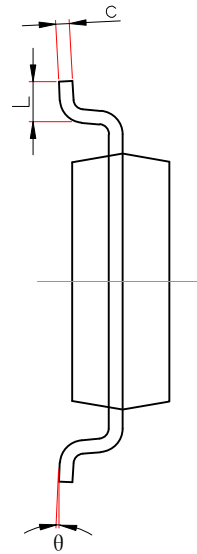
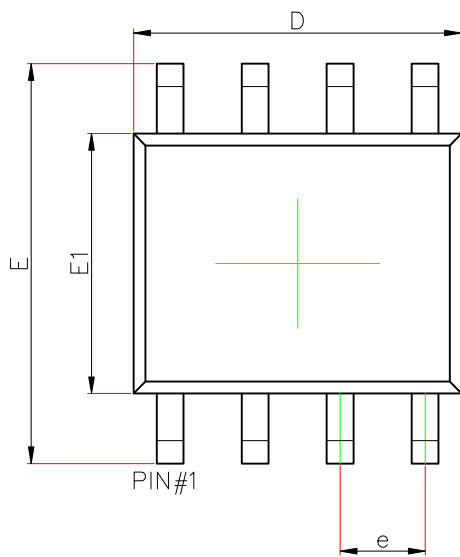
**Typical Electrical and Thermal Characteristics**

P-Channel MOS





## 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	0.156	0.250	0.006	0.010
D	4.700	5.100	0.185	0.201
e	1.270(BSC)		0.050(BSC)	
E	5.800	6.200	0.228	0.244
E1	3.700	4.100	0.146	0.161
L	0.400	1.270	0.016	0.05
θ	0°	8°	0°	8°