DESCRIPTION

The MX16P02S uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as -4.5V. This device is suitable for use as a Battery protection or in other Switching application.

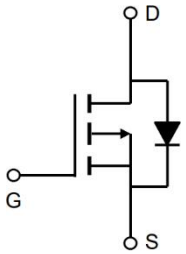
GENERAL FEATURES

- V_{DS}=-20V, I_D=-16A
  $R_{DS(ON)}$(Typ.)=14mΩ @ V_{GS}=-4.5V

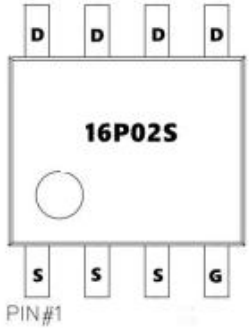
APPLICATION

- Battery protection
- Load switch
- Uninterruptible power supply

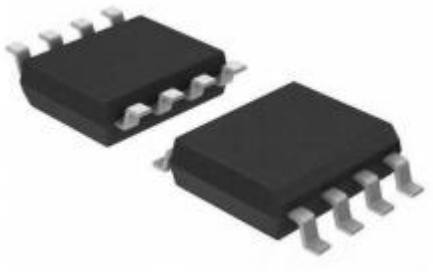
PINOUT



Schematic diagram



Marking and pin Assignment


SOP-8L top & bottom view

ORDERING INFORMATION

Part Number	Marking	StorageTemperature	Package	Devices Per Reel
MX16P02S		-55°C to 150°C	SOP-8	3000

ABSOLUTE MAXIMUM RATINGS(T_C=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	±12	V
Drain Current-Continuous(V_{GS}=-4.5V, T_C=25°C)(Note1)	I_D	-16	A
Drain Current-Continuous(V_{GS}=-4.5V, T_C=70°C)(Note1)	I_D	-8	A
Pulsed Drain Current(Note2)	I_{DM}	-48	A
Total Power Dissipation(T_C=25°C)(Note3)	P_D	2.5	W
Total Power Dissipation(T_C=70°C)(Note3)	P_D	1.6	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C
Thermal Resistance, Junction-to-Ambient(Note1)	$R_{\theta JA}$	85	°C/W
Thermal Resistance, Junction-to-Case(Note1)	$R_{\theta JC}$	24	°C/W

Note 1.The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
Note 2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
Note 3.The power dissipation is limited by 150°C junction temperature

ELECTRICAL CHARACTERISTICS(T_C=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=-250μA	-20	-24	-	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=-20V,V_{GS}=0V,T_J=25°C	-	-	-1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±12V, V_{DS}=0V	-	-	±100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250μA	-0.5	-0.6	-1.2	V
Drain-Source On-State Resistance(Note 2)	$R_{DS(ON)}$	V_{GS}=-4.5V, I_D=-20A	-	14	20	mΩ
		V_{GS}=-2.5V, I_D=-10A	-	22	28	mΩ
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=-10V, V_{GS}=0V, F=1.0MHz	-	2000	-	pF
Output Capacitance	C_{oss}		-	242	-	pF
Reverse Transfer Capacitance	C_{rss}		-	231	-	pF
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-10V, I_D=-10A, V_{GS}=-4.5V,R_G=3.3Ω	-	10	-	nS
Turn-on Rise Time	t_r		-	31	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	28	-	nS
Turn-Off Fall Time	t_f		-	8	-	nS
Total Gate Charge	Q_g	V_{DS}=-10V, I_D=-6A, V_{GS}=-4.5V	-	15.3	-	nC
Gate-Source Charge	Q_{gs}		-	2.2	-	nC
Gate-Drain Charge	Q_{gd}		-	4.4	-	nC
Drain-Source Diode Characteristics						
Continuous Source Current(Note1、3)	I_S	V_G=V_D=0V, Force Current	-	-	-20	A
Pulsed Source Current(Note2、3)	I_{SM}		-	-	-48	A
Diode Forward Voltage(Note2)	V_{SD}	V_{GS}=0V,I_S=-1A,T_J=25°C	-	-	-1.2	V

Note1. The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
Note2. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
Note3. The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 1. Output Characteristics

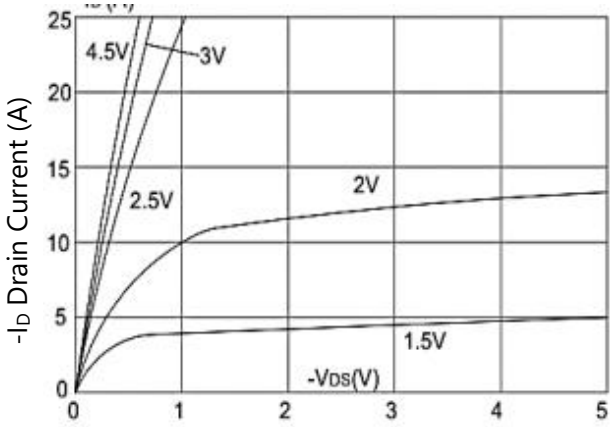


Figure 2. Transfer Characteristics

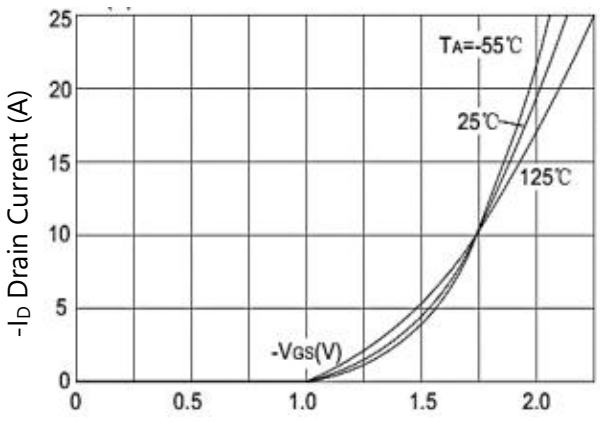


Figure 3. On-Resistance vs. Drain Current

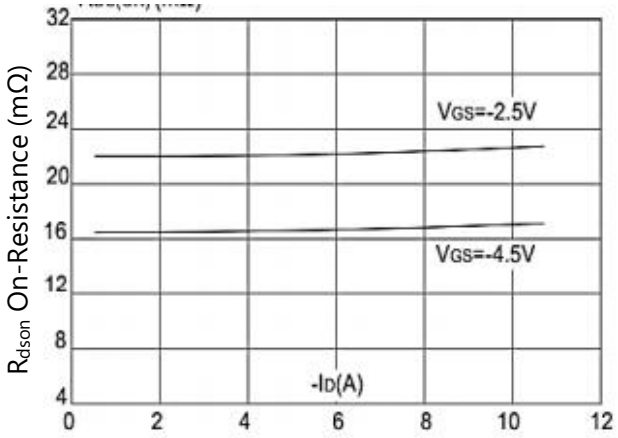


Figure 4. Body Diode Characteristics

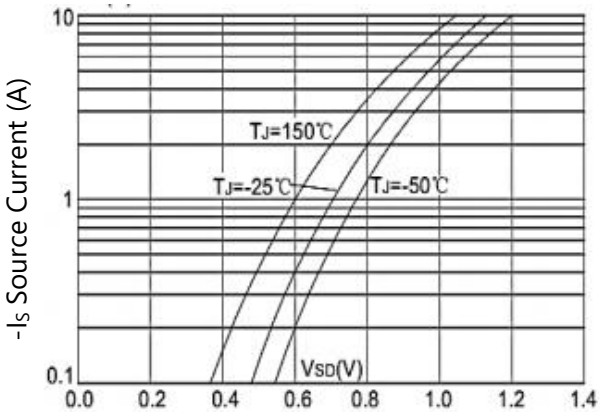


Figure 5. Gate Charge Characteristics

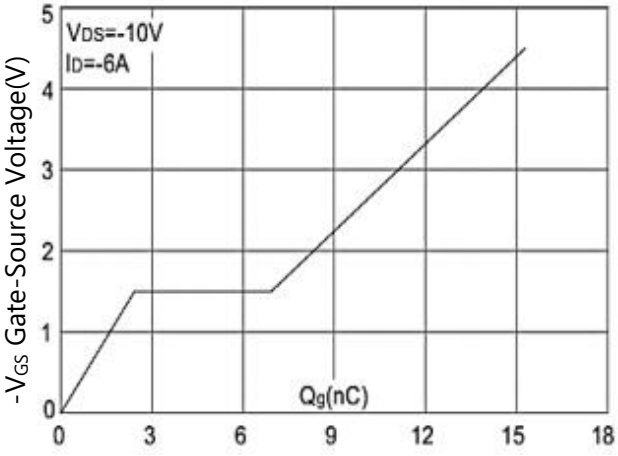
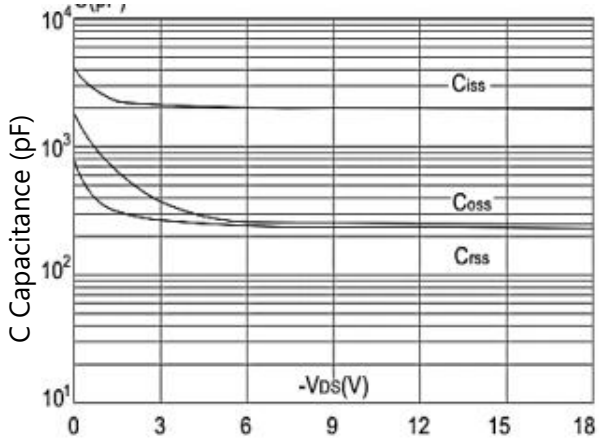
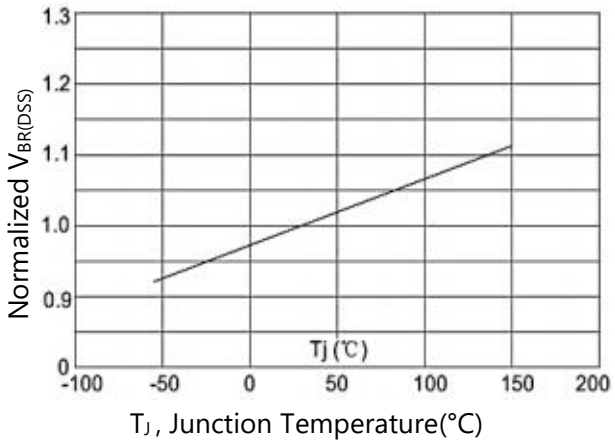


Figure 6. Capacitance Characteristics



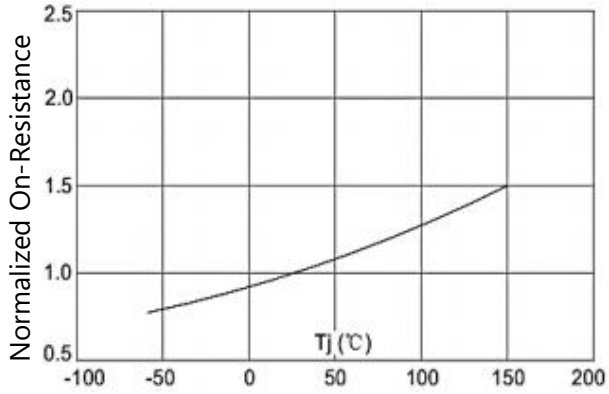
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 7. Normalized Breakdown Voltage vs Junction Temperature



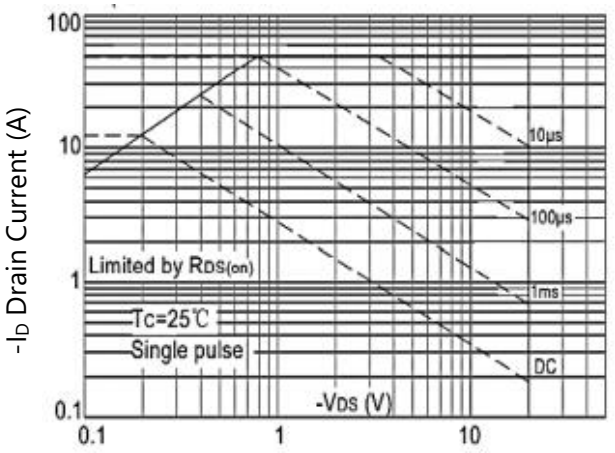
T_J , Junction Temperature(°C)

Figure 8. Normalized on Resistance vs Junction Temperature



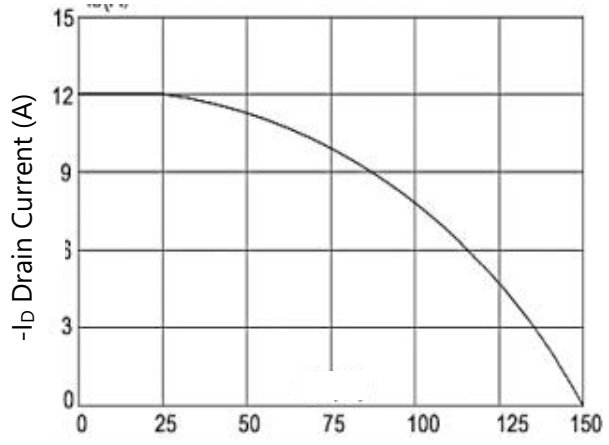
T_J , Junction Temperature(°C)

Figure 9. Maximum Safe Operating Area



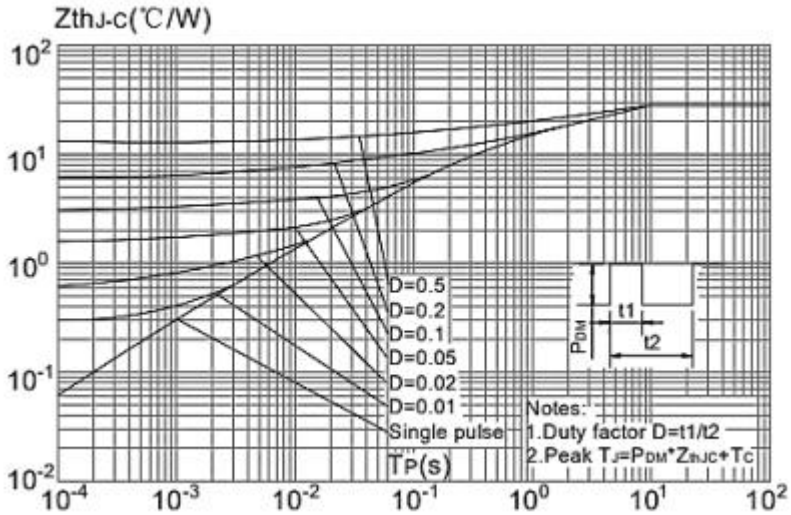
$-V_{DS}$, Drain-Source Voltage (V)

Figure 10. Maximum Continuous Drain Current vs Ambient Temperature



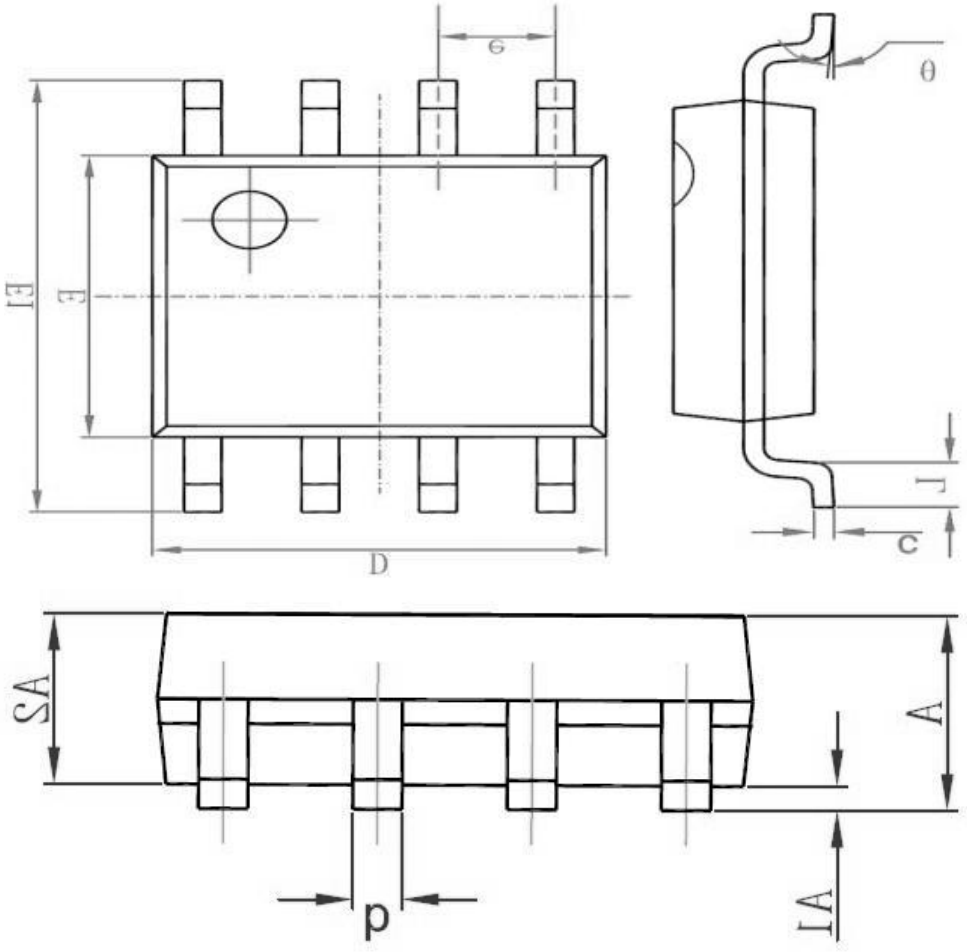
T_A , Ambient Temperature(°C)

Figure 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambien



PACKAGE INFORMATION

SOP-8



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	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°