MY20P03C

-30V P-Channel Enhancement ModeMOSFET

General Description

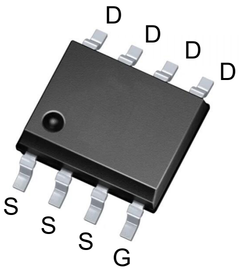
The MY20P03C uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

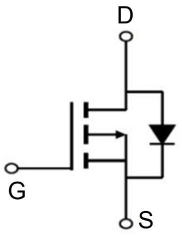
Features

V_{DSS}	-30	V
I_D	-20	A
$P_D(T_A=25℃)$	2.5	W
$R_{DS(ON)}(at V_{GS}=10V)$	<8.7	mΩ

Application

- Battery protection
- Load switch
- Uninterruptible power supply





Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
MY20P03C	SOP-8	20P03C	3000

Absolute Maximum Ratings (T_A=25℃unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-30	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_A=25°C	Continuous Drain Current, V_{GS} @ -10V^1	-20	A
I_D@T_A=70°C	Continuous Drain Current, V_{GS} @ -10V^1	-18	A
I_{DM}	Pulsed Drain Current^2	-56	A
EAS	Single Pulse Avalanche Energy^3	151	mJ
I_{AS}	Avalanche Current	-55	A
P_D@T_A=25°C	Total Power Dissipation^4	1.5	W
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ^{1}(t≦10 s)	40	°C/W
	Thermal Resistance Junction-Ambient ^{1}	75	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case^1	24	°C/W

Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=-250uA	-30	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=-1mA	---	-0.018	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=-10V , I_D=- 12A	---	---	7.3	mΩ
		V_{GS}=-4.5V , I_D=-10A	---	---	9.5	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250uA	-1.2	---	-2.5	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	5.04	---	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-24V , V_{GS}=0V , T_J=25℃	---	---	-1	uA
		V_{DS}=-24V , V_{GS}=0V , T_J=55℃	---	---	-5	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=-5V , I_D=-12A	---	25	---	S
Q_g	Total Gate Charge (-4.5V)	V_{DS}=-15V , V_{GS}=-4.5V , I_D=-12A	---	30	---	nC
Q_{gs}	Gate-Source Charge		---	10	---	
Q_{gd}	Gate-Drain Charge		---	10.4	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=-15V, V_{GS}=-10V, R_G=3.3 I_D=-1A	---	9.4	---	ns
T_r	Rise Time		---	10.2	---	
$T_{d(off)}$	Turn-Off Delay Time		---	117	---	
T_f	Fall Time		---	24	---	
C_{iss}	Input Capacitance	V_{DS}=-15V , V_{GS}=0V , f=1MHz	---	3448	---	pF
C_{oss}	Output Capacitance		---	508	---	
C_{rss}	Reverse Transfer Capacitance		---	421	---	
I_S	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	-14	A
I_{SM}	Pulsed Source Current[2,5]		---	---	-56	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=-1A , T_J=25℃	---	---	-1.2	V
t_{rr}	Reverse Recovery Time	I_F=-10A , dI/dt=100A/μs , T_J=25℃	---	19.4	---	nS
Q_{rr}	Reverse Recovery Charge		---	9.1	---	nC

Note :

1.The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
3.The EAS data shows Max. rating . The test condition is V_{DD}=-25V,V_{GS}=-10V,L=0.1mH,I_{AS}=-55A
4.The power dissipation is limited by 150℃ junction temperature
5.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

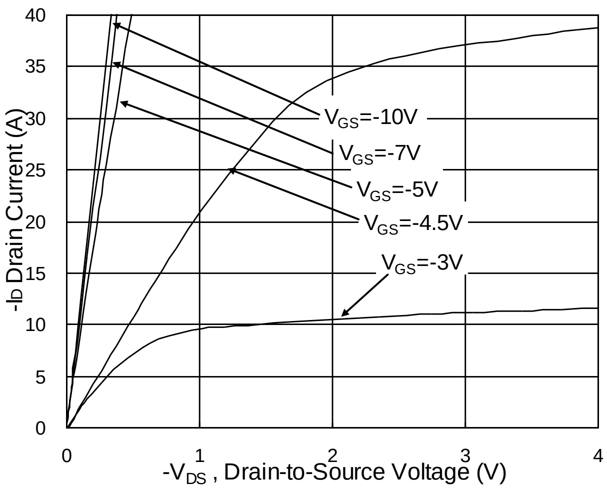


Fig.1 Typical Output Characteristics

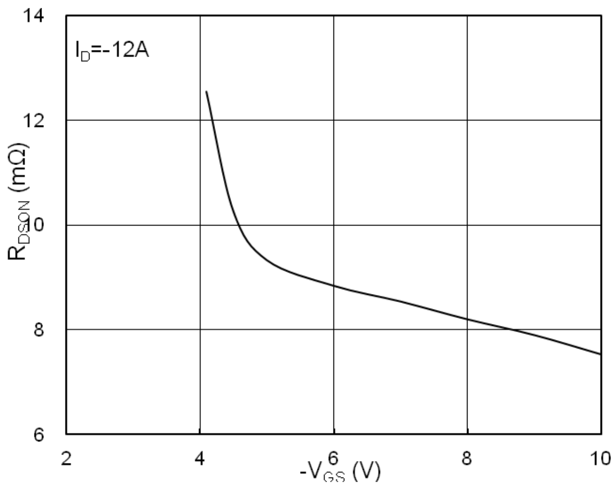


Fig.2 On-Resistance v.s Gate-Source

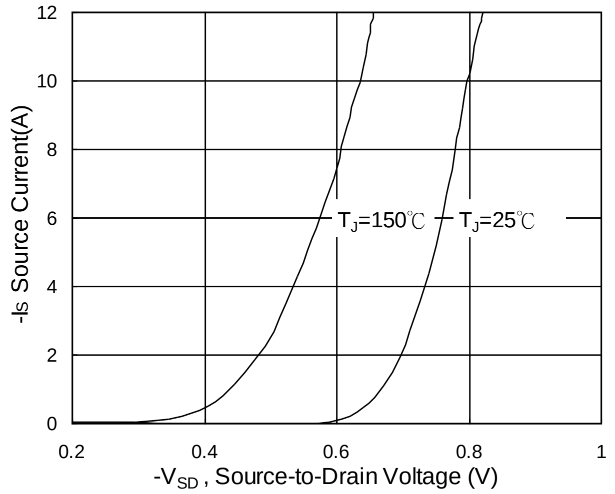


Fig.3 Forward Characteristics Of Reverse

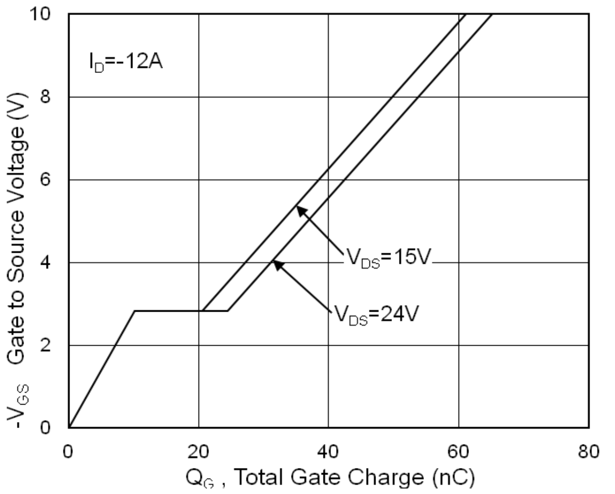


Fig.4 Gate-Charge Characteristics

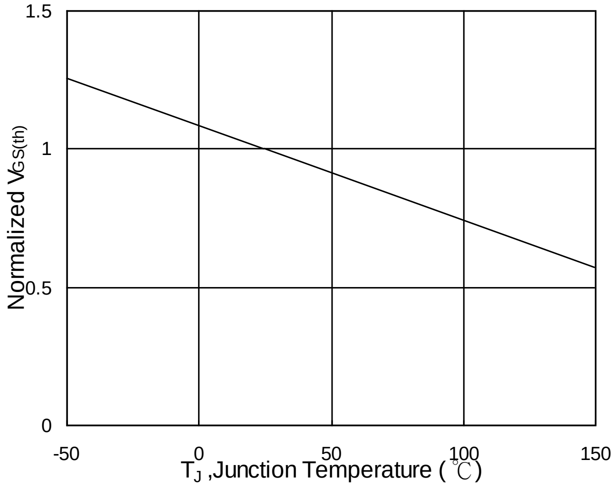


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

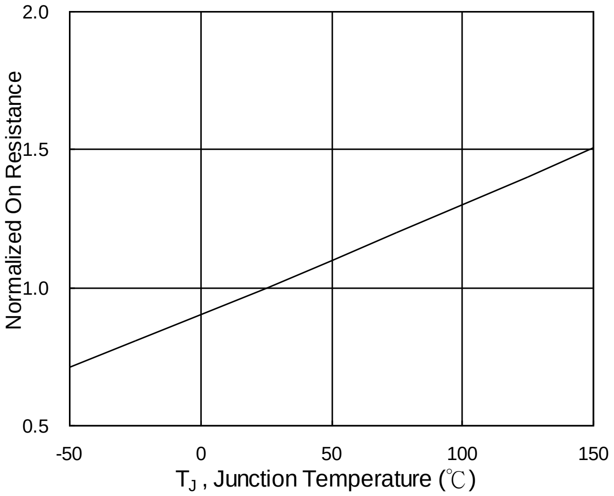
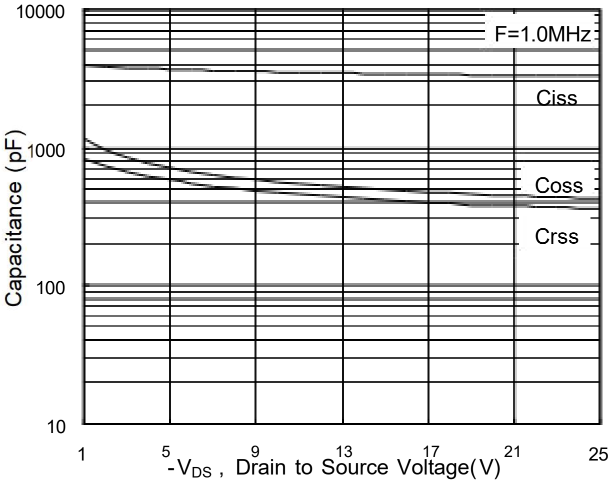


Fig.6 Normalized R_{DSON} vs. T_J



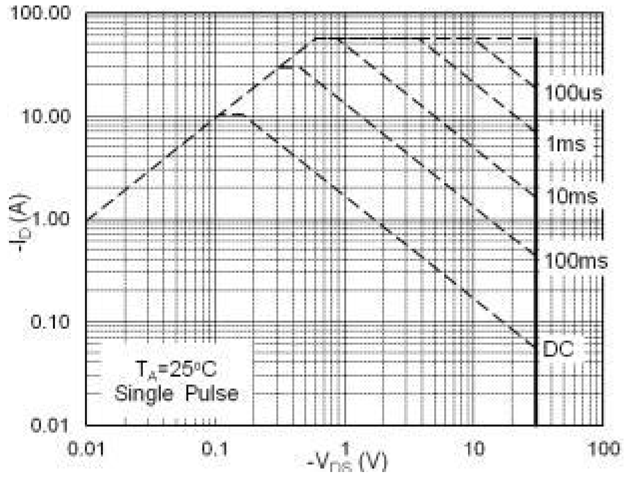


Fig.7 Capacitance

Fig.8 Safe Operating Area

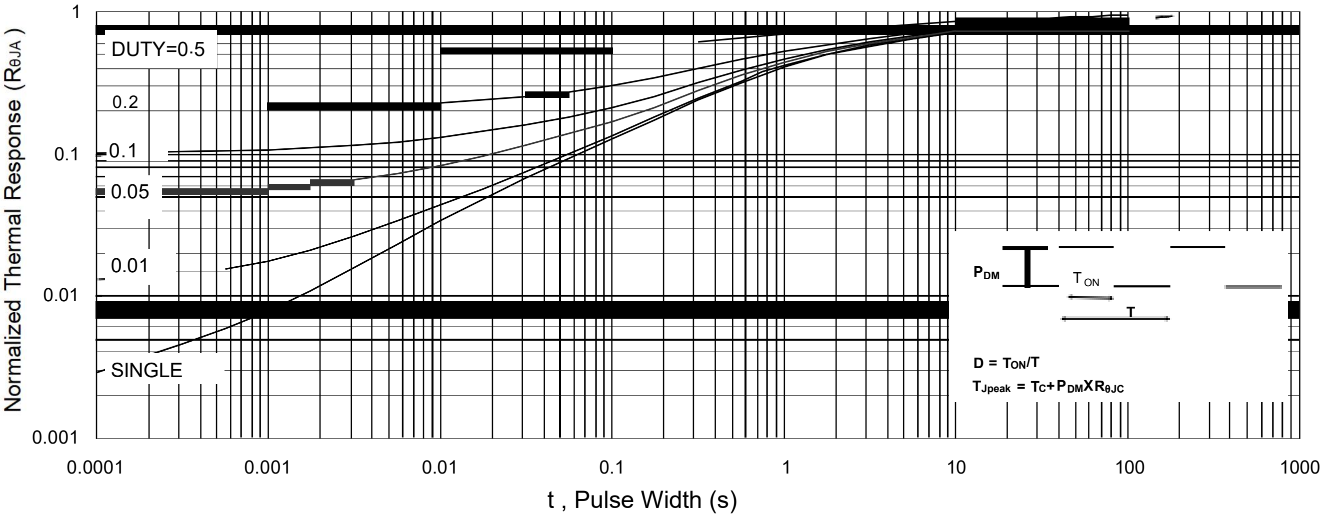
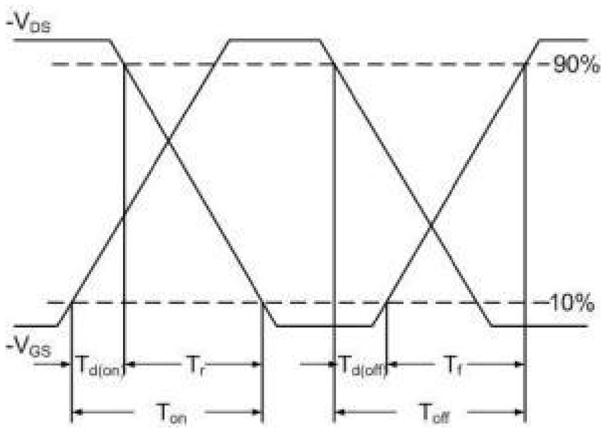


Fig. 9 Normalized Maximum Transient Thermal Impedance



$$EAS=\frac{1}{2}L\times(-I_{AS}{}^{2})\times\frac{-BV_{DSS}}{-BV_{DSS}-(-V_{DD})}$$

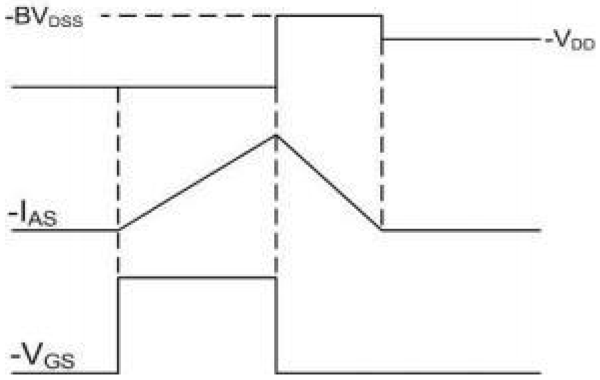
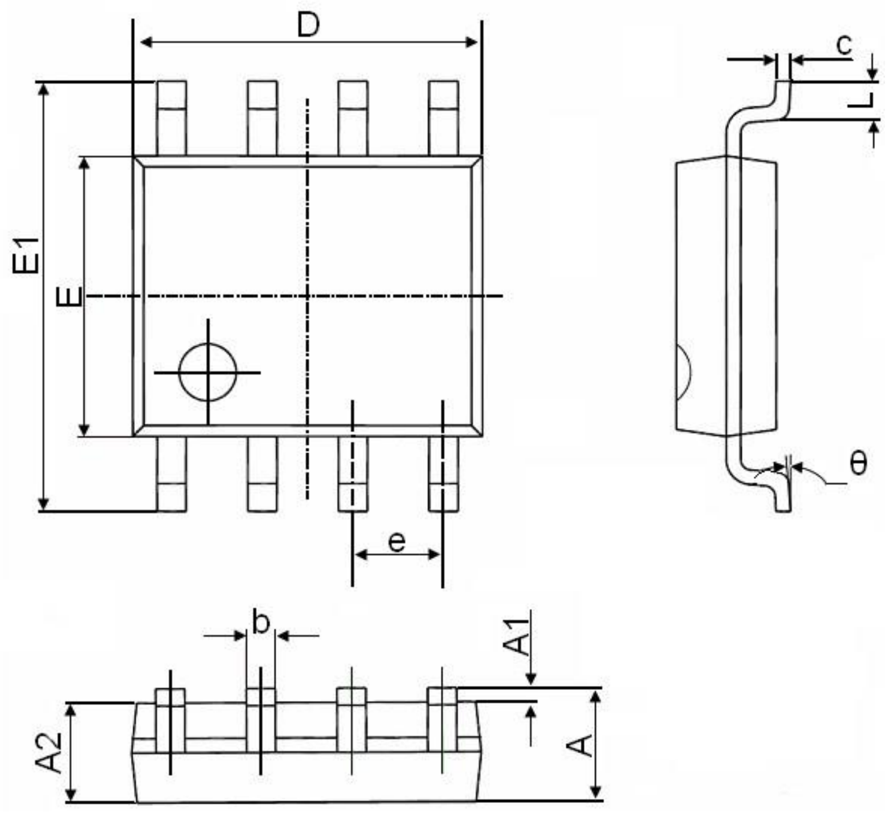


Fig.10 Switching Time Waveform

Fig.11 Unclamped Inductive Switching Waveform

Package Mechanical Data-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