MS60P03

P-Channel 60-V (D-S) MOSFET

Description

The MS60P03 is the highest performance P-ch MOSFETs with super high dense cell design for low $R_{DS(ON)}$ and gate charge for high efficiency fast switching applications.

The device meets the RoHS and Green Product requirement with full function reliability approved.

Features

- Low Reverse Transfer Capacitance
- High Switching Speed
- Improved dv/dt Capability
- Low Gate Charge
- Green Device Available

Typical Applications

- Motor Control
- Net Working
- LED Applications

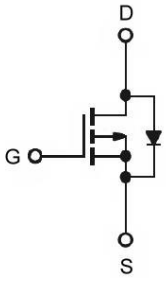
Package type : SOT-23

Packing & Order Information

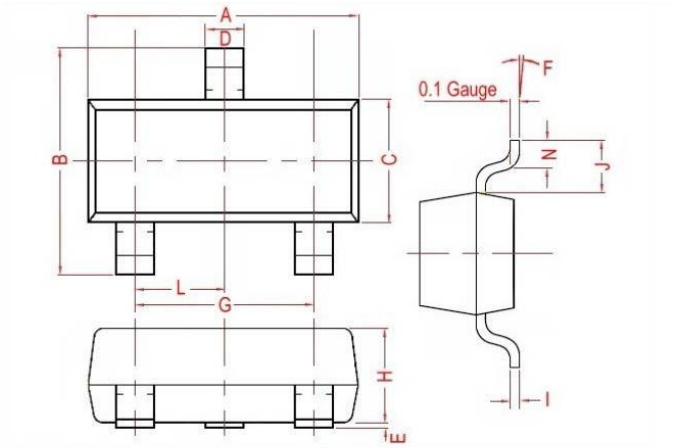
3,000/Reel

RoHS Compliant

Graphic Symbol

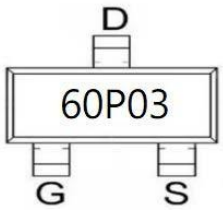


Package Dimension



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	2.70	3.10	G	1.90 Ref.	
B	2.30	3.00	H	0.90	1.30
C	1.20	1.75	I	0.05	0.21
D	0.30	0.50	J	0.58 Ref.	
E	0.01	0.15	L	0.95 Typ.	
F	0°	10°	N	0.20 Min.	

Marking



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MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings (unless otherwise specified)			
Symbol	Parameter	Value	Units
V_{DS}	Drain-Source Voltage	-60	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Continuous Drain Current[1] (T_A =25°C)	-3	A
	Continuous Drain Current[1] (T_A =70°C)	-2.3	A
I_{DM}	Pulsed Drain Current[1,2] (T_A =25°C)	-12	A
P_D	Power Dissipation[3] (T_A =25°C)	2	W
T_J/T_{STG}	Operating Junction and Storage Temperature	-55 to +150	°C

Thermal Resistance Ratings			
Symbol	Parameter	Maximum	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient[1]	125	°C/W
$R_{\theta JC}$	Maximum Junction-to-Case[1]	80	°C/W

Electrical Characteristics(T_J=25°C unless otherwise specified)						
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{GS\,(th)}$	Gate Threshold Voltage	V_{DS} =V_{GS}, I_D =-250μA	-1.0	-	-2.5	V
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} =0V, I_D =-250μA	-60	-	-	V
I_{GSS}	Gate-Source Leakage Current	V_{DS} =0V, V_{GS} =±20V	-	-	±100	nA
I_{DSS}	Drain-Source Leakage Current	V_{DS} =-48V, V_{GS} =0V, T_J =25°C V_{DS} =-48V, V_{GS} =0V, T_J =125°C	-	-	-1 -5	μA
$R_{DS\,(on)}$	Static Drain-Source On-Resistance[2]	V_{GS} =-10V, I_D =-2A V_{GS} =-4.5V, I_D =-1.5A	- -	120 150	140 200	mΩ
V_{SD}	Diode Forward Voltage[2]	I_S =-1.0A, V_{GS} =0V, T_J =25°C	-	-	-1.2	V
I_S	Continuous Source Current[1,4] (Diode)	V_G =V_D =0V, Force Current	-	-	-3.2	A

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Dynamic and switching Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
Q_g	Total Gate Charge[2]	V_{DS} =-20V	--	5.9	--	nC
Q_{gs}	Gate-Source Charge	I_D=-2A	--	2.9	--	
Q_{gd}	Gate-Drain Charge	V_{GS} =-4.5V	--	1.8	--	
$t_{d(on)}$	Turn-On Delay Time[2]	V_{DD}=-12V	--	10	--	ns
t_r	Rise Time	I_D=-1A	--	17	--	
$t_{d(off)}$	Turn-Off Delay Time	V_{GS} =-10V	--	22	--	
t_f	Fall Time	R_G =3.3Ω	--	21	--	
C_{ISS}	Input Capacitance	V_{DS} =-15V	--	715	--	pF
C_{OSS}	Output Capacitance	V_{GS} =0V	--	51	--	
C_{RSS}	Reverse Transfer Capacitance	f =1.0MHz	--	34	--	

Notes

1. 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 power dissipation is limited by 150°C junction temperature.
4. The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.

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Typical Electrical Characteristics

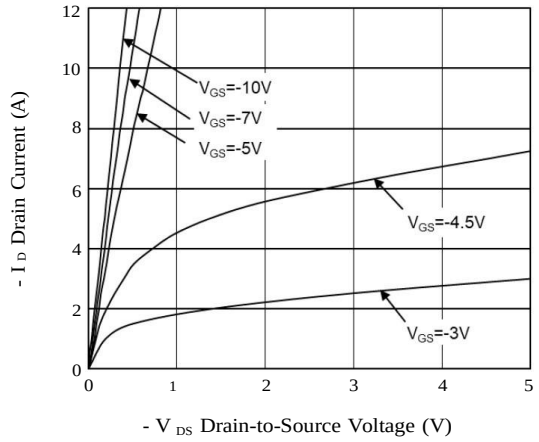

FIG.1-Typical Output Characteristics

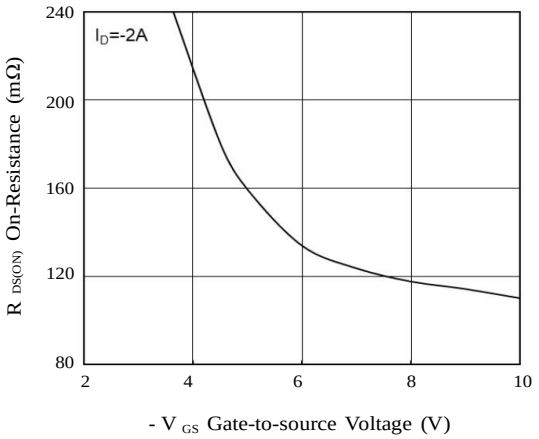

FIG.2-On-Resistance vs. G-S Voltage

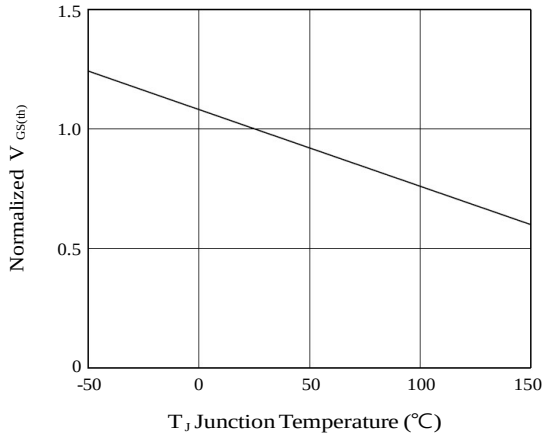

FIG.3-Normalized $V_{GS(th)}$ vs. T_J

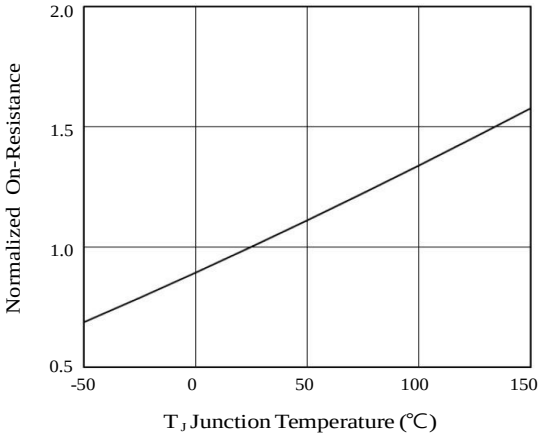

FIG.4-Normalized R_{DSON} vs. T_J

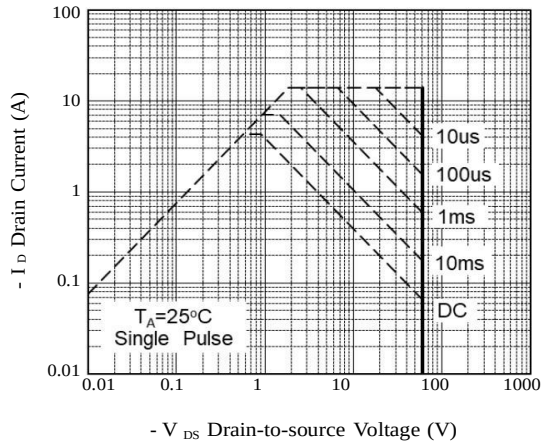

FIG.5-Safe Operating Area

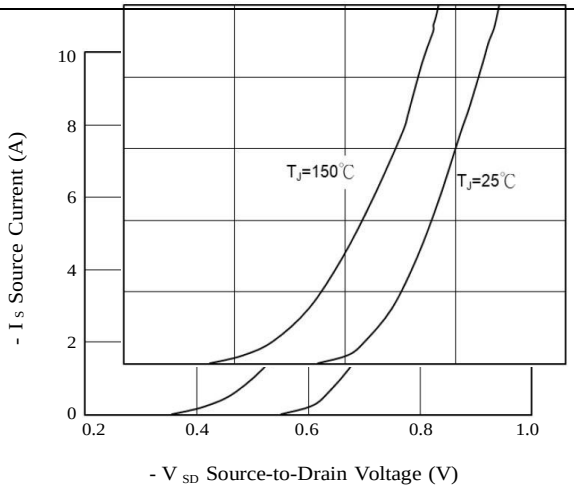

FIG.6-Source Drain Forward Characteristics

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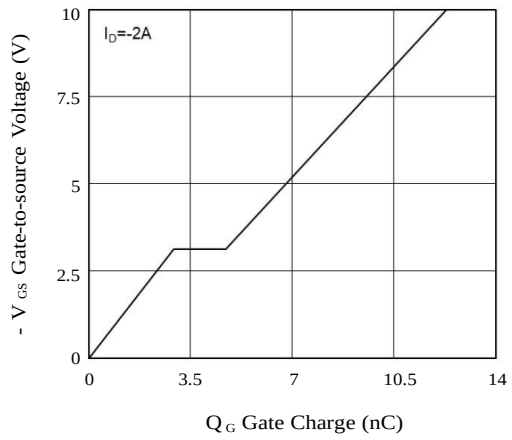


FIG.7-Gate Charge Characteristics

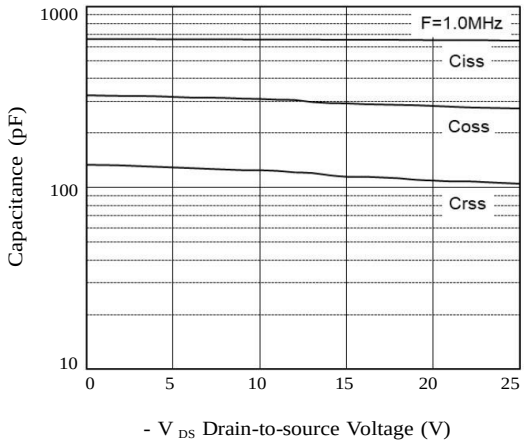


FIG.8-Capacitance Characteristics

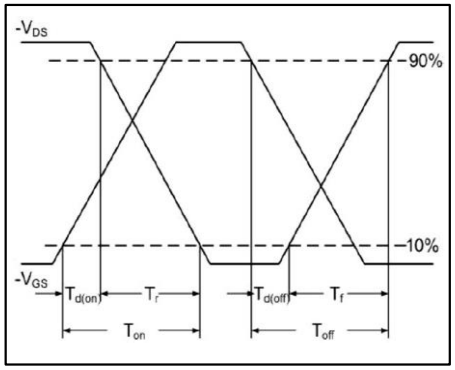
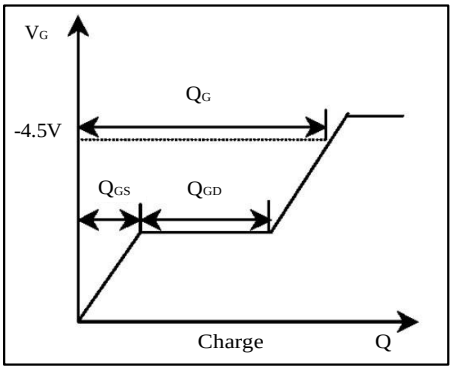


FIG.9-Switching Time Waveform



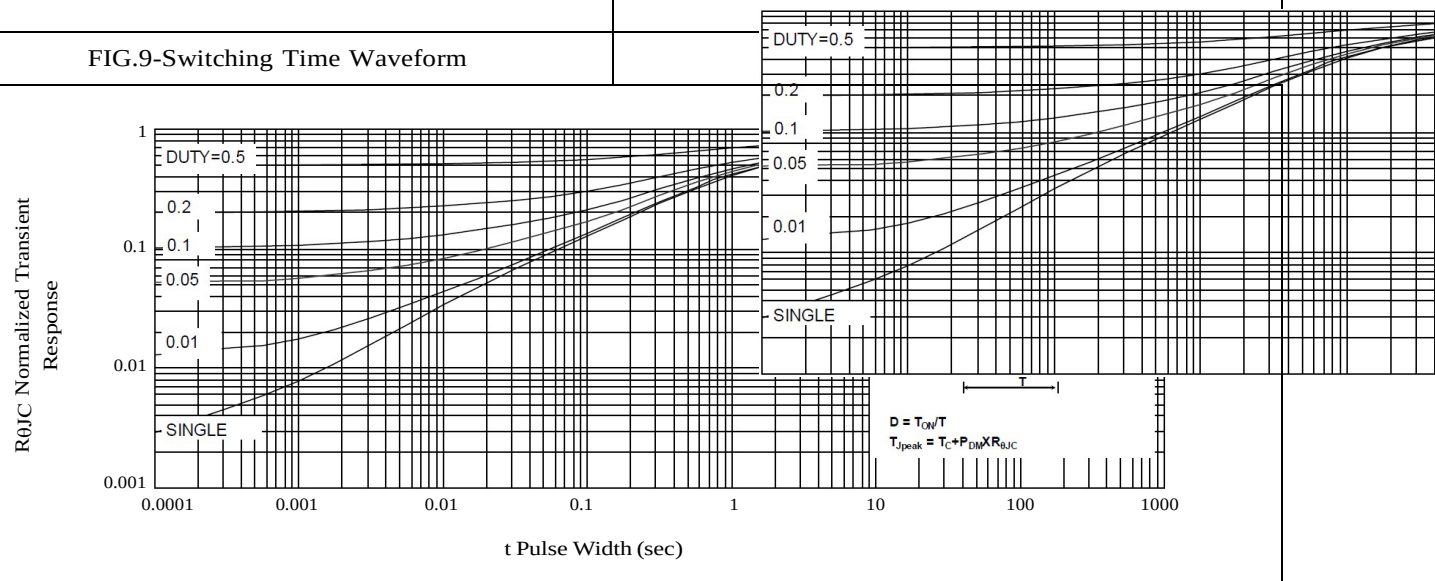


FIG.11-Normalized Maximum Transient Thermal Impedance

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