MS23P05

P-Channel 20-V (D-S) MOSFET

Description

The MS23P05 is the highest performance trench P-ch MOSFETs with extreme high cell density, which provide excellent $R_{DS(ON)}$ and gate charge for most of the small power switching and load switch applications.

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

Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- Green Device Available

Typical Applications

- Notebook
- Load Switch
- Hand-held Instrument

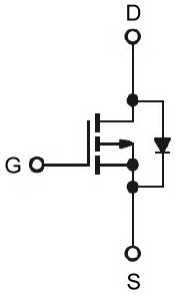
Package type：SOT-23

Packing & Order Information

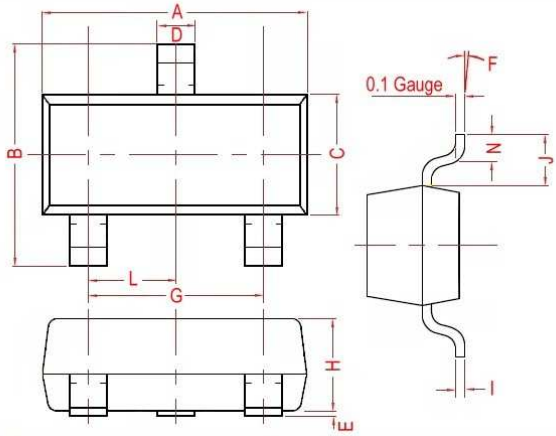
3,000/Reel

RoHS Compliant

Graphic Symbol

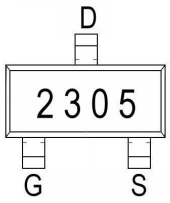


Package Dimension



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	-20	V
V_{GS}	Gate-Source Voltage	±12	V
I_D	Continuous Drain Current[1] (T_A=25°C)	-3.1	A
	Continuous Drain Current[1] (T_A=70°C)	-2.5	A
I_{DM}	Pulsed Drain Current[2] (T_A=25°C)	-15.5	A
P_D	Power Dissipation[3] (T_A=25°C)	1.0	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

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	-0.4	-	-1.2	V
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=-250μA	-20	-	-	V
g_{fs}	Forward Transconductance	V_{DS}=-5V, I_D=-3.0A	-	9	-	S
I_{GSS}	Gate-Source Leakage Current	V_{DS}=0V, V_{GS}=±12V	-	-	±100	nA
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-16V, V_{GS}=0V, T_J=25°C	-	-	-1	μA
		V_{DS}=-16V, V_{GS}=0V, T_J=55°C			-5	
$R_{DS\ (on)}$	Static Drain-Source On-Resistance[2]	V_{GS}=-10V, I_D=-3.0A	-	-	55	mΩ
		V_{GS}=-4.5V, I_D=-3.0A	-	-	65	
		V_{GS}=-2.5V, I_D=-2.0A	-	-	100	
		V_{GS}=-1.8V, I_D=-1.0A	-	-	150	
V_{SD}	Diode Forward Voltage[2]	I_S=-1.0A, V_{GS}=0V, T_J=25°C	-	-	-1.0	V
I_S	Continuous Source Current[1,4] **(Diode)**	V_G=V_D=0V, Force Current	-	-	-3.1	A
I_{SM}	Pulsed Source Current[2,4] **(Diode)**		-	-	-15.5	

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℃ 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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Dynamic and switching Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
Q_g	Total Gate Charge[2]	V_{DS} =-15V I_D =-3.0A V_{GS} =-4.5V	--	9.7	--	nC
Q_{gs}	Gate-Source Charge		--	2.1	--	
Q_{gd}	Gate-Drain Charge		--	2.4	--	
$t_{d(on)}$	Turn-On Delay Time[2]	V_{DS} =-10V I_D =-3.0A V_{GS} =-4.5V R_G =3.3Ω	--	4.8	9.6	ns
t_r	Rise Time		--	9.6	17.3	
$t_{d(off)}$	Turn-Off Delay Time		--	52	104	
t_f	Fall Time		--	8.4	16.8	
C_{ISS}	Input Capacitance	V_{DS} =-15V V_{GS} =0V f =1.0MHz	--	686	--	pF
C_{OSS}	Output Capacitance		--	91	--	
C_{RSS}	Reverse Transfer Capacitance		--	80	--	

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- **Typical Electrical Characteristics**

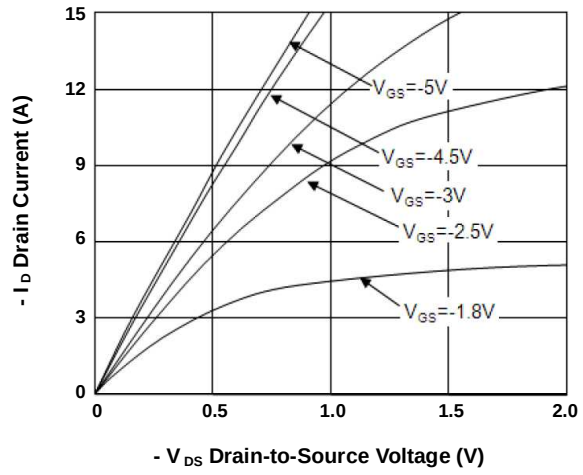

FIG.1-Typical Output Characteristics

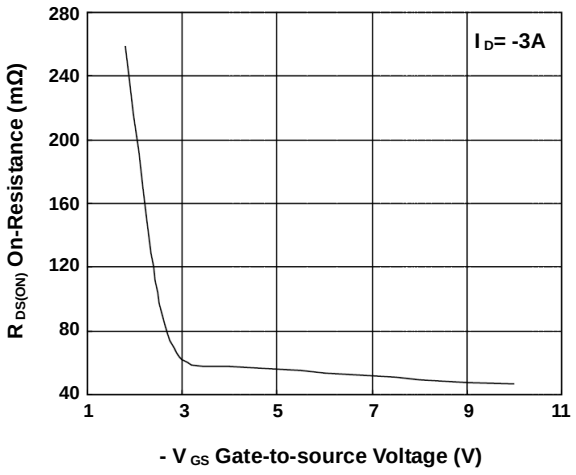

FIG.2-On-Resistance vs. G-S Voltage

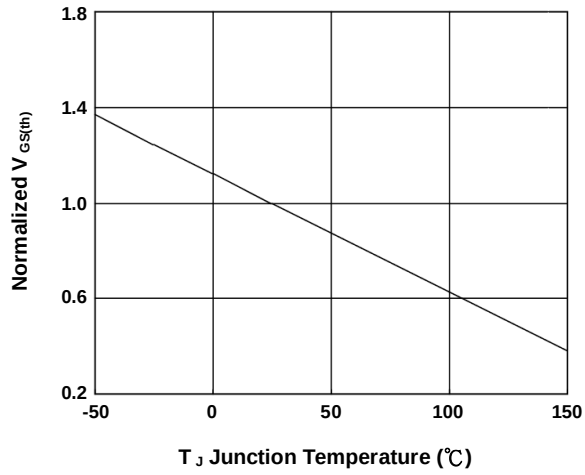

FIG.3-Normalized $V_{GS(th)}$ vs. T_J

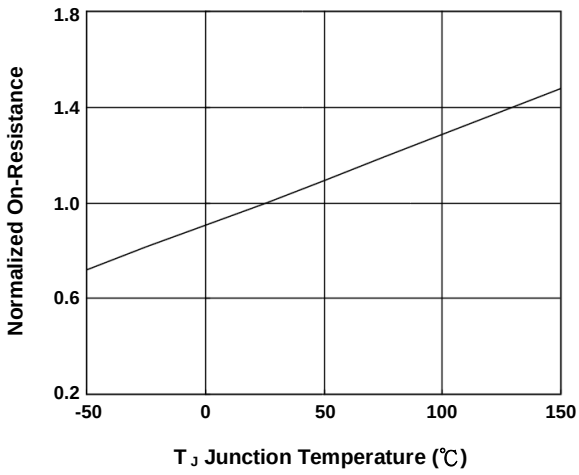

FIG.4-Normalized R_{DSON} vs. T_J

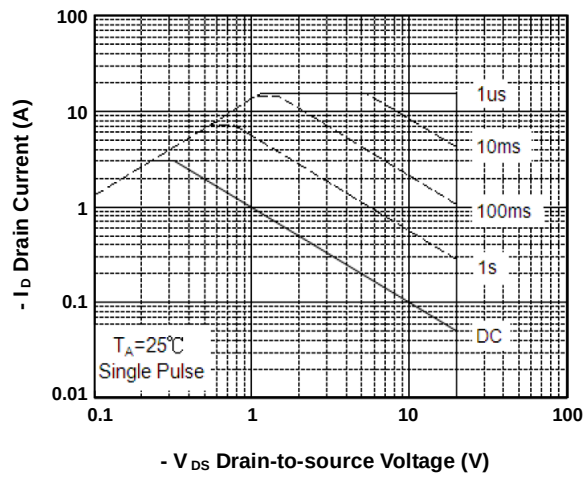

FIG.5-Safe Operating Area

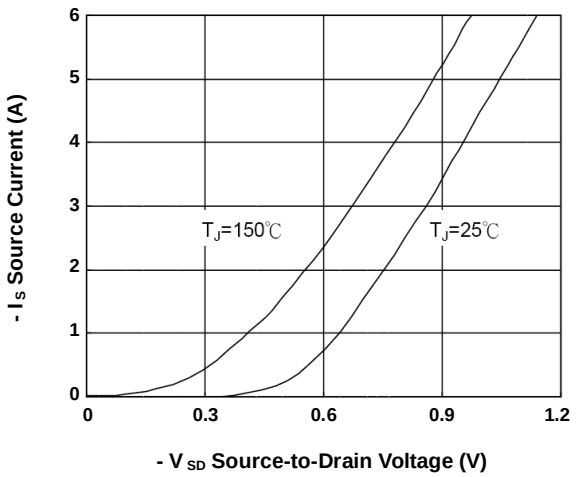

FIG.6-Forward Characteristics of Reverse

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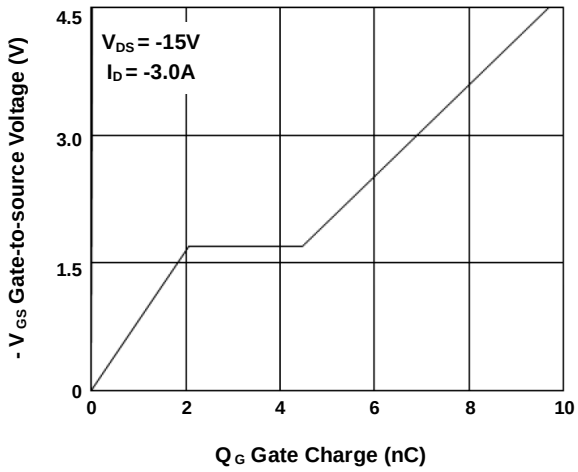

FIG.7-Gate Charge Characteristics

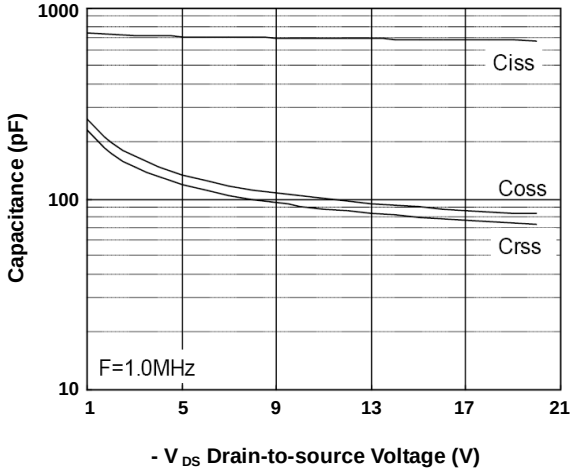

FIG.8-Capacitance Characteristics

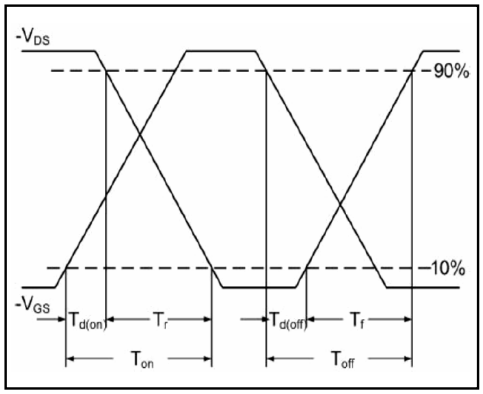

FIG.9-Switching Time Waveform

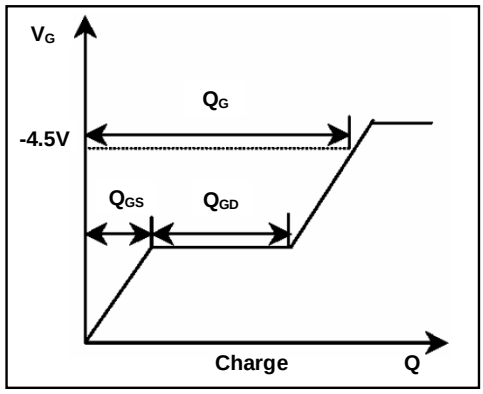

FIG.10-Gate Charge Waveform

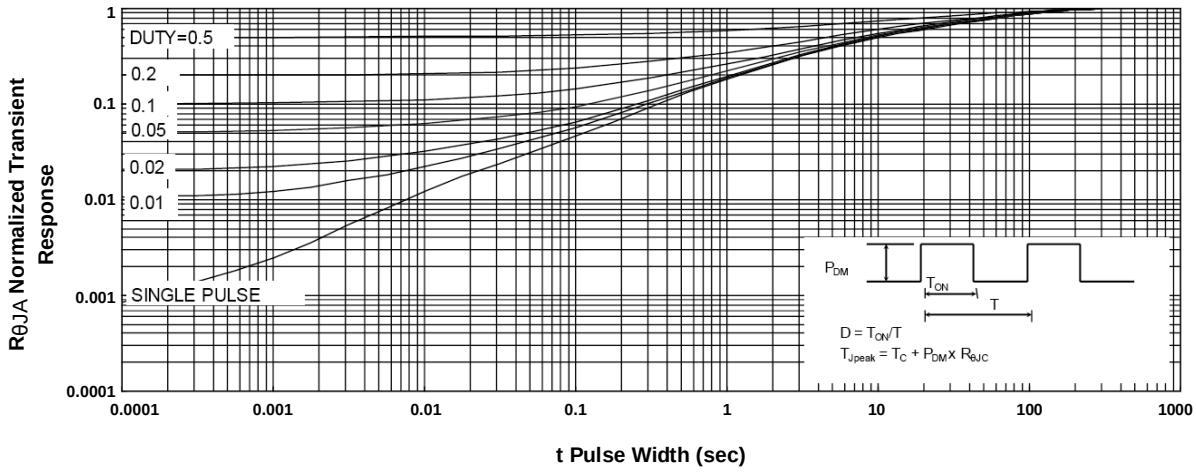

FIG.11-Normalized Maximum Transient Thermal Impedance

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