MSQ30C01D

N & P-Channel 30-V (D-S) MOSFET

Description

The device is the highest performance trench N-ch and P-ch MOSFETs with extreme high cell density, which provide excellent $R_{DS(ON)}$ and gate charge for most of the synchronous buck converter applications.

The device meets the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

Features

- Suit for 4.5V Gate Drive Applications
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- 100% EAS Guaranteed
- Green Device Available

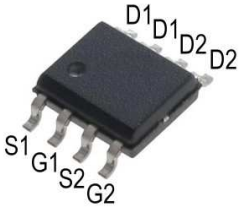
Typical Applications

- DC Fan
- Motor Drive Applications
- Networking
- Half / Full Bridge Topology

Package type：SOP-8

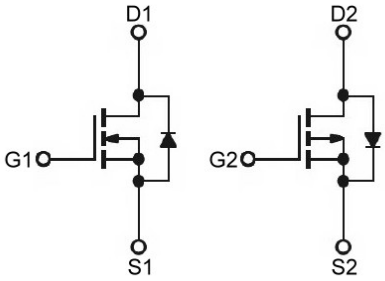
Packing & Order Information

3,000/Reel

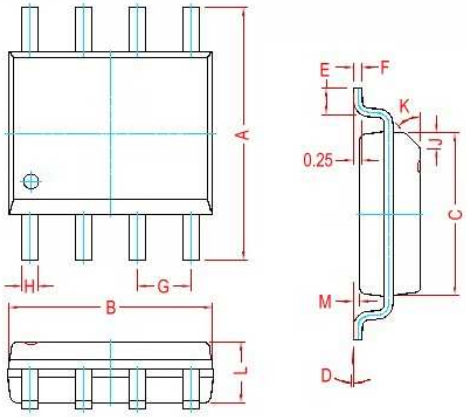


RoHS Compliant

Graphic Symbol

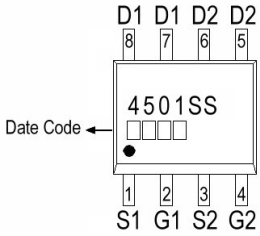


Package Dimension



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	5.80	6.20	M	0.10	0.25
B	4.80	5.00	H	0.35	0.51
C	3.80	4.00	L	1.35	1.75
D	0°	8°	J	0.40 Ref.	
E	0.40	0.90	K	45° Ref.	
F	0.19	0.26	G	1.27 Typ.	

Marking



MSQ30C01D

N & P-Channel 30-V (D-S) MOSFET

MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings (unless otherwise specified)

Symbol	Parameter	Value		Units
		N-ch	P-ch	
V_{DS}	Drain-Source Voltage	30	-30	V
V_{GS}	Gate-Source Voltage	±20	±20	V
I_D	Continuous Drain Current[1] (T_A=25°C)	7.0	-5.3	A
	Continuous Drain Current[1] (T_A=70°C)	5.8	-4.7	A
I_{DM}	Pulsed Drain Current[2] (T_A=25°C)	20	-20	A
I_{AS}	Single Pulse Avalanche Current, L =0.1mH[3]	21	-19	A
E_{AS}	Single Pulse Avalanche Energy, L =0.1mH[3]	22	18	mJ
P_D	Power Dissipation[3] (T_A=25°C)	1.5		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]	83	°C/W
$R_{\theta JC}$	Maximum Junction-to-Case[1]	60	°C/W

Electrical Characteristics(T_J=25°C unless otherwise specified)

Symbol	Parameter	Test Conditions	Ch	Min.	Typ.	Max.	Units
$V_{GS\ (th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA V_{DS}=V_{GS}, I_D=-250μA	N P	1.2 -1.2	-	2.5 -2.5	V
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA V_{GS}=0V, I_D=-250μA	N P	30 -30	-	-	V
g_{fs}	Forward Transconductance	V_{DS}=5V, I_D=7A V_{DS}=-10V, I_D=-5.3A	N P	-	6 6	-	S
I_{GSS}	Gate-Source Leakage Current	V_{DS}=0V, V_{GS}=±20V	N P	-	-	±100	nA
I_{DSS}	Drain-Source Leakage Current	V_{DS}=24V, V_{GS}=0V, T_J=25°C V_{DS}=24V, V_{GS}=0V, T_J=55°C V_{DS}=-24V, V_{GS}=0V, T_J=55°C V_{DS}=-24V, V_{GS}=0V, T_J=55°C	N P	-	-	1 5 -1 -5	μA
$R_{DS\ (on)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V, I_D=7A V_{GS}=4.5V, I_D=5A V_{GS}=-10V, I_D=-5.3A V_{GS}=-4.5V, I_D=-4.2A	N P	-	-	28 42 52 82	mΩ
EAS	Single Pulse Avalanche Energy[5]	V_{DD}=25V, L =0.1mH, I_{AS}=10A V_{DD}=-25V, L =0.1mH, I_{AS}=-10A	N P	5 5	-	-	mJ
V_{SD}	Diode Forward Voltage[2]	I_S=7A, V_{GS}=0V, T_J=25°C I_S=-5.3A, V_{GS}=0V, T_J=25°C	N P	-	-	1.2 -1.2	V
I_S	Continuous Source Current[14] **(Diode)**	V_G=V_D=0V, Force Current	N P	-	-	7.0 -5.3	A

MSQ30C01D

N & P-Channel 30-V (D-S) MOSFET

Dynamic and switching Characteristics

Symbol	Parameter	Test Conditions	Ch	Min.	Typ.	Max.	Units
Q_g	Total Gate Charge[2]	N-Ch V_{DS}=15V, I_D=7A, V_{GS}=4.5V P-Ch V_{DS}=-20V, I_D=-5A, V_{GS}=-4.5V	N P	--	6.0 6.4	--	nC
Q_{gs}	Gate-Source Charge		N P	--	2.5 2.2	--	
Q_{gd}	Gate-Drain Charge		N P	--	2.1 2.3	--	
$t_{d(on)}$	Turn-On Delay Time[2]	N-Ch V_{DS}=15V, I_D=7A, V_{GS}=10V, R_G=3.3Ω P-Ch V_{DS}=-12V, I_D=-5A, V_{GS}=-10V R_G=3.3Ω	N P	--	2.4 9	-- --	ns
t_r	Rise Time		N P	--	7.8 16.6	-- --	
$t_{d(off)}$	Turn-Off Delay Time		N P	--	22 21	-- --	
t_f	Fall Time		N P	--	4 21.6	-- --	
C_{ISS}	Input Capacitance	N-Ch V_{DS}=15V, V_{GS}=0V, f=1.0MHz P-Ch V_{DS}=-15V, V_{GS}=0V, f=1.0MHz	N P	-- --	572 632	-- --	pF
C_{OSS}	Output Capacitance		N P	-- --	80 100	-- --	
C_{RSS}	Reverse Transfer Capacitance		N P	-- --	65 74	--	

Notes

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 maximum rating. The test condition is N-ch V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=21A, P-ch V_{DD}=-25V, V_{GS}=-10V, L=0.1mH, I_{AS}=-19A.
4. The power dissipation is limited by 150℃ junction temperature.
5. The Min. value is 100% EAS tested guarantee.
6. The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.

MSQ30C01D

N & P-Channel 30-V (D-S) MOSFET

- **Typical Electrical Characteristics N-Channel**

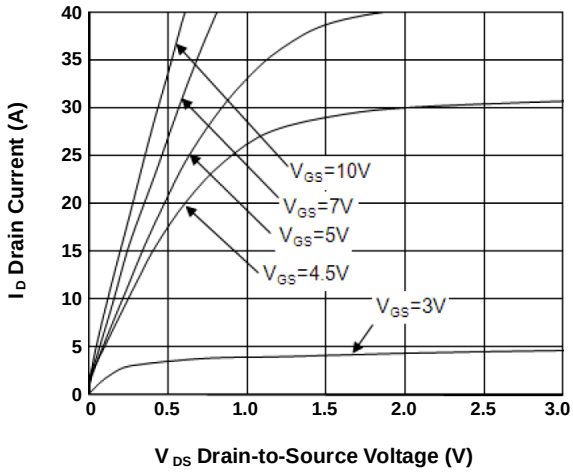


FIG.1-Typical Output Characteristics

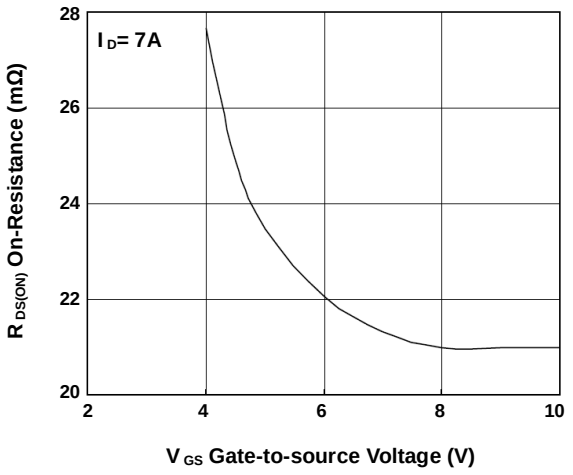


FIG.2-On-Resistance vs. G-S Voltage

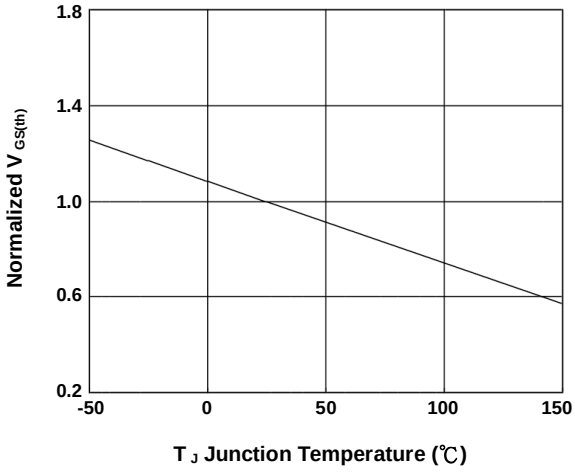


FIG.3-Normalized $V_{GS(th)}$ vs. T_J

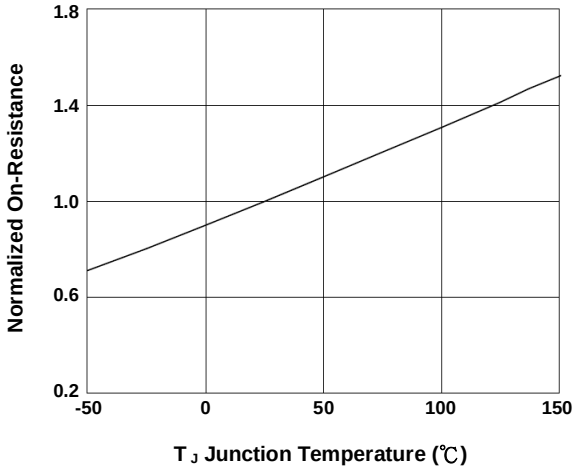


FIG.4-Normalized R_{DSON} vs. T_J

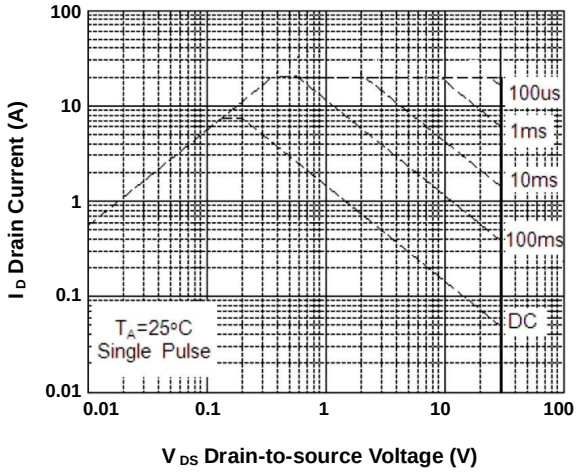


FIG.5-Safe Operating Area

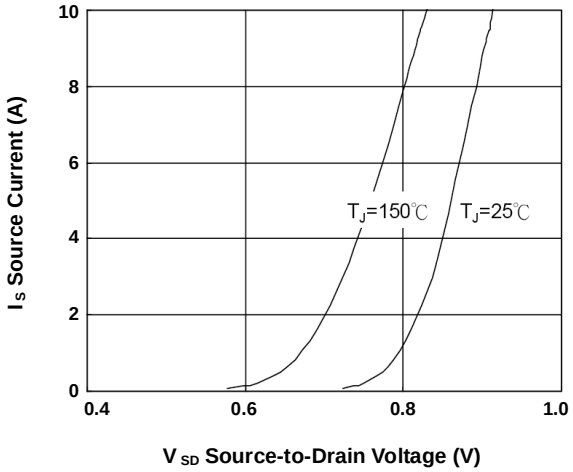


FIG.6-Forward Characteristics of Reverse

MSQ30C01D

N & P-Channel 30-V (D-S) MOSFET

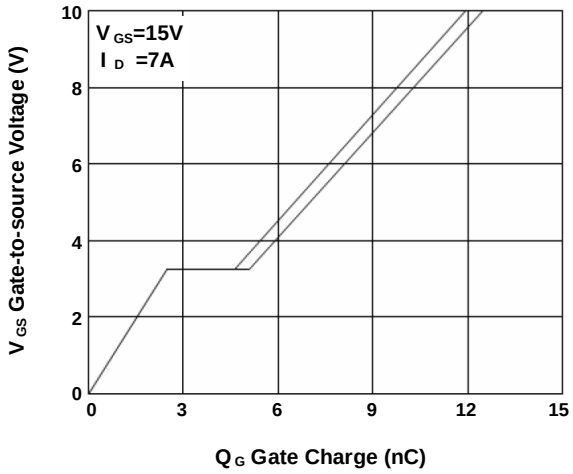


FIG.7-Gate Charge Characteristics

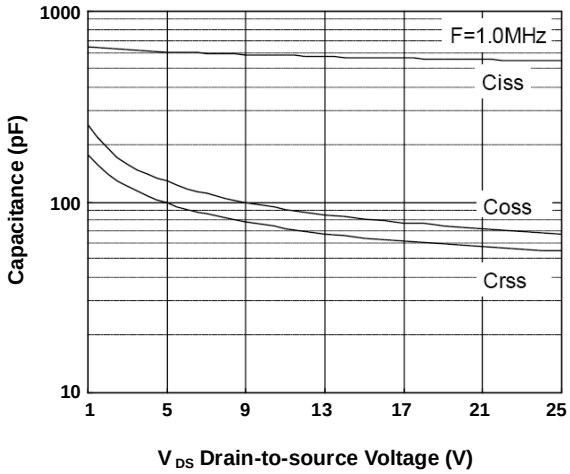


FIG.8-Capacitance Characteristics

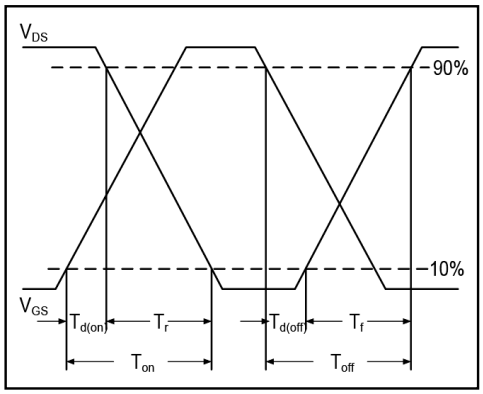


FIG.9-Switching Time Waveform

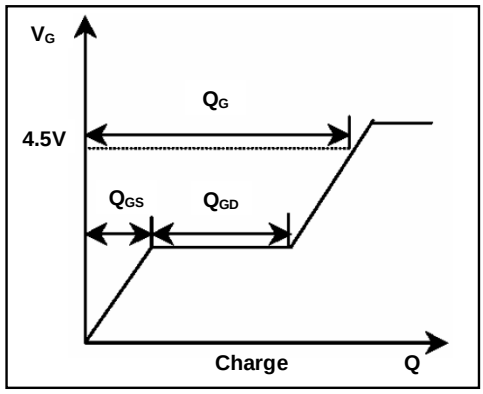


FIG.10-Gate Charge Waveform

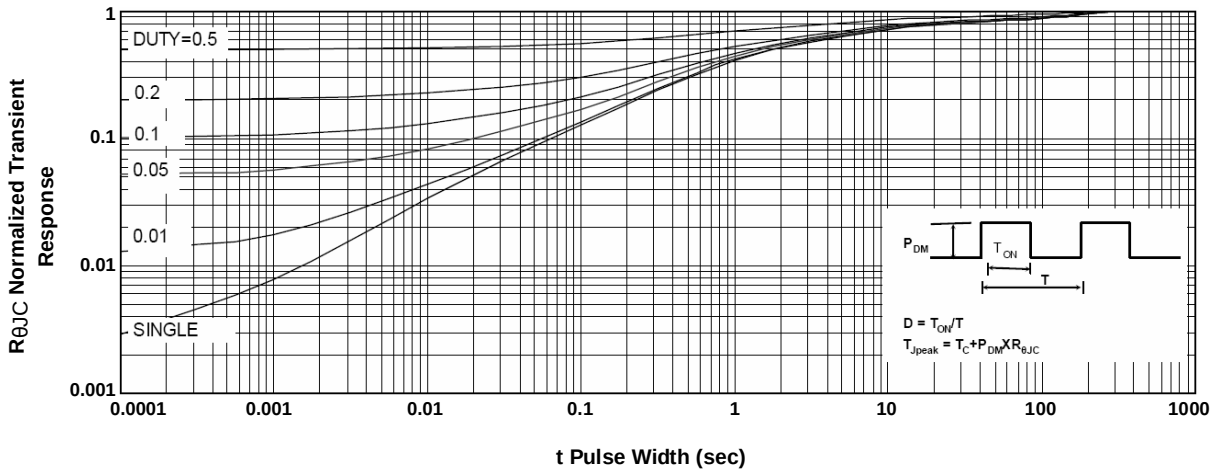


FIG.11-Normalized Maximum Transient Thermal Impedance

MSQ30C01D

N & P-Channel 30-V (D-S) MOSFET

- **Typical Electrical Characteristics P-Channel**

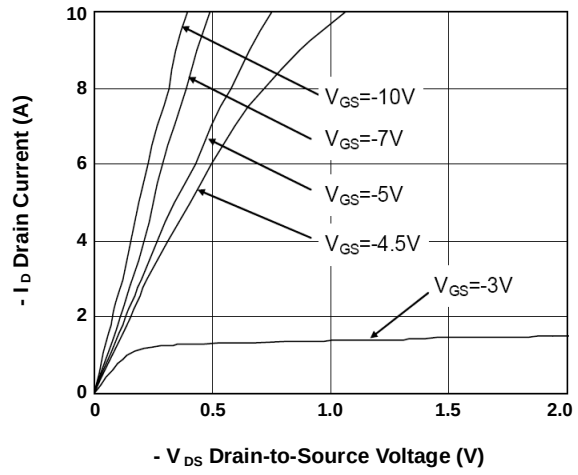


FIG.1-Typical Output Characteristics

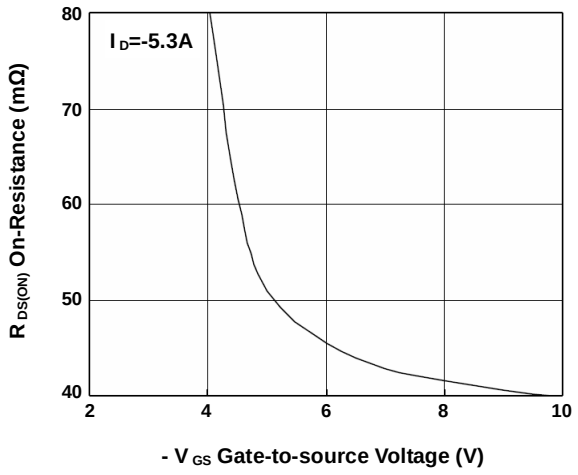


FIG.2-On-Resistance vs. G-S Voltage

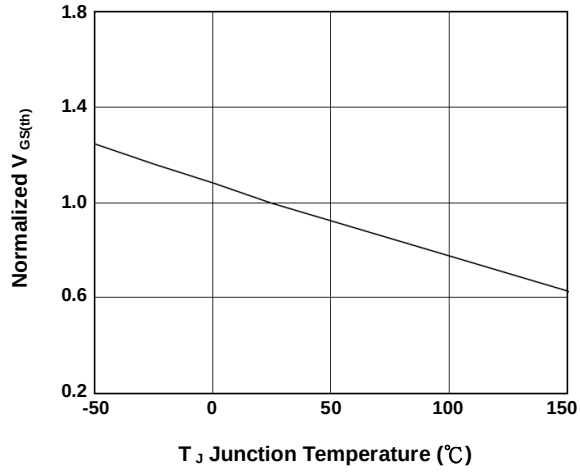


FIG.3-Normalized $V_{GS(th)}$ vs. T_J

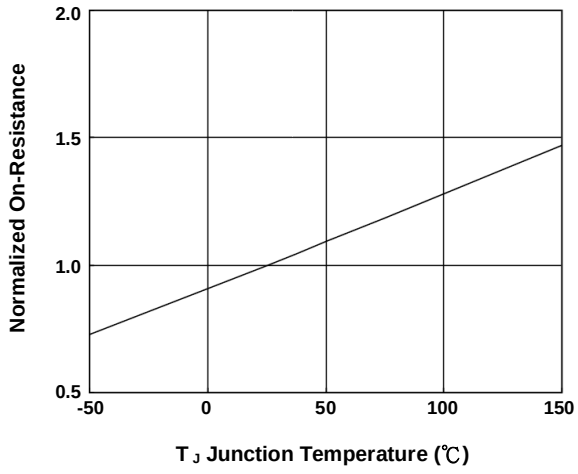


FIG.4-Normalized R_{DSON} vs. T_J

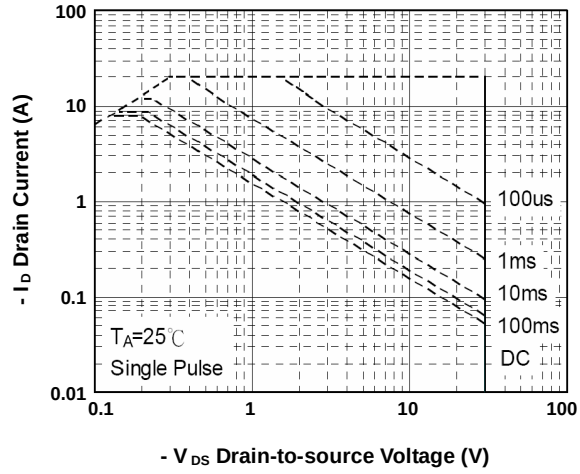


FIG.5-Safe Operating Area

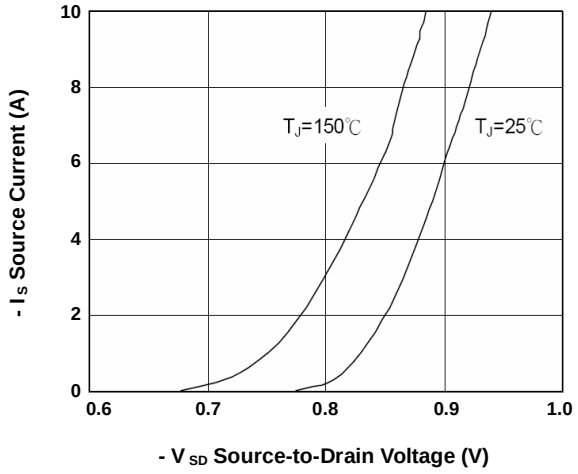


FIG.6-Forward Characteristics of Reverse

MSQ30C01D

N & P-Channel 30-V (D-S) MOSFET

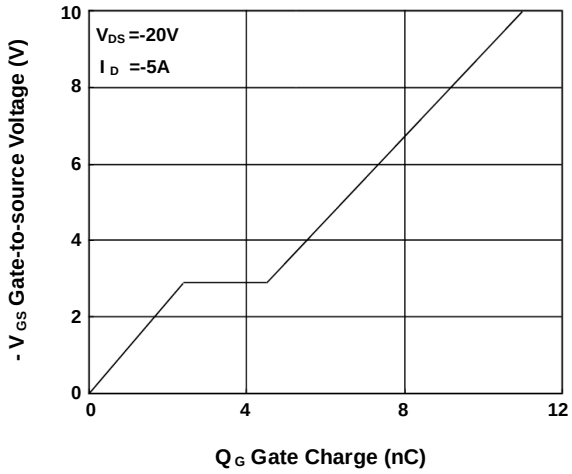


FIG.7-Gate Charge Characteristics

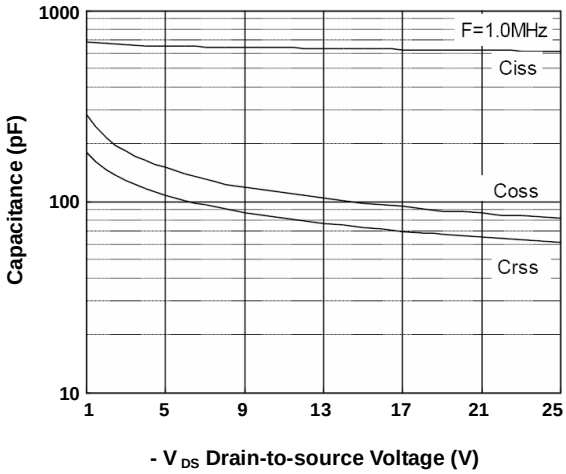


FIG.8-Capacitance Characteristics

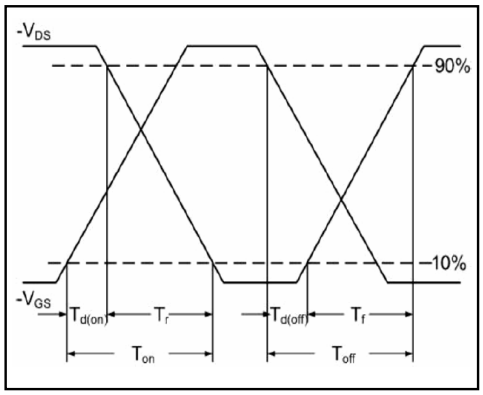


FIG.9-Switching Time Waveform

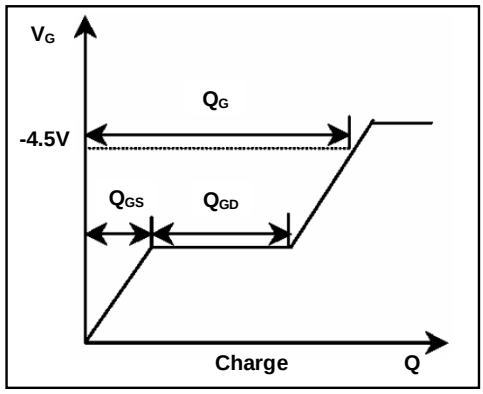


FIG.10-Gate Charge Waveform

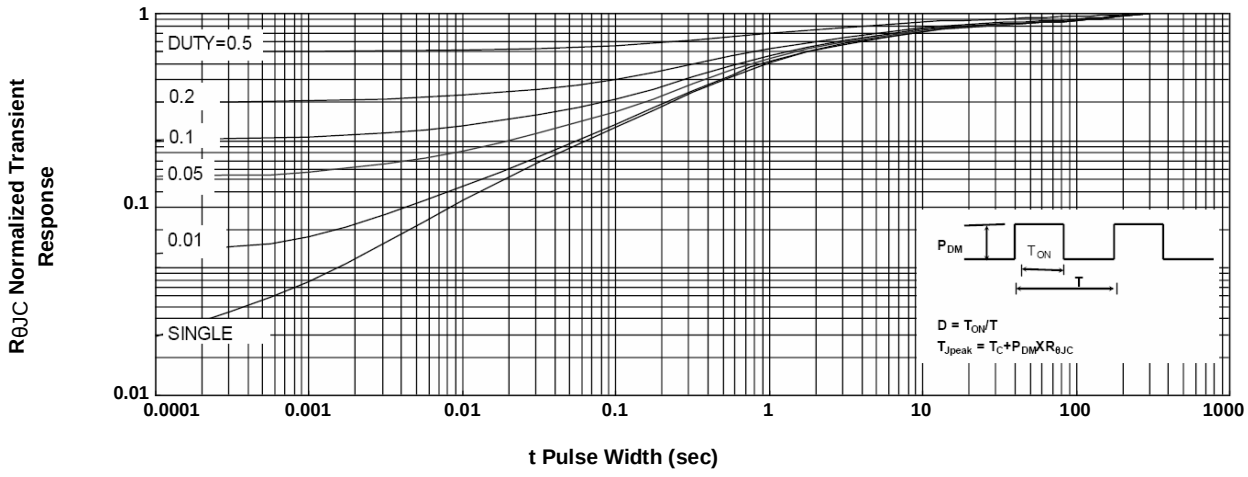


FIG.11-Normalized Maximum Transient Thermal Impedance

MSQ30C01D

N & P-Channel 30-V (D-S) MOSFET

Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Bruckewell Technology Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, “Bruckewell”), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Bruckewell makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Bruckewell disclaims

(i) Any and all liability arising out of the application or use of any product.

(ii) Any and all liability, including without limitation special, consequential or incidental damages.

(iii) Any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Bruckewell’s knowledge of typical requirements that are often placed on Bruckewell products in generic applications.

Such statements are not binding statements about the suitability of products for a particular application. It is the customer’s responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time.

Product specifications do not expand or otherwise modify Bruckewell’s terms and conditions of purchase, including but not limited to the warranty expressed therein.