

MSA4P21

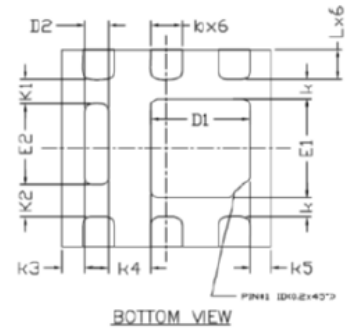
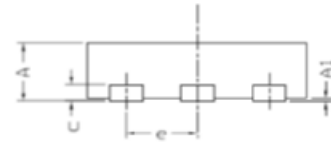
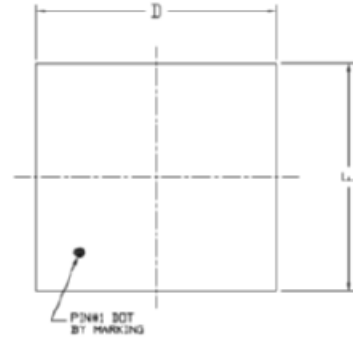
N & P-Channel 40-V (D-S) MOSFET

Features

- Low $r_{DS(on)}$ trench technology
- Low thermal impedance
- Fast switching speed
- RoHS compliant package

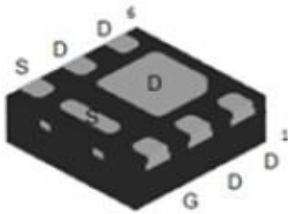
Typical Applications:

- Load Switches
- Motor Drives
- DC/DC Conversion



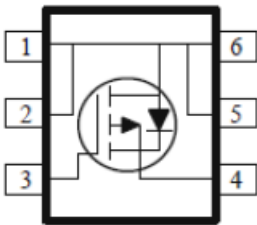
Packing & Order Information

3,000/Reel



**RoHS
COMPLIANT**

Graphic symbol



Symbol	Dimensions in Millimeters			Dimensions in Inches		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.50	0.55	0.60	0.02	0.022	0.024
A1	0.00	-	0.05	0.00	-	0.002
b	0.25	0.30	0.35	0.01	0.012	0.014
E	0.152 BEF			0.006 BEF		
D	1.90	2.00	2.10	0.750	0.079	0.083
D1	0.85	0.95	1.05	0.033	0.037	0.041
D2	0.13	0.23	0.33	0.005	0.009	0.013
E	1.90	2.00	2.10	0.075	0.079	0.083
E1	0.90	1.00	1.10	0.035	0.039	0.043
E2	0.72	0.82	0.92	0.028	0.032	0.036
e	0.65 BSC			0.026 BSC		
K	0.20 BSC			0.008 BSC		
K1	0.25 BSC			0.010 BSC		
K2	0.33 BSC			0.013 BSC		
K3	0.22 BSC			0.009 BSC		
K4	0.40 BSC			0.016 BSC		
K5	0.20 BSC			0.008 BSC		
L	0.25	0.30	0.35	0.010	0.012	0.014

MSA4P21

N & P-Channel 40-V (D-S) MOSFET

Absolute Maximum Ratings ($T_A=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-Source Voltage	± 8	V
I_D	Continuous Drain Current ^a ($T_A=25^\circ\text{C}$)	-8.8	A
	Continuous Drain Current ^a ($T_A=70^\circ\text{C}$)	-7	A
I_{DM}	Pulsed Drain Current ^b	-40	A
I_S	Continuous Source Current (Diode Conduction) ^a	-5	A
P_D	Power Dissipation ^a ($T_A=25^\circ\text{C}$)	3	W
	Power Dissipation ^a ($T_A=70^\circ\text{C}$)	1.9	W
T_J/T_{STG}	Operating Junction and Storage Temperature	-55 to 150	$^\circ\text{C}$

Thermal Resistance Ratings

Symbol	Parameter	Maximum	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient ^a ($t \leq 10$ sec)	40	$^\circ\text{C/W}$
	Maximum Junction-to-Ambient ^a (Steady-State)	90	

Notes

- Surface Mounted on 1" x 1" FR4 Board.
- Pulse width limited by maximum junction temperature

Static

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
$V_{GS(th)}$	Gate-Source Threshold Voltage	$V_{DS} = V_{GS}$, $I_D = -250\mu\text{A}$	-0.4			V
I_{GSS}	Gate-Body Leakage	$V_{DS} = 0$ V, $V_{GS} = \pm 8$ V			± 100	nA
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = -16$ V, $V_{GS} = 0$ V $V_{DS} = -16$ V, $V_{GS} = 0$ V, $T_J = 55^\circ\text{C}$			-1 -25	μA
$I_{D(on)}$	On-State Drain Current	$V_{DS} = -5$ V, $V_{GS} = -4.5$ V	-12			A
$r_{DS(on)}$	Drain-Source On-Resistance	$V_{GS} = -4.5$ V, $I_D = -7$ A $V_{GS} = -2.5$ V, $I_D = -5.6$ A			26 34	m Ω
g_{fs}	Forward Transconductance	$V_{GS} = -15$ V, $I_D = -7$ A		8		S
V_{SD}	Diode Forward Voltage	$I_S = -2.5$ A, $V_{GS} = 0$ V		-0.68		V

MSA4P21

N & P-Channel 40-V (D-S) MOSFET

Dynamic ^b						
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
Q_g	Total Gate Charge	$V_{DS} = -10\text{ V}$, $I_D = -7\text{ A}$, $V_{GS} = -4.5\text{ V}$	--	30	--	nC
Q_{gs}	Gate-Source Charge		--	4	--	nC
Q_{gd}	Gate-Drain Charge		--	6	--	nC
$t_{d(on)}$	Turn-On Delay Time	$I_D = -7\text{ A}$, $R_L = 1.4\ \Omega$, $V_{GEN} = -4.5\text{ V}$, $R_{GEN} = 6\ \Omega$ $V_{DS} = -10\text{ V}$	--	6	--	ns
t_r	Rise Time		--	12	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	85	--	ns
t_f	Fall Time		--	35	--	ns
C_{ISS}	Input Capacitance	$V_{DS} = -15\text{ V}$ $f = 1\text{ MHz}$, $V_{GS} = 0\text{ V}$	--	1435	--	pF
C_{OSS}	Output Capacitance		--	126	--	pF
C_{RSS}	Reverse Transfer Capacitance		--	113	--	pF

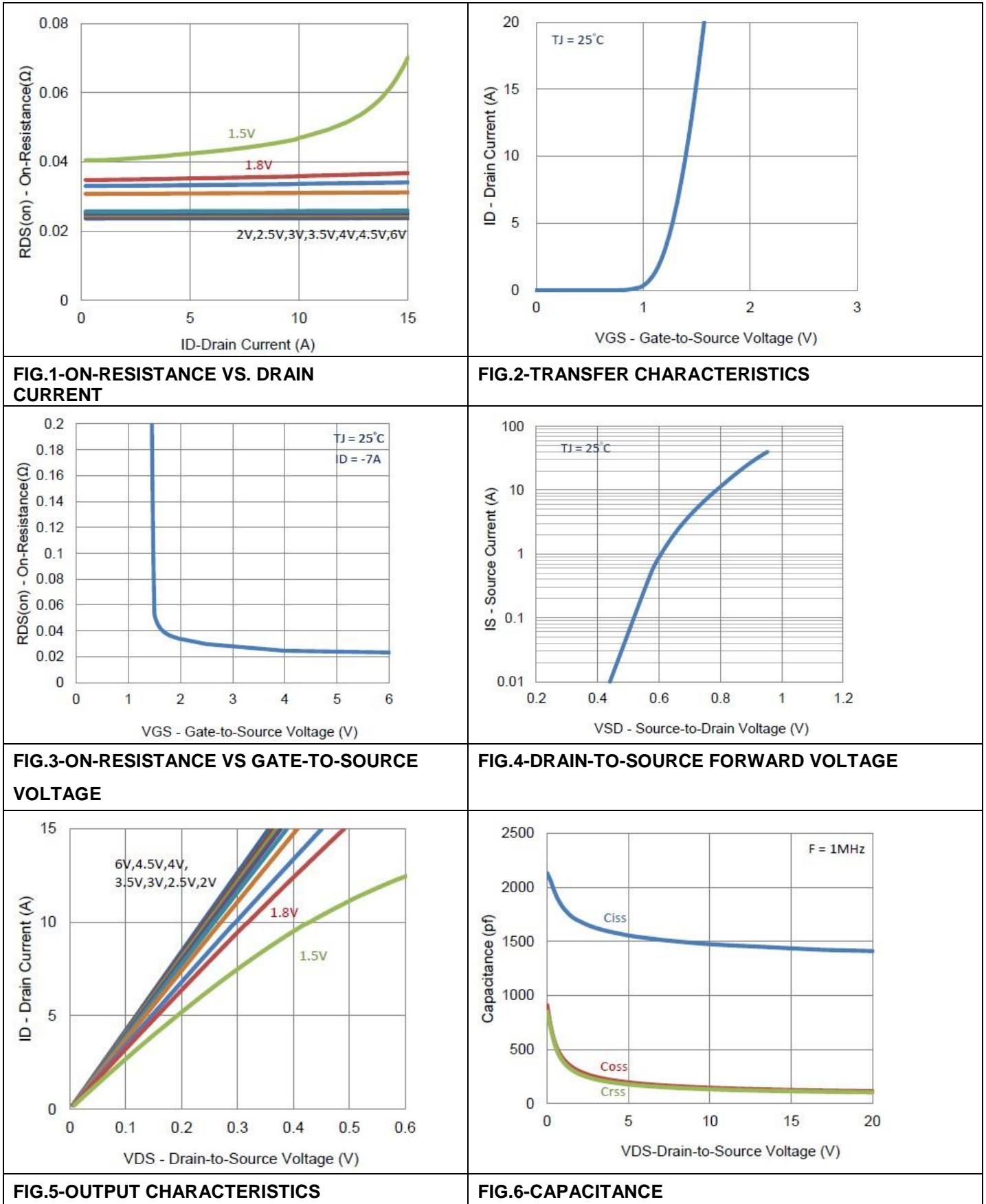
Notes

- Pulse test: $PW \leq 300\mu\text{s}$ duty cycle $\leq 2\%$.
- Guaranteed by design, not subject to production testing.

MSA4P21

N & P-Channel 40-V (D-S) MOSFET

Typical Electrical Characteristics



MSA4P21

N & P-Channel 40-V (D-S) MOSFET

Typical Electrical Characteristics

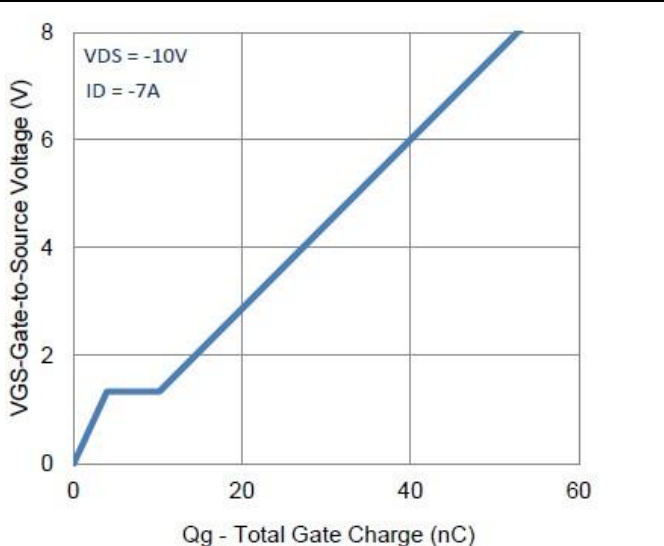


FIG.7-GATE CHARGE

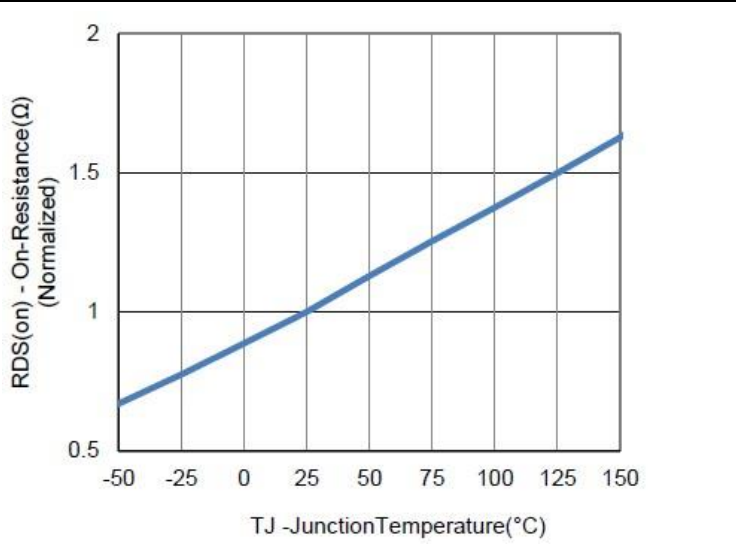


FIG.8-NORMALIZED ON-RESISTANCE VS JUNCTION TEMPERATURE

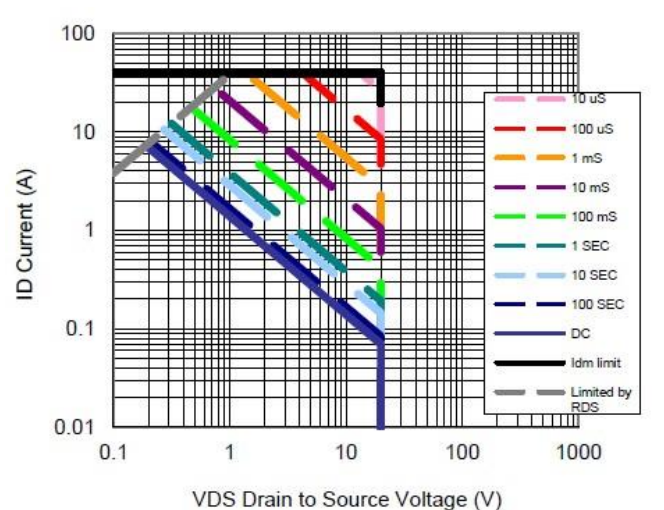


FIG.9-SAFE OPERATING AREA

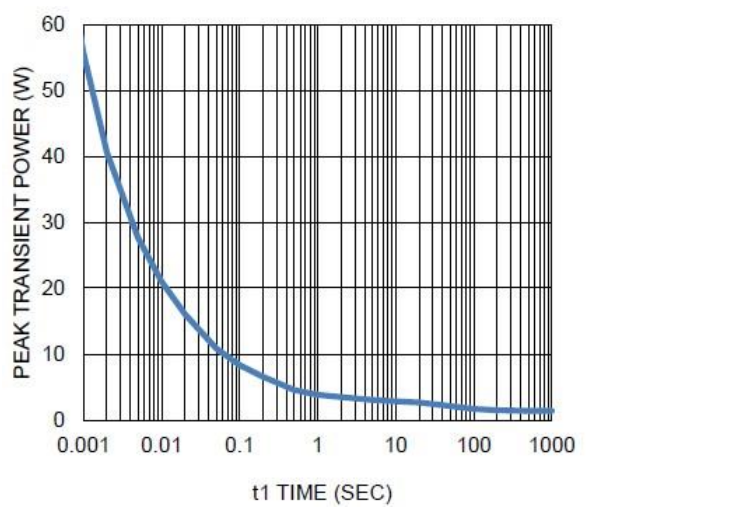


FIG.10-SINGLE PULSE MAXIMUM POWER DISSIPATION

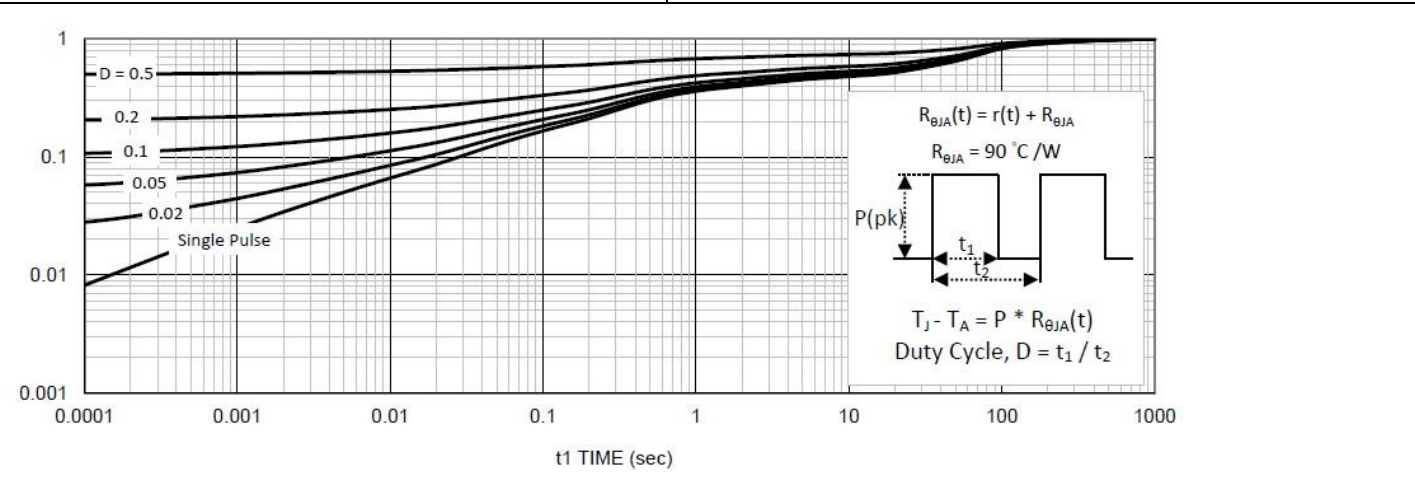


FIG.11-NORMALIZED THERMAL TRANSIENT JUNCTION TO AMBIENT

MSA4P21

N & P-Channel 40-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.