MSA4P21

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

Features

- Low rDS(on) trench technology
- Low thermal impedance
- Fast switching speed
- RoHS compliant package

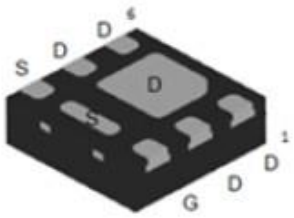
Typical Applications:

- Load Switches
- Motor Drives
- DC/DC Conversion

Package type：DFN2X2

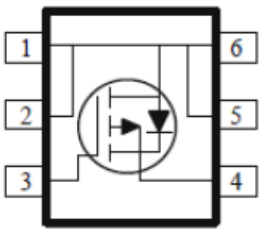
Packing & Order Information

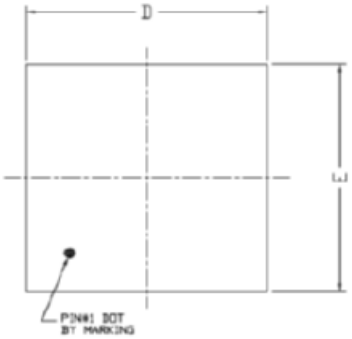
3,000/Reel

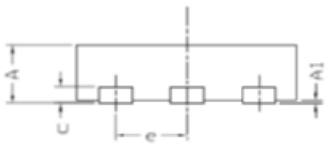


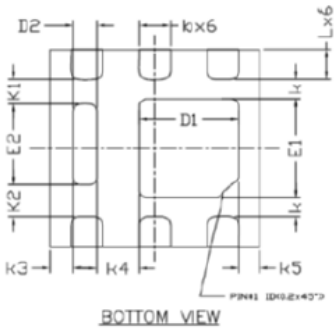
RoHS
COMPLIANT

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

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Absolute Maximum Ratings (T_A=25°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°C)	-8.8	A
	Continuous Drain Current[a] (T_A=70°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°C)	3	W
	Power Dissipation[a] (T_A=70°C)	1.9	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[a] (t <= 10 sec)	40	°C/W
	Maximum Junction-to-Ambient[a] (Steady-State)	90	

Notes

a. Surface Mounted on 1” x 1” FR4 Board.

b. 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 = -250μA	-0.4			V
I_{GSS}	Gate-Body Leakage	V_{DS} = 0 V , V_{GS} = ±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°C			-1 -25	uA
$I_{D(on)}$	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	mΩ
g_{fs}	Forward Tranconductance	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

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Dynamic[b]						
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
Q_g	Total Gate Charge	V_{DS} = -10 V , I_D = -7 A, V_{GS} = -4.5 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 A , R_L = 1.4 Ω, V_{GEN} = -4.5 V , R_{GEN} = 6 Ω V_{DS} = -10 V	--	6	--	ns
t_r	Rise Time		--	12	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	85	--	ns
tf	Fall Time		--	35	--	ns
C_{ISS}	Input Capacitance	V_{DS} = -15 V f = 1 MHz ,V_{GS} = 0 V	--	1435	--	pF
C_{OSS}	Output Capacitance		--	126	--	pF
C_{RSS}	Reverse Transfer Capacitance		--	113	--	pF

Notes

a. Pulse test: PW <= 300us duty cycle <= 2%.

b. Guaranteed by design, not subject to production testing.

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■Typical Electrical Characteristics

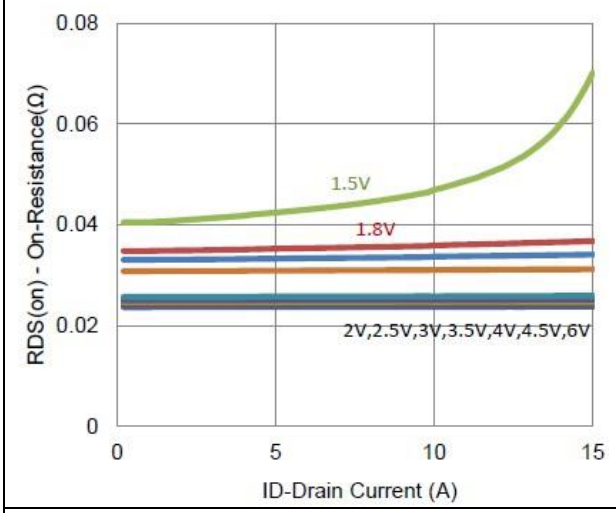

FIG.1-ON-RESISTANCE VS. DRAIN CURRENT

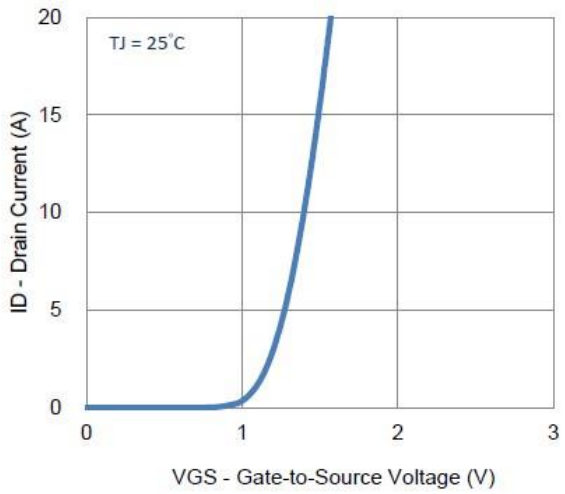

FIG.2-TRANSFER CHARACTERISTICS

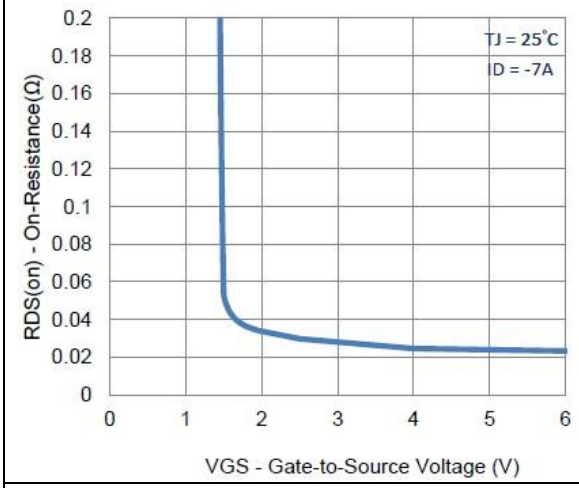

FIG.3-ON-RESISTANCE VS GATE-TO-SOURCE VOLTAGE

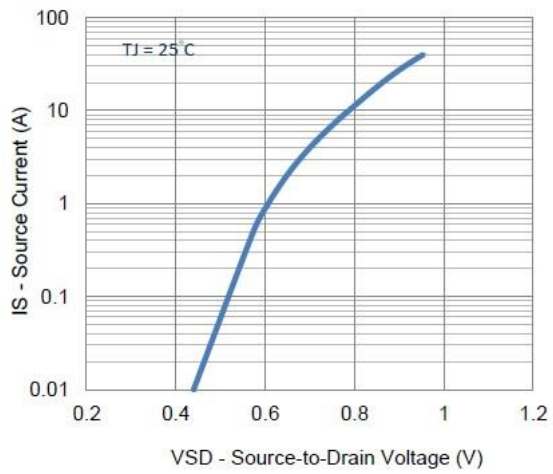

FIG.4-DRAIN-TO-SOURCE FORWARD VOLTAGE

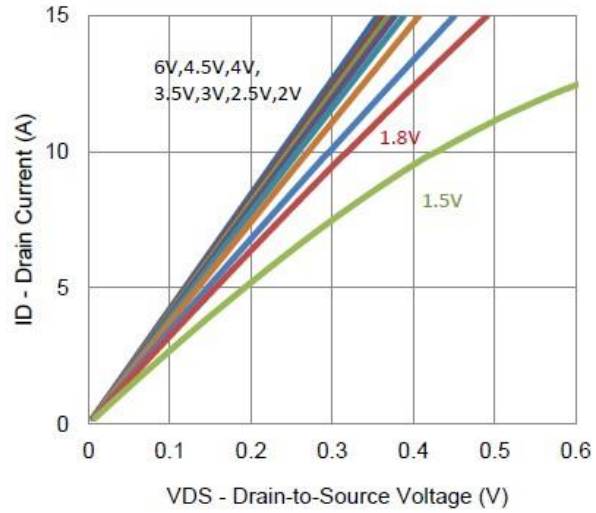

FIG.5-OUTPUT CHARACTERISTICS

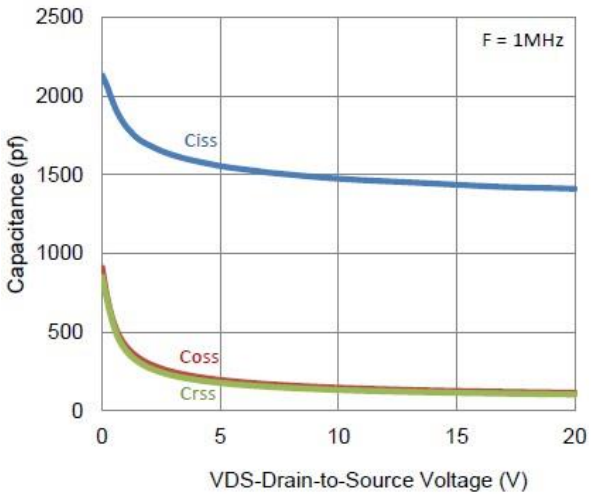

FIG.6-CAPACITANCE

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■Typical Electrical Characteristics

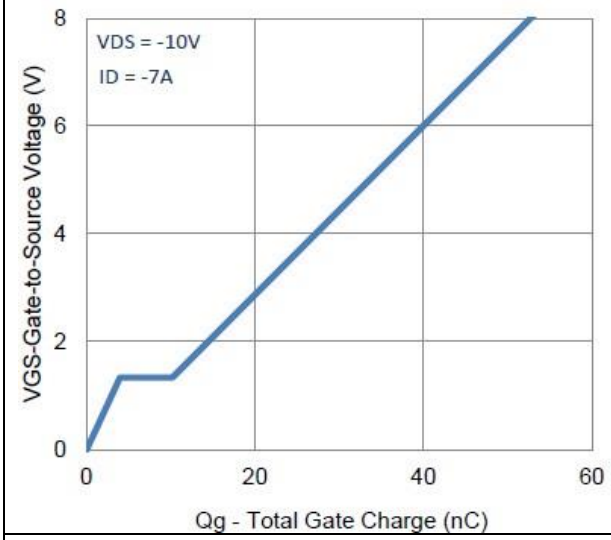

FIG.7-GATE CHARGE

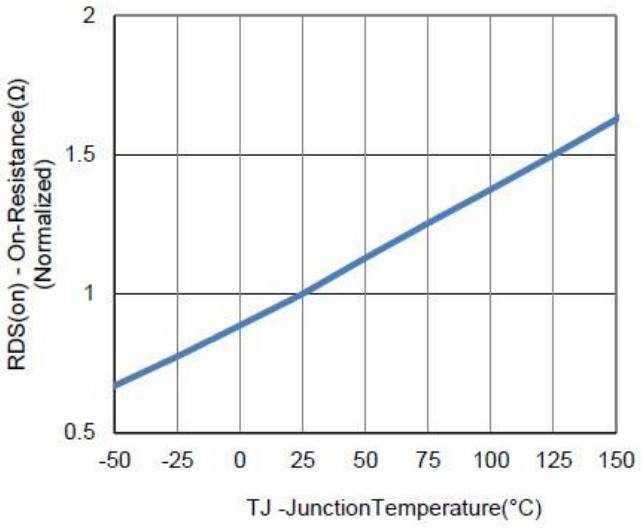

FIG.8-NORMALIZED ON-RESISTANCE VS JUNCTION TEMPERATURE

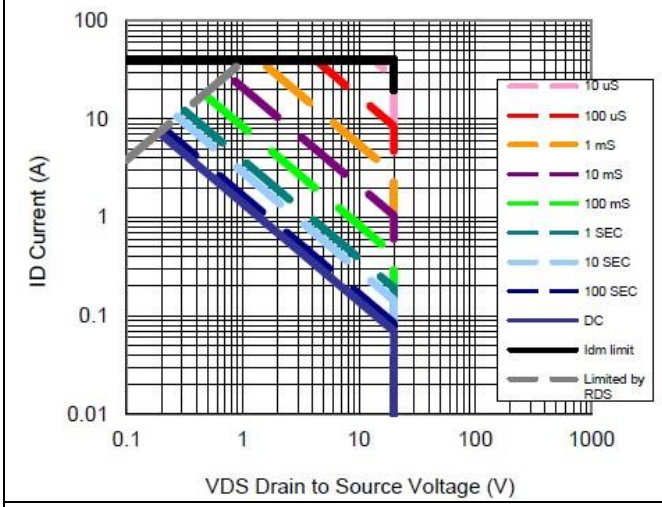

FIG.9-SAFE OPERATIING AREA

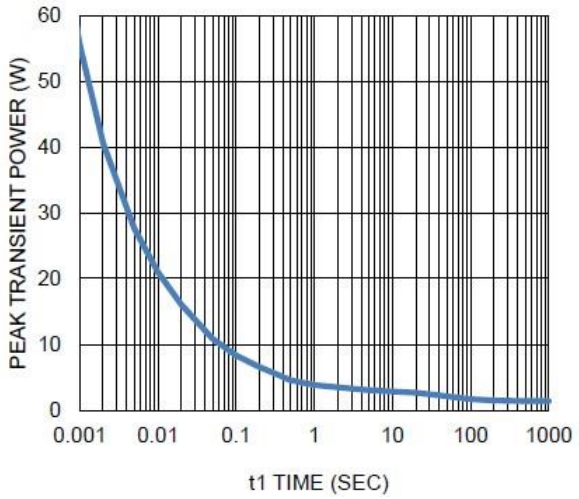

FIG.10-SINGLE PULSE MAXIMUM POWER DISSIPATION

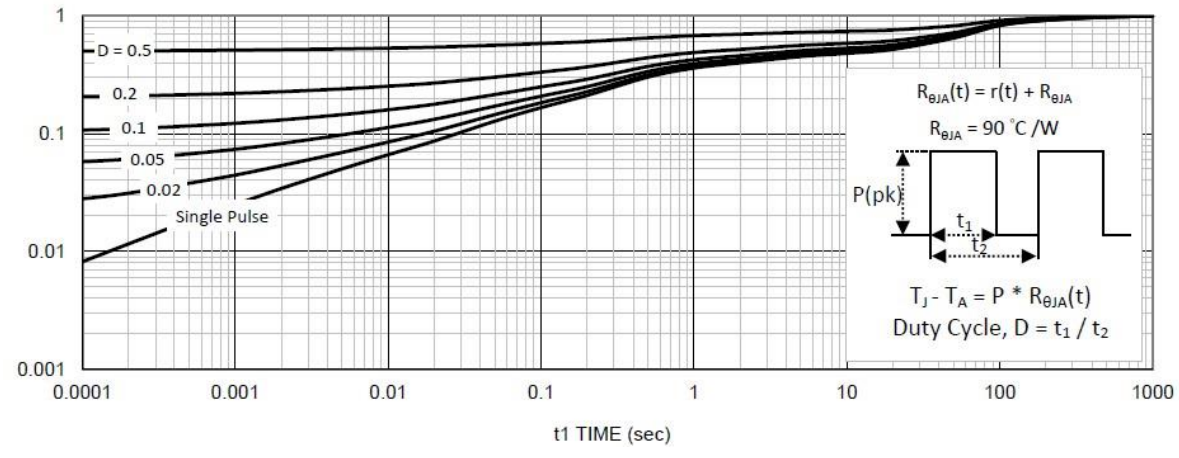

FIG.11-NORMALIZED THERMAL TRANSIENT JUNCTION TO AMBIENT

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