MS39P93

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

Description

These miniature surface mount MOSFETs utilize a high cell density trench process to provide low rDS(on) and to ensure minimal power loss and heat dissipation. Typical applications are DC-DC converters and power management in portable and battery-powered products such as computers, printers, PCMCIA cards, cellular and cordless telephones.

Features

• Low rDS(on) provides higher efficiency and extends battery life

• Low thermal impedance copper lead frame TSOP-6 saves board space

• RoHS compliant package

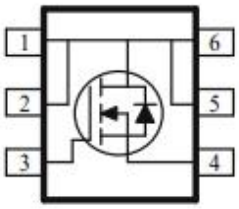
Package type：TSOP-6

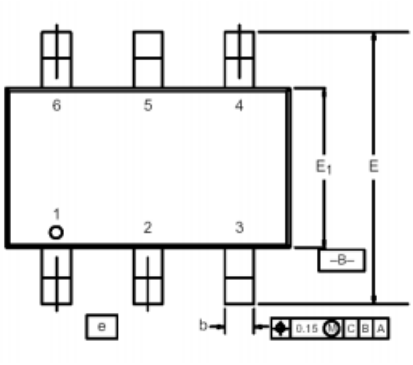
Packing & Order Information

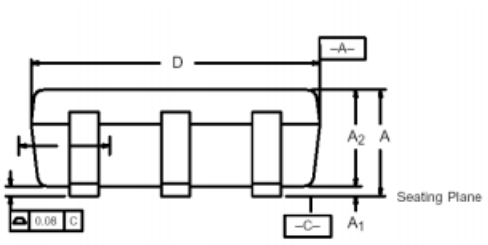
3,000/Reel

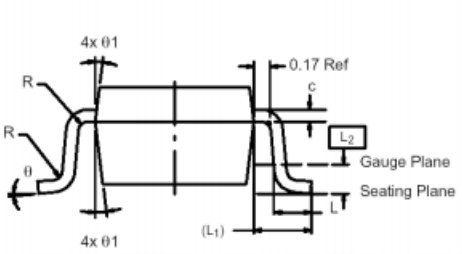
RoHS
COMPLIANT

Graphic symbol









Dim	MILLIMETERS			INCHES		
	Min	Nom	Max	Min	Nom	Max
A	0.91	–	1.10	0.036	–	0.043
A_1	0.01	–	0.10	0.0004	–	0.004
A_2	0.84	–	1.00	0.033	0.038	0.039
b	0.30	0.32	0.45	0.012	0.013	0.018
c	0.10	0.15	0.20	0.004	0.006	0.008
D	2.95	3.05	3.10	0.116	0.120	0.122
E	2.70	2.85	2.98	0.106	0.112	0.117
E_1	1.55	1.65	1.70	0.061	0.065	0.067
e	1.00 BSC			0.0394 BSC		
L	0.35	–	0.50	0.014	–	0.020
L_1	0.60 Ref			0.024 Ref		
L_2	0.25 BSC			0.010 BSC		
R	0.10	–	–	0.004	–	–
θ	0°	4°	8°	0°	4°	8°
θ_1	7° Nom			7° Nom		

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Absolute Maximum Ratings (Tc=25°C unless otherwise specified)			
Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Continuous Drain Current[a] (T_A=25°C)	-2.5	A
	Continuous Drain Current[a] (T_A=70°C)	-1.9	A
I_{DM}	Pulsed Drain Current[b]	-10	A
I_S	Continuous Source Current (Diode Conduction)[a]	±1.6	A
P_D	Power Dissipation[a] (T_A =25°C)	1.15	W
	Power Dissipation[a] (T_A =70°C)	0.7	W
T_J/T_{STG}	Operating Junction and Storage Temperature	-55 to +150	°C

Thermal Resistance Ratings				
Symbol	Parameter	Typ	Max	Units
R_{THJA}	Maximum Junction-to-Ambient[a] (t <= 10 sec)	93	110	°C/W
	Maximum Junction-to-Ambient[a] (Steady-State)	130	150	

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-Threshold Voltage	V_{DS} = V_{GS}, I_D = -250μA	-1			
I_{GSS}	Gate-Body Leakage	V_{DS} =0 V , V_{GS} = ±20 V			±100	nA
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = -24 V , V_{GS} = 0 V V_{DS} = -24 V , V_{GS} = 0 V , T_J= 55°C			-1 -10	uA
$I_{D(on)}$	On-State Drain Current[A]	V_{DS} = -5 V, V_{GS} = -10 V	-3			A
$R_{DS(on)}$	Drain-Source On-Resistance[A]	V_{GS} = -10 V , I_D = -2.5 A V_{GS} = -4.5 V , I_D = -1.9 A			0.13 0.19	Ω
g_{fs}	Forward Tranconductance[A]	V_{DS} = -5 V , I_D = -2.5 A		3		S
V_{SD}	Diode Forward Voltage	I_S = -1.6 A , V_{GS} = 0 V		-0.70		V

Dynamic[b]						
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
Q_g	Total Gate Charge	V_{DS} = -5 V , I_D = -2.5 A , V_{GS} = -4.5 V	--	6.0	--	nC
Q_{gs}	Gate-Source Charge		--	0.8	--	nC
Q_{gd}	Gate-Drain Charge		--	1.3	--	nC

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Dynamic[b]						
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = -5 V , R_L = 5 OHM , V_{GEN} = -4.5 V , R_G = 5 OHM ,	--	6.5	--	ns
t_r	Rise Time		--	20	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	31	--	ns
tf	Fall Time		--	21	--	ns
C_{ISS}	Input Capacitance	P-Channel V_{DS} = -15 V , V_{GS} = 0 V , f =1.0MHz	--	451	--	pF
C_{OSS}	Output Capacitance		--	130	--	pF
C_{RSS}	Reverse Transfer Capacitance		--	33	--	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 (P-Channel)

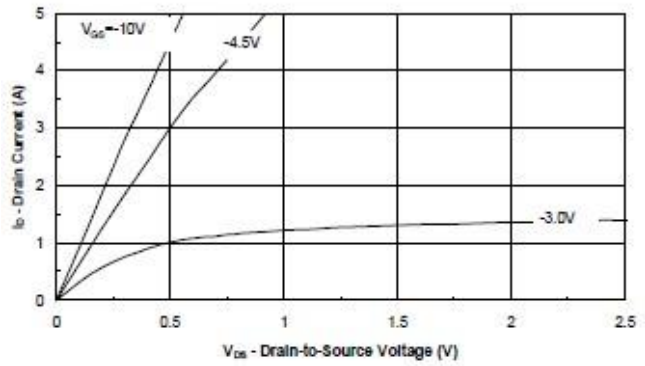

FIG.1-OUTPUT CHARACTERISTICS

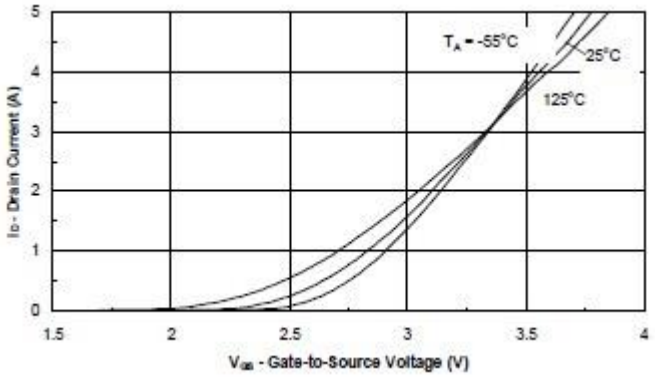

FIG.2-TRANSFER CHARACTERISTICS

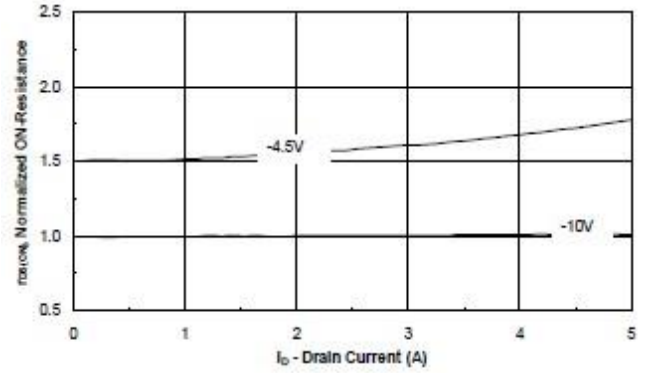

FIG.3-ON RESISTANCE VS DRAIN CURRENT

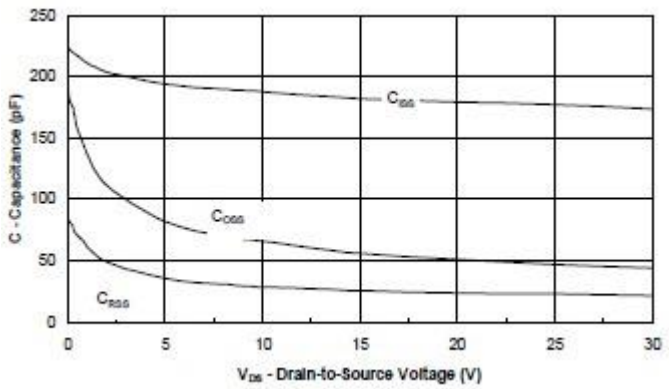

FIG.4-CAPACITANCE

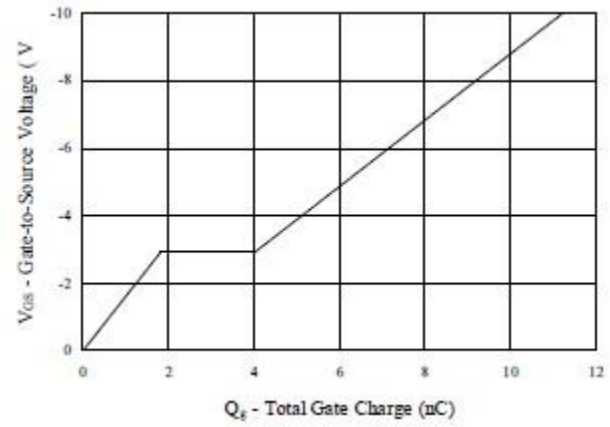

FIG.5- GAGE CHARGE

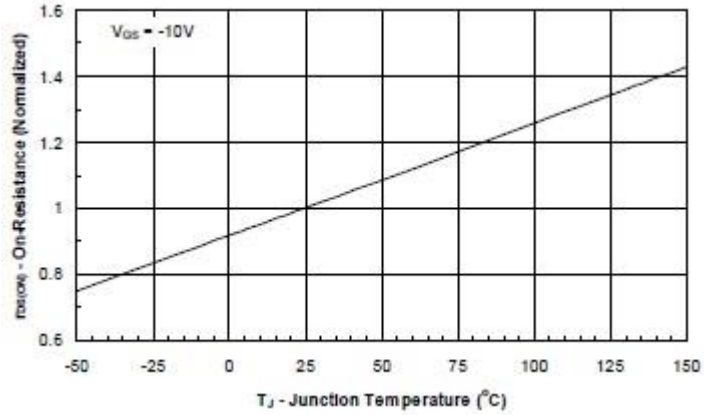

FIG.6- ON-RESISTANCE VS JUNCTION TEMPERATURE

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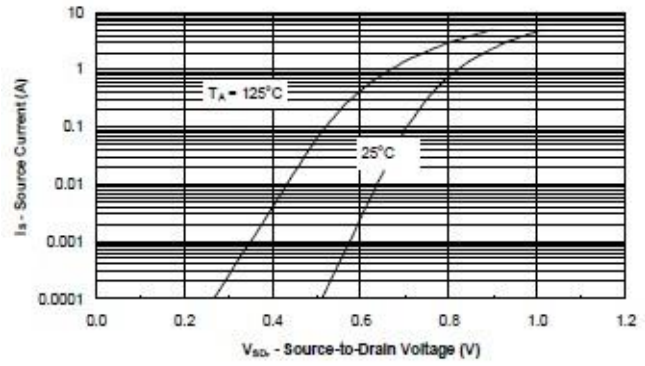

FIG.7- SOURCE-DRAIN DIODE FORWARD VOLTAGE

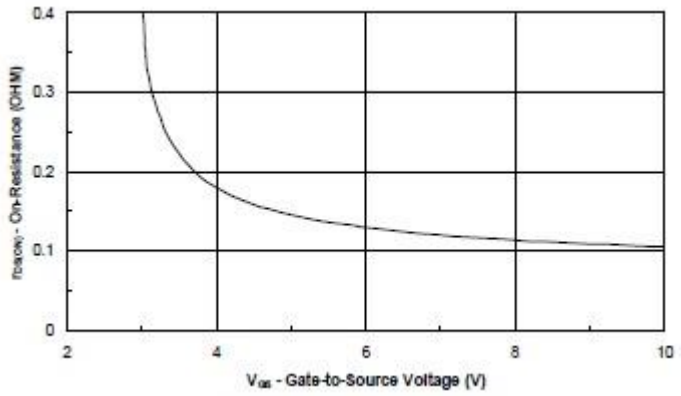

FIG.8- ON-RESISTANCE VS GATO-TO SOURCE VOLTAGE

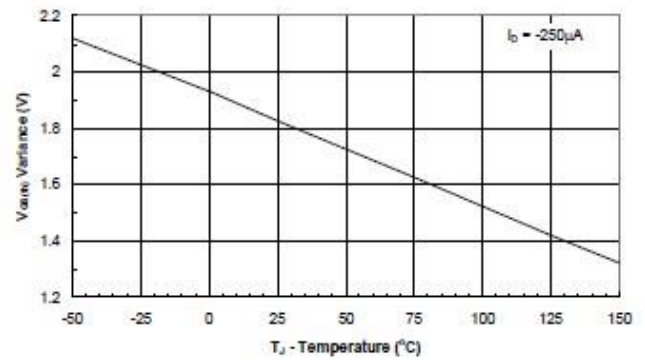

FIG.9-THRESHOLD VOLTAGE

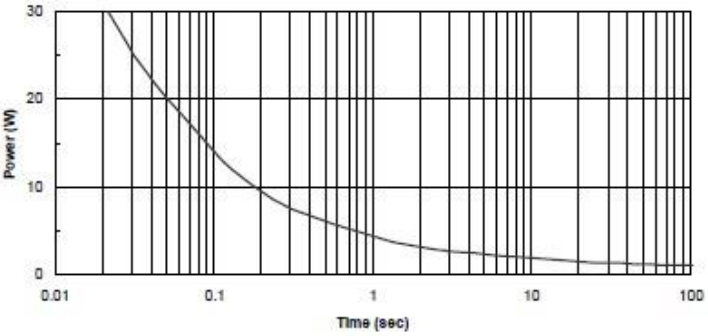

FIG.10-SINGLE PULSE POWER

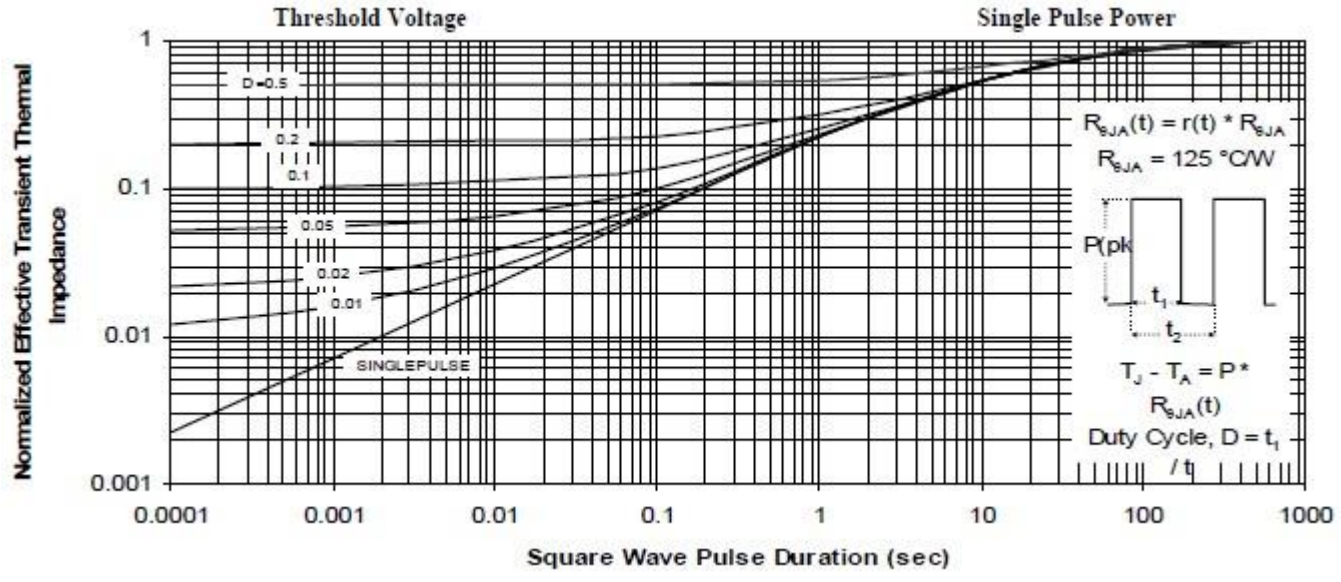

FIG.11-NORMALIZED THERMAL TRANSIENT JUNCTION TO AMBIENT

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