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

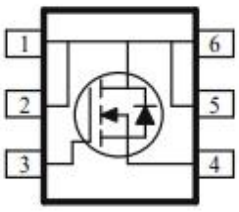
- Low rDS(on) provides higher efficiency and extends battery life
- Low thermal impedance copper lead frame TSOP-6 saves board space
- RoHS compliant package

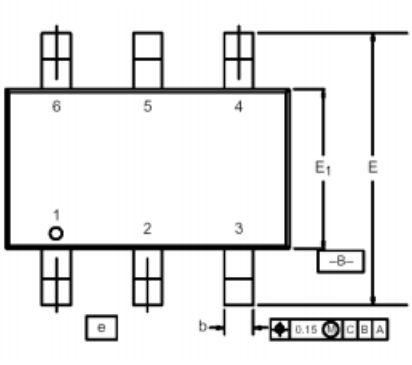
Packing & Order Information

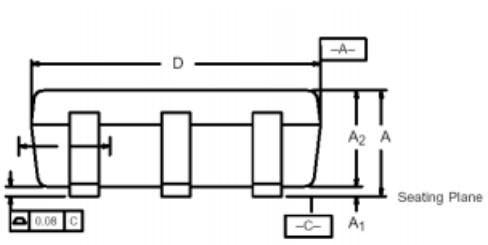
3,000/Reel

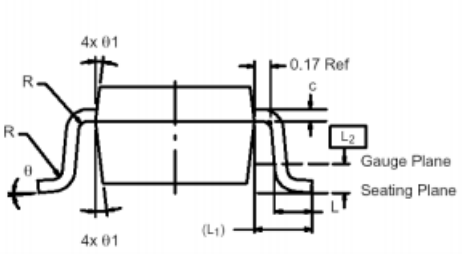
RoHS COMPLIANT

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		

MS39P93

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

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
$I_{DS(on)}$	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

MS39P93

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

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.

MS39P93

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

■Typical Electrical Characteristics (P-Channel)

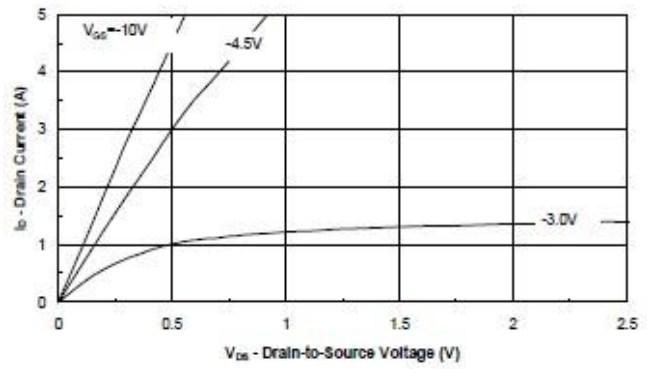


FIG.1-OUTPUT CHARACTERISTICS

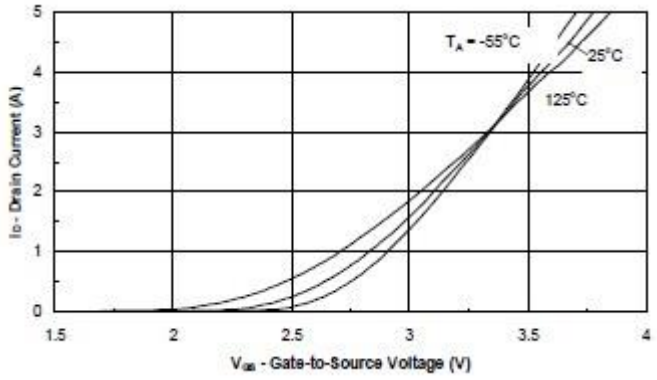


FIG.2-TRANSFER CHARACTERISTICS

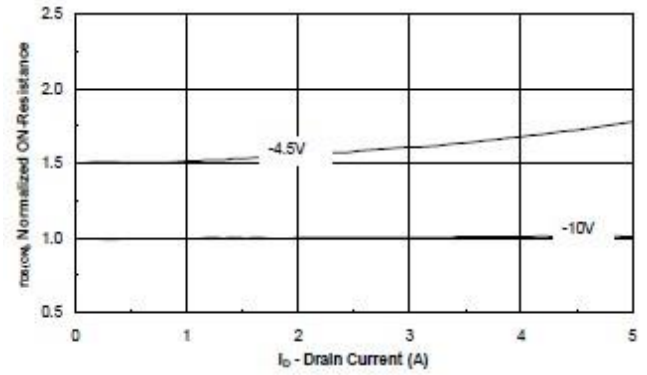


FIG.3-ON RESISTANCE VS DRAIN CURRENT

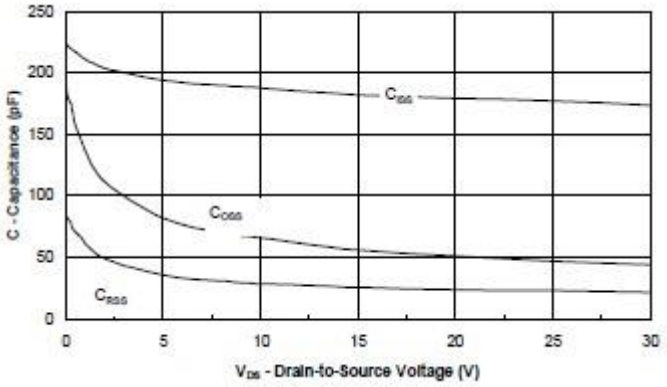


FIG.4-CAPACITANCE

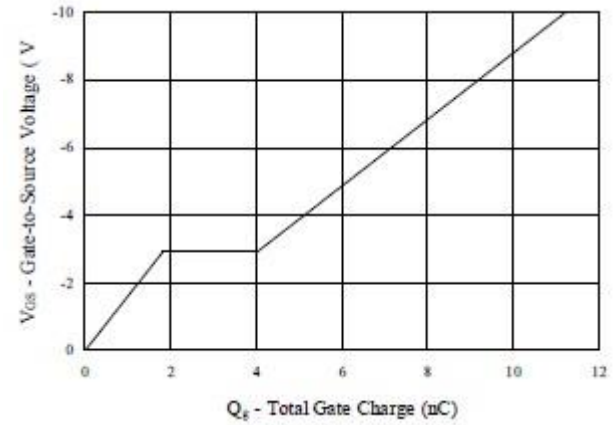


FIG.5- GAGE CHARGE

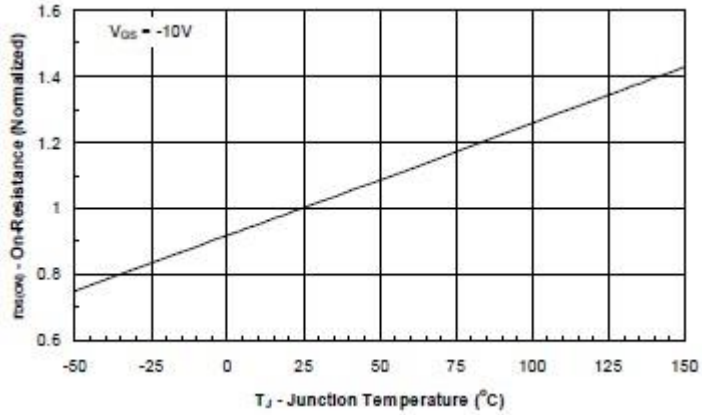


FIG.6- ON-RESISTANCE VS JUNCTION TEMPERATURE

MS39P93

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

■Typical Electrical Characteristics (P-Channel)

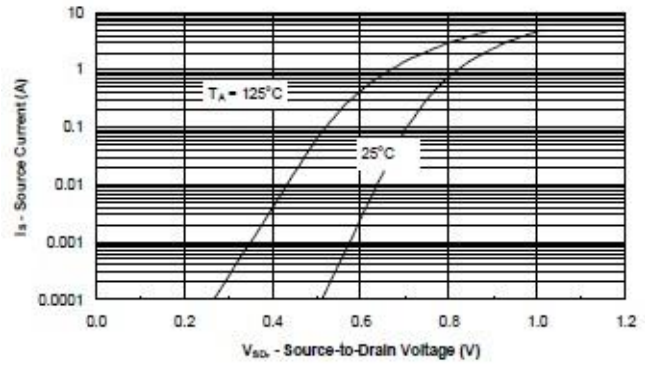


FIG.7- SOURCE-DRAIN DIODE FORWARD VOLTAGE

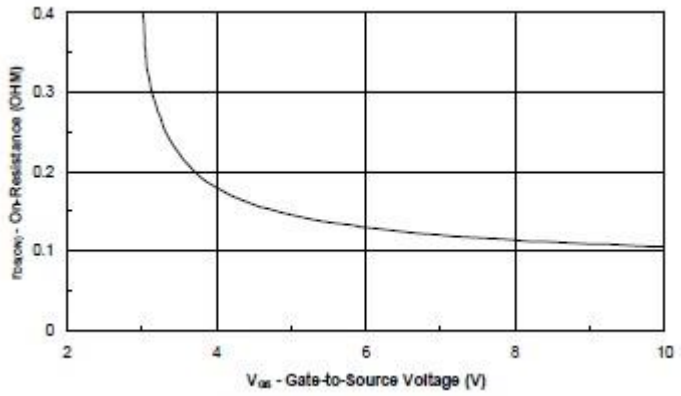


FIG.8- ON-RESISTANCE VS GATO-TO SOURCE VOLTAGE

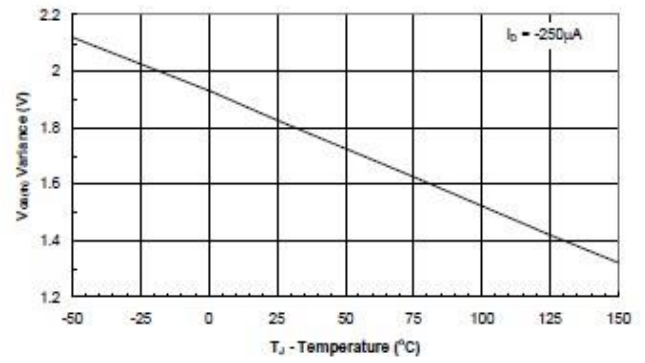


FIG.9-THRESHOLD VOLTAGE

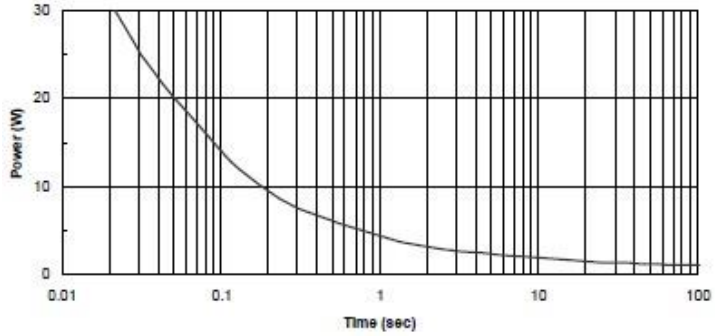


FIG.10-SINGLE PULSE POWER

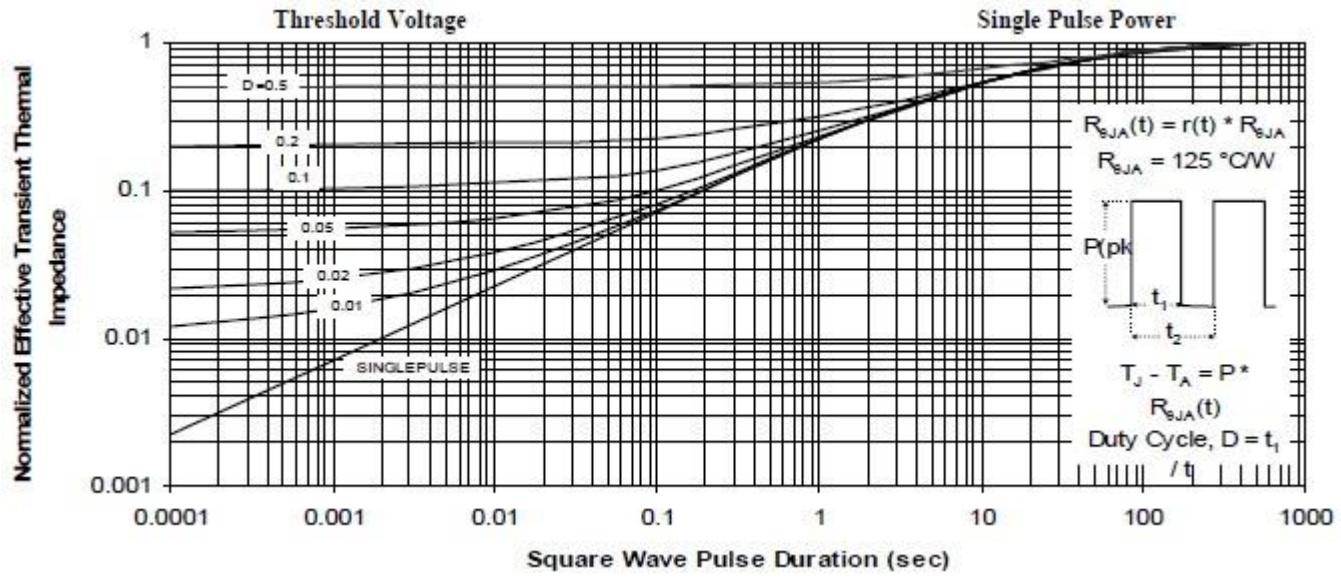


FIG.11-NORMALIZED THERMAL TRANSIENT JUNCTION TO AMBIENT

MS39P93

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.