

MS23P39

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

Description

These miniature surface mount MOSFETs utilize High Cell Density process. Low $r_{DS(on)}$ assures minimal power loss and conserves energy, making this device ideal for use in power management circuitry. Typical applications are lower voltage application, power management in portable and battery-powered products such as computers, printers, PCMCIA cards, cellular and cordless telephones.

Features

- Low $r_{DS(on)}$ trench technology
- Low thermal impedance
- Fast switching speed
- Low thermal impedance copper lead frame SOT-23 saves board space
- RoHS compliant package

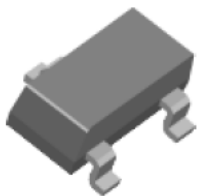
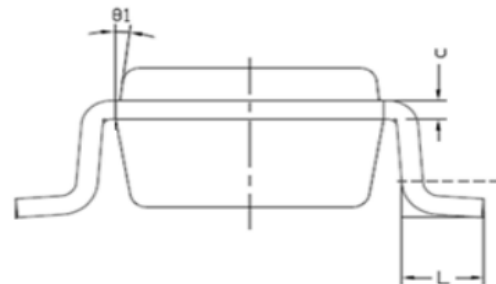
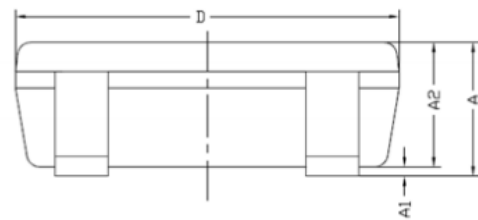
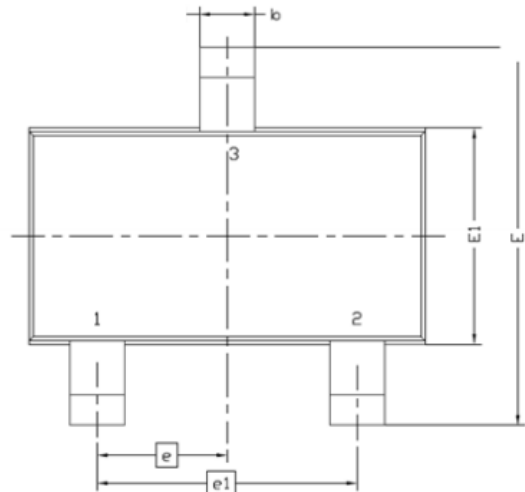
Typical Applications

- White LED boost converters
- Automotive Systems
- Industrial DC/DC Conversion Circuits

Package type : SOT-23

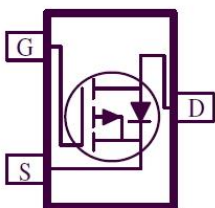
Packing & Order Information

3,000/Reel



**RoHS
COMPLIANT**

Graphic symbol



Symbol	MILLIMETERS	
	MIN	MAX
A	0.8	1.2
A1	0	0.1
A2	0.7	1.1
b	0.3	0.5
c	0.1	0.2
D	2.7	3.1
E	2.6	3
E1	1.4	1.8
e	0.95 BSC	
e1	1.9 BSC	
L	0.3	0.6
$\theta1$	7° NOM	

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MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

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	±8	V
I _D	Continuous Drain Current ^a (T _A =25°C)	-3.9	A
	Continuous Drain Current ^a (T _A =70°C)	-3.1	A
I _{DM}	Pulsed Drain Current ^b	-1.0	A
I _S	Continuous Source Current (Diode Conduction) ^a	-1.7	A
P _D	Power Dissipation ^a (T _A =25°C)	1.3	W
	Power Dissipation ^a (T _A =70°C)	0.8	W
T _J /T _{STG}	Operating Junction and Storage Temperature	-55 to +150	°C

THERMAL RESISTANCE RATINGS

Symbol	Parameter	Maximum	Units
R _{θJA}	Maximum Junction-to-Ambient C/W ^a (t ≤ 10 sec)	100	°C/W
	Maximum Junction-to-Ambient C/W ^a (Steady-State)	166	

Notes

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

Electrical Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
V _{GS(th)}	Gate 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} = -24 V, V _{GS} = 0 V V _{DS} = -24 V, V _{GS} = 0 V, T _J = 55°C			-1 -25	uA
I _{D(on)}	On-State Drain Current ^A	V _{DS} = -5V, V _{GS} = -4.5 V	-5			A
r _{DS(on)}	Drain-Source On-Resistance ^A	V _{DS} = -4.5V, I _D = -2.5 A V _{DS} = -2.5V, I _D = -2 A			57 89	mΩ
g _{fs}	Forward Transconductance ^A	V _{GS} = -15V, I _D = -2.5 A		10		S
V _{SD}	Diode Forward Voltage	I _S = -0.9A, V _{GS} = 0 V		-0.8		V

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Dynamic ^b						
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
Q_g	Total Gate Charge	$V_{DS} = -15\text{ V}$, $I_D = -2.5\text{ A}$, $V_{GS} = -4.5\text{ V}$	--	12	--	nC
Q_{gs}	Gate-Source Charge		--	1.9	--	nC
Q_{gd}	Gate-Drain Charge		--	3.6	--	nC
$t_{d(on)}$	Turn-On Delay Time	$V_{DG} = -15\text{ V}$, $I_D = -2.5\text{ A}$, $V_{GEN} = -4.5\text{ V}$, $R_L = 6\ \Omega$, $R_{GEN} = 6\ \Omega$	--	12	--	ns
t_r	Rise Time		--	9	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	42	--	ns
t_f	Fall Time		--	15	--	ns
C_{ISS}	Input Capacitance	$V_{DS} = -15\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1.0\text{ MHz}$	--	684	--	pF
C_{OSS}	Output Capacitance		--	75	--	pF
C_{RSS}	Reverse Transfer Capacitance		--	60	--	pF

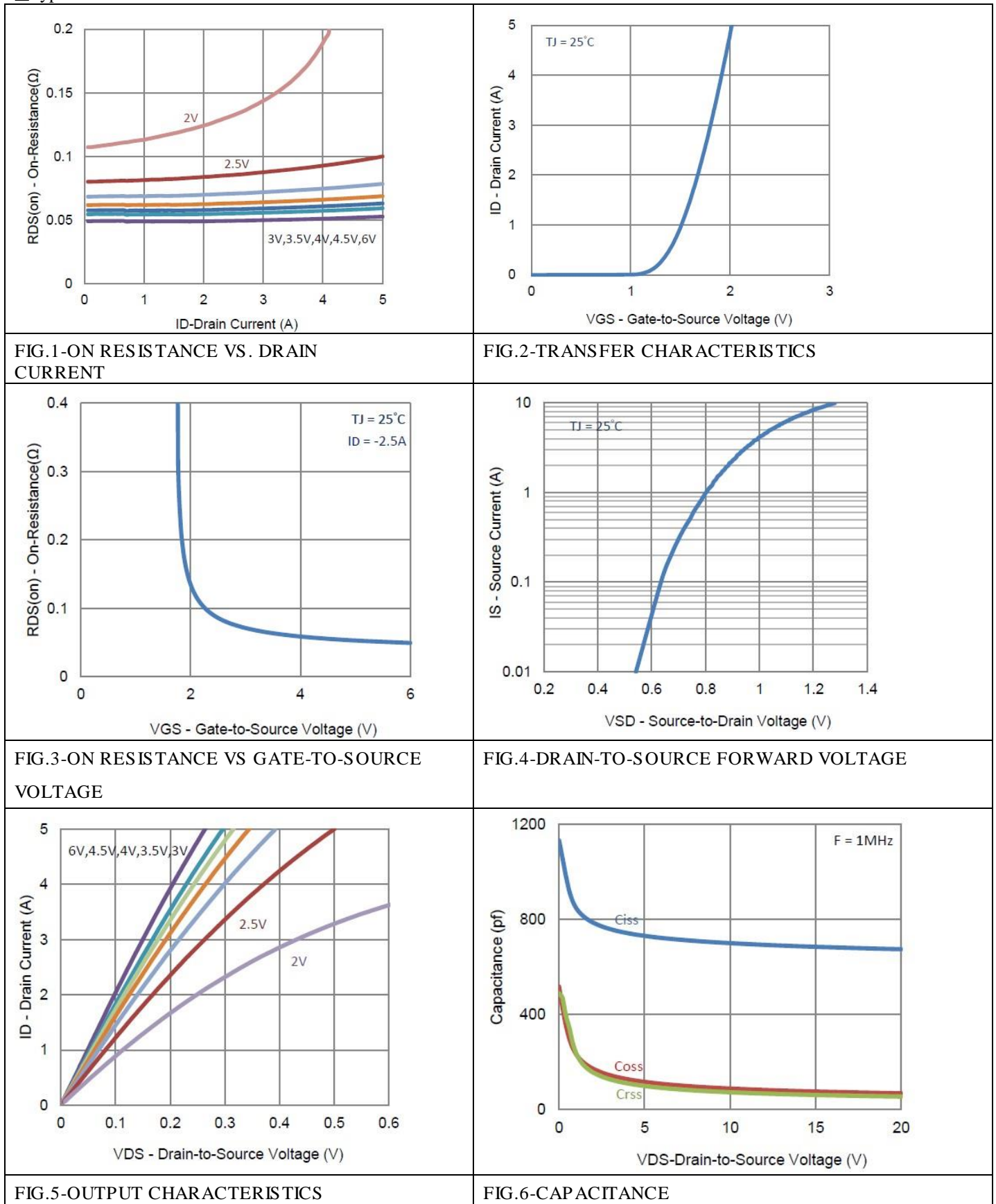
Notes

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

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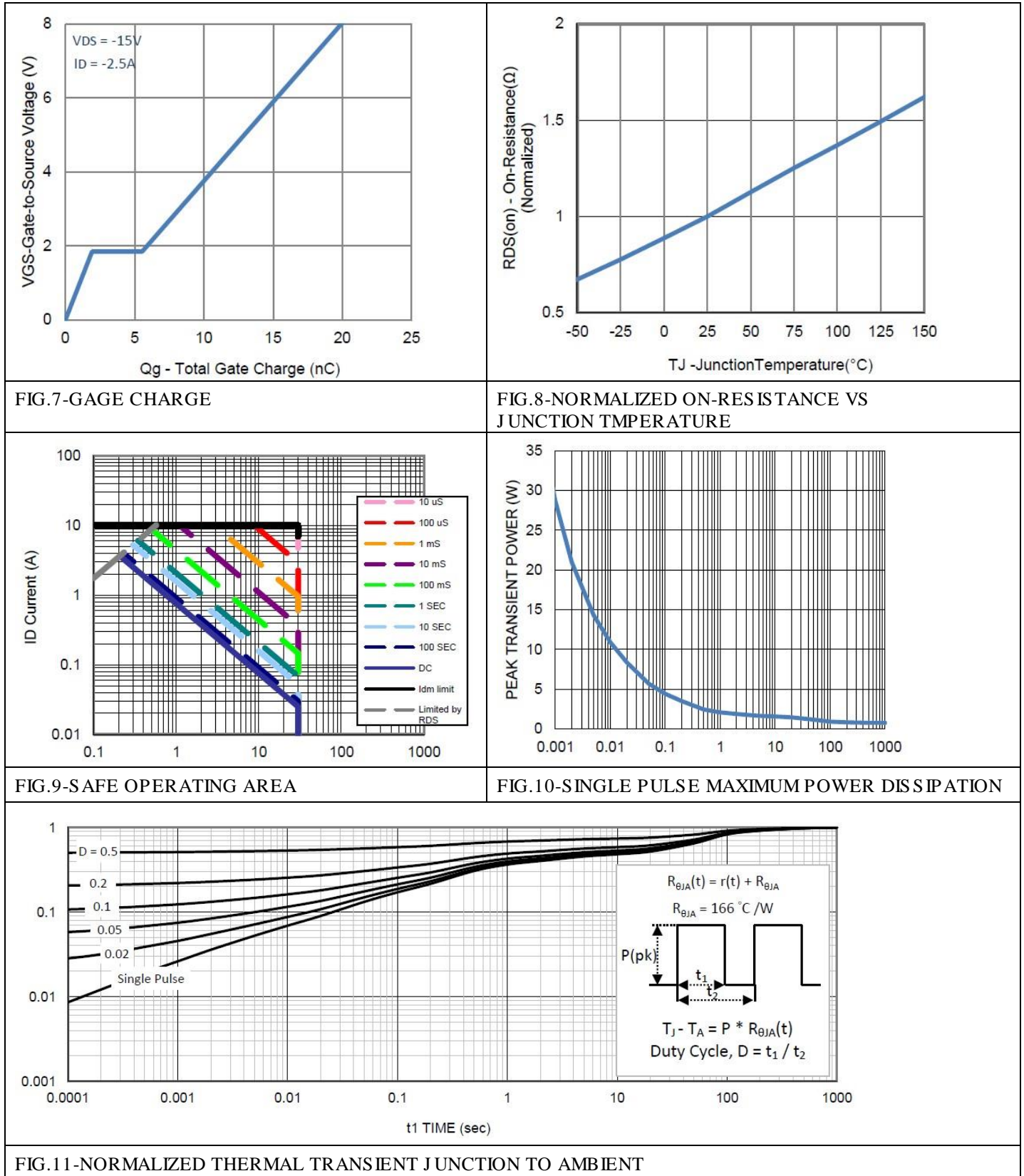
Typical Electrical Characteristics



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