

MS23P61

P-Channel -60-V (D-S) MOSFET

Description

These miniature surface mount MOSFETs utilize a high cell density trench process to provide low $r_{DS(on)}$ 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 $r_{DS(on)}$ trench technology
- Low thermal impedance
- Fast switching speed
- RoHS compliant package

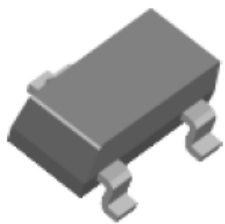
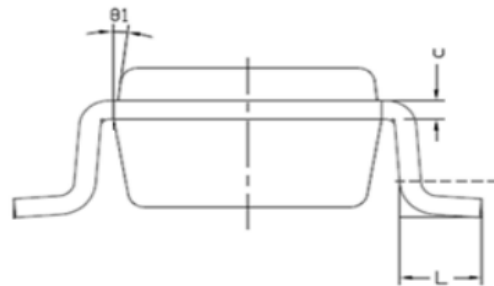
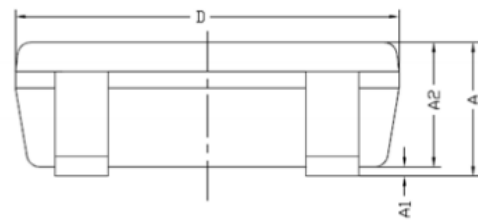
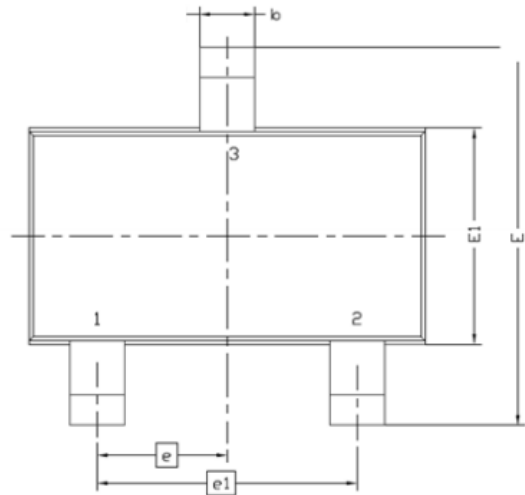
Typical Applications

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

Package type : SOT-23

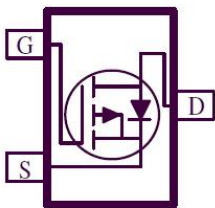
Packing & Order Information

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
θ1	7° NOM	

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MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

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

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage	-60	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current ^a ($T_A=25^{\circ}\text{C}$)	-3.4	A
	Continuous Drain Current ^a ($T_A=70^{\circ}\text{C}$)	-2.6	A
I_{DM}	Pulsed Drain Current ^b	-20	A
I_S	Continuous Source Current (Diode Conduction) ^a	-1.6	A
P_D	Power Dissipation ^a ($T_A=25^{\circ}\text{C}$)	1.3	W
	Power Dissipation ^a ($T_A=70^{\circ}\text{C}$)	0.8	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)	100	$^{\circ}\text{C/W}$
	Maximum Junction-to-Ambient ^a (Steady-State)	166	

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-Threshold Voltage	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$	-1			V
I_{GSS}	Gate-Body Leakage	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 100	nA
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = -48\text{ V}, V_{GS} = 0\text{ V}$ $V_{DS} = -48\text{ V}, V_{GS} = 0\text{ V}, T_J = 55^{\circ}\text{C}$			-1 -10	μA
$I_{D(on)}$	On-State Drain Current	$V_{DS} = 5\text{ V}, V_{GS} = 10\text{ V}$	-8			A
$r_{DS(on)}$	Drain-Source On-Resistance	$V_{GS} = -10\text{ V}, I_D = -2.7\text{ A}$ $V_{GS} = -4.5\text{ V}, I_D = -2.2\text{ A}$			210 250	$\text{m}\Omega$
g_{fs}	Forward Transconductance	$V_{DS} = -15\text{ V}, I_D = -2.7\text{ A}$		10		S
V_{SD}	Diode Forward Voltage	$I_S = -0.8\text{ A}, V_{GS} = 0\text{ V}$		0.83		V

Dynamic^b

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
Q_g	Total Gate Charge	$V_{DS} = -30\text{ V}, I_D = -2.7\text{ A},$ $V_{GS} = -4.5\text{ V}$	--	5	--	nC
Q_{gs}	Gate-Source Charge		--	2.2	--	nC
Q_{gd}	Gate-Drain Charge		--	2.3	--	nC

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Dynamic ^b						
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
$t_{d(on)}$	Turn-On Delay Time	$V_{DS} = -30\text{ V}$, $R_L = 11.2\ \Omega$, $V_{GEN} = -10\text{ V}$, $R_{GEN} = 6\ \Omega$, $I_D = -2.7\text{ A}$	--	7	--	ns
t_r	Rise Time		--	5	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	23	--	ns
t_f	Fall Time		--	6	--	ns
C_{ISS}	Input Capacitance	$V_{DS} = -15\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1.0\text{ MHz}$	--	371	--	pF
C_{OSS}	Output Capacitance		--	31	--	pF
C_{RSS}	Reverse Transfer Capacitance		--	26	--	pF

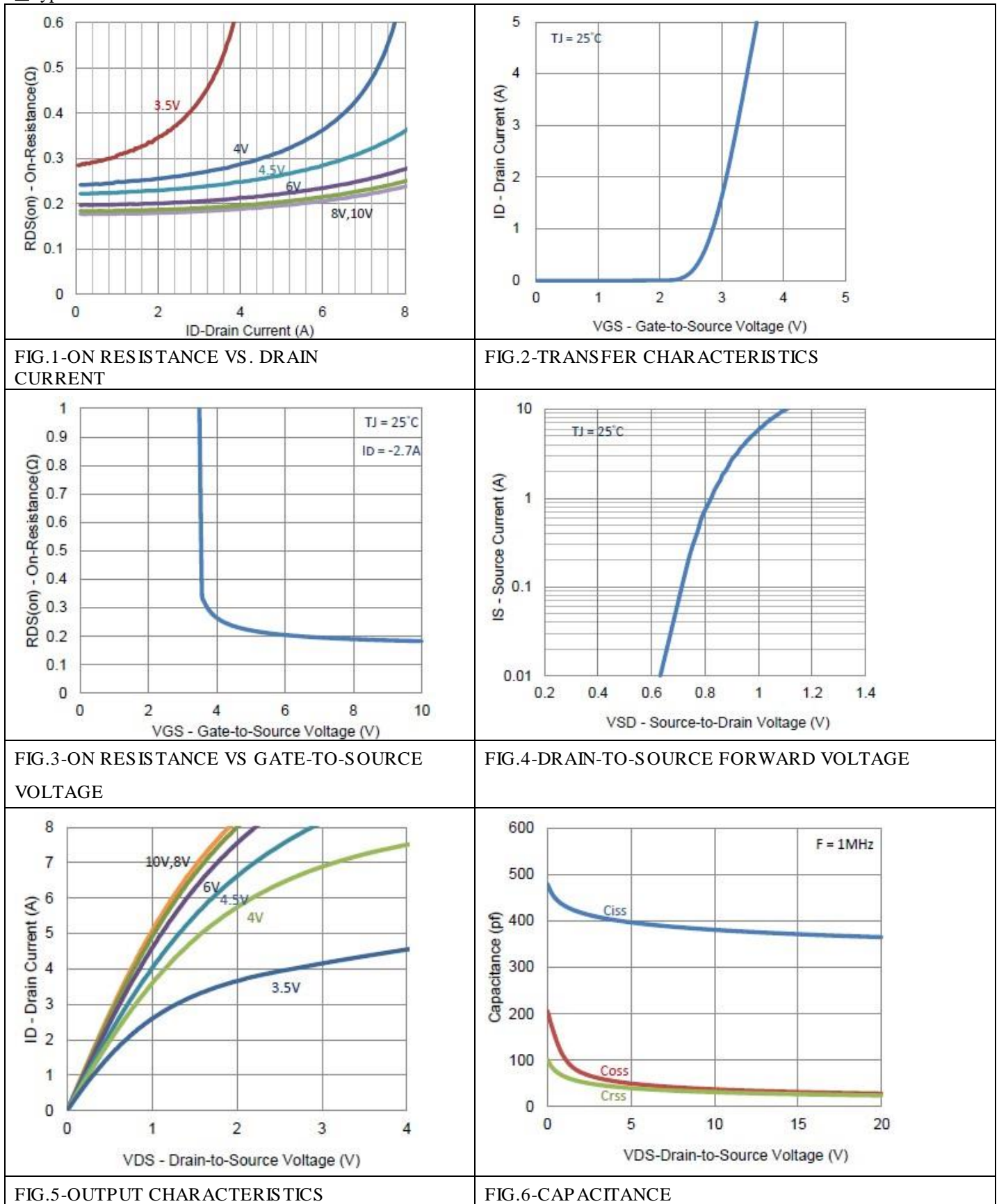
Notes :

- a. Pulse test: PW \leq 300us duty cycle \leq 2%.
- b. Guaranteed by design, not subject to production testing.

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Typical Electrical Characteristics



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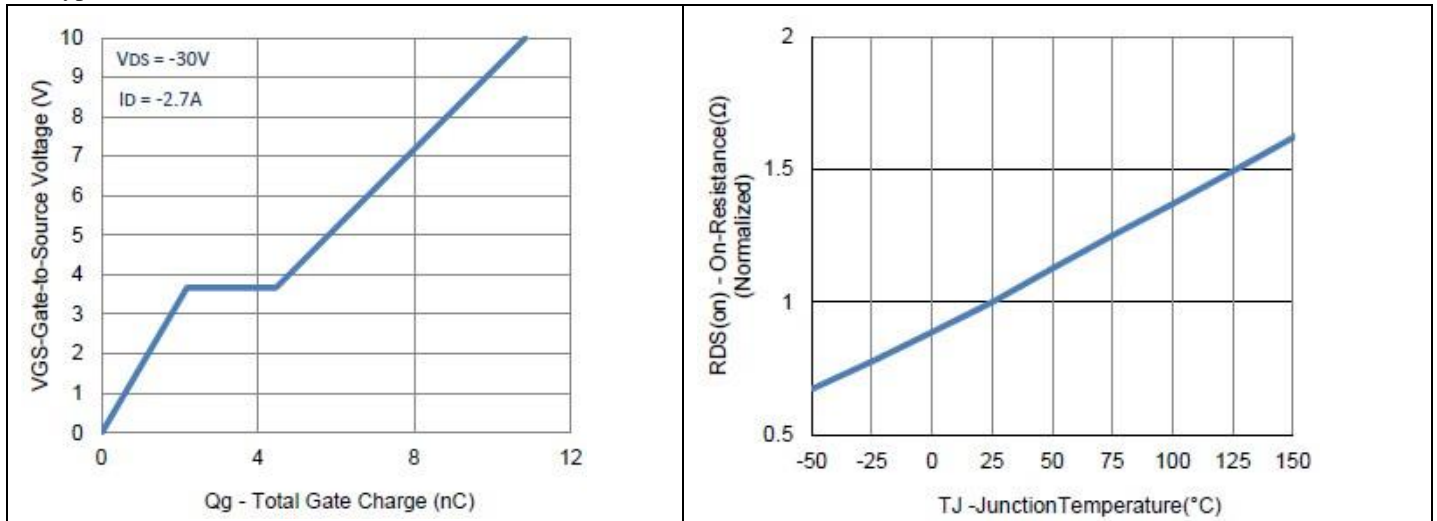


FIG.7-GAGE CHARGE

FIG.8-NORMALIZED ON-RESISTANCE VS JUNCTION TEMPERATURE

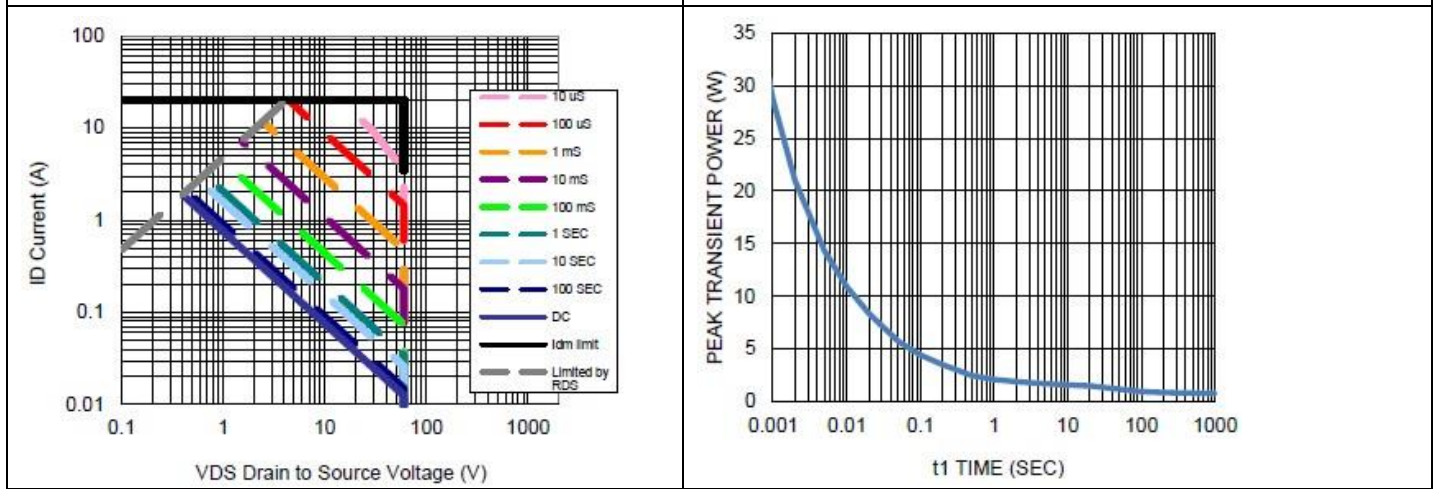


FIG.9-SAFE OPERATING AREA

FIG.10-SINGLE PULSE MAXIMUM POWER DISSIPATION

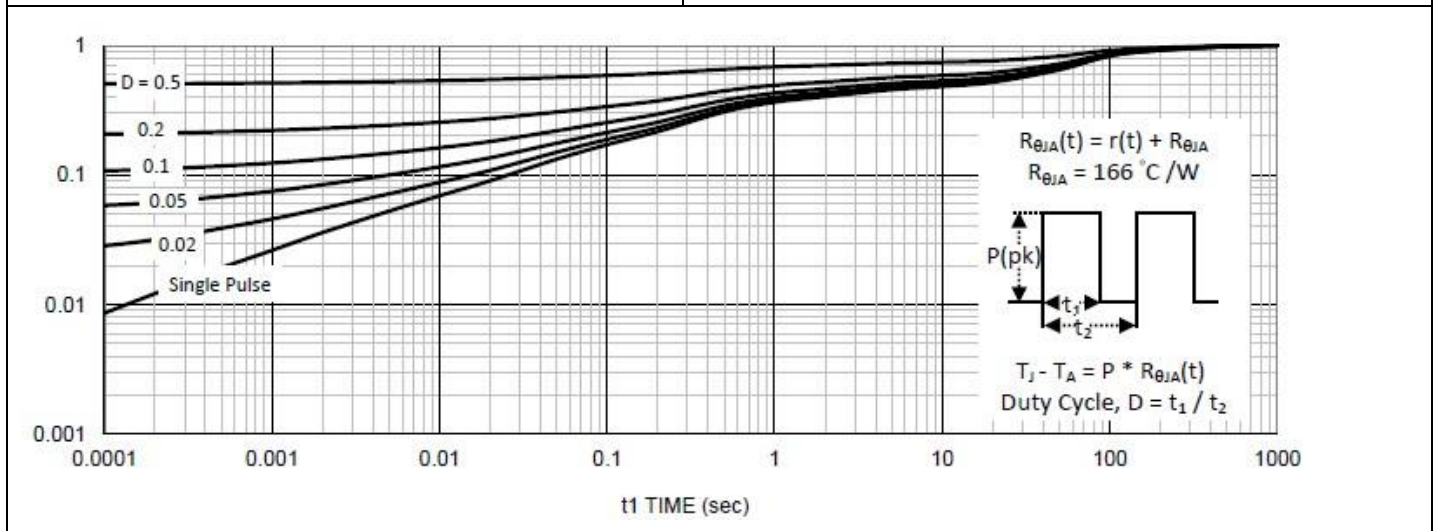


FIG.11-NORMALIZED THERMAL TRANSIENT JUNCTION TO AMBIENT

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