

MS 13N30

N-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
- Fast switching speed
- Low thermal impedance
- RoHS compliant package

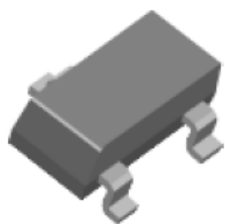
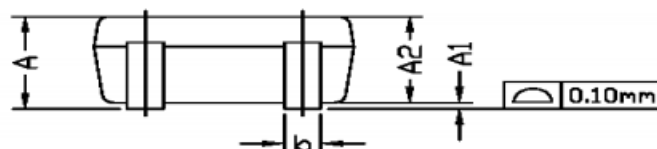
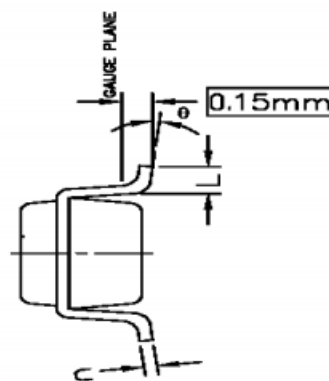
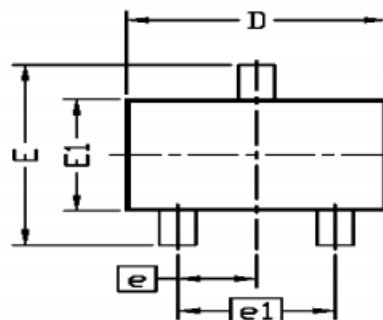
Applications:

- Power Routing
- Li Ion Battery Packs
- Level Shifting and Driver Circuits

Package type : SC70-3

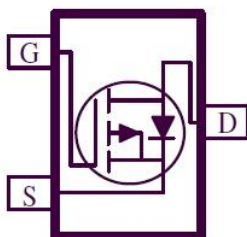
Packing & Order Information

3,000/Reel



**RoHS
COMPLIANT**

Graphic symbol



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A			1.10			0.043
A1	0.00		0.10	0.00		0.004
A2	0.7	0.9	1.00	0.028	0.035	0.039
b	0.15		0.30	0.006		0.012
c	0.08		0.22	0.003		0.009
D	1.85	2.10	2.15	0.073	0.083	0.085
E	1.80	2.30	2.40	0.071	0.091	0.094
e	0.65 BSC			0.026 BSC		
e1	1.30 BSC			0.051 BSC		
E1	1.1	1.30	1.4	0.043	0.051	0.055
L	0.26	0.36	0.46	0.010	0.014	0.018
θ	0°	4°	8°	0°	4°	8°

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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	30	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current ^a ($T_A=25^\circ\text{C}$)	2.0	A
	Continuous Drain Current ^a ($T_A=70^\circ\text{C}$)	1.6	A
I_{DM}	Pulsed Drain Current ^b	10	A
I_S	Continuous Source Current (Diode Conduction) ^a	0.45	A
P_D	Power Dissipation ^a ($T_A=25^\circ\text{C}$)	0.34	W
	Power Dissipation ^a ($T_A=70^\circ\text{C}$)	0.22	W
T_J/T_{STG}	Operating Junction and Storage Temperature	-55 to +150	$^\circ\text{C}$

Thermal Resistance Ratings

Symbol	Parameter	Maximum	Units
R_{THJA}	Maximum Junction-to-Ambient C/W ^a ($t \leq 10$ sec)	375	$^\circ\text{C/W}$
	Maximum Junction-to-Ambient C/W ^a (Steady-State)	430	

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}	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	$V_{DS} = 24\text{ V}, V_{GS} = 0\text{ V}$ $V_{DS} = 24\text{ V}, V_{GS} = 0\text{ V}, T_J = 55^\circ\text{C}$			1 10	μA
$I_{D(on)}$	On-State Drain Current ^A	$V_{DS} = 5\text{ V}, V_{GS} = 10\text{ V}$	3			A
$R_{DS(on)}$	Drain-Source On-Resistance ^A	$V_{GS} = 10\text{ V}, I_D = 1.6\text{ A}$ $V_{GS} = 4.5\text{ V}, I_D = 1.3\text{ A}$			58 82	m Ω
g_{fs}	Forward Transconductance ^A	$V_{DS} = 15\text{ V}, I_D = 1.6\text{ A}$		4		S
V_{SD}	Diode Forward Voltage	$I_S = 0.25\text{ V}, V_{GS} = 0\text{ V}$		0.74		V

Dynamic^b

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
$t_{d(on)}$	Turn-On Delay Time	$V_{DS} = 15\text{ V}, R_L = 9.4\ \Omega,$ $V_{GEN} = 10\text{ V}, R_{GEN} = 6\ \Omega$ $I_D = 1.6\text{ A}$	--	4	--	ns
t_r	Rise Time		--	7	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	19	--	ns
t_f	Fall Time		--	5	--	ns

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Dynamic ^b						
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
Q_g	Total Gate Charge	$V_{DS} = 15\text{ V}$, $I_D = 1.6\text{ A}$ $V_{GS} = 4.5\text{ V}$	--	5.9	--	nC
Q_{gs}	Gate-Source Charge		--	2.1	--	nC
Q_{gd}	Gate-Drain Charge		--	2.1	--	nC
C_{ISS}	Input Capacitance	$V_{GS} = 0\text{ V}$, $V_{DS} = 15\text{ V}$, $f = 1\text{ MHz}$	--	513	--	pF
C_{OSS}	Output Capacitance		--	69	--	pF
C_{RSS}	Reverse Transfer Capacitance		--	54	--	pF

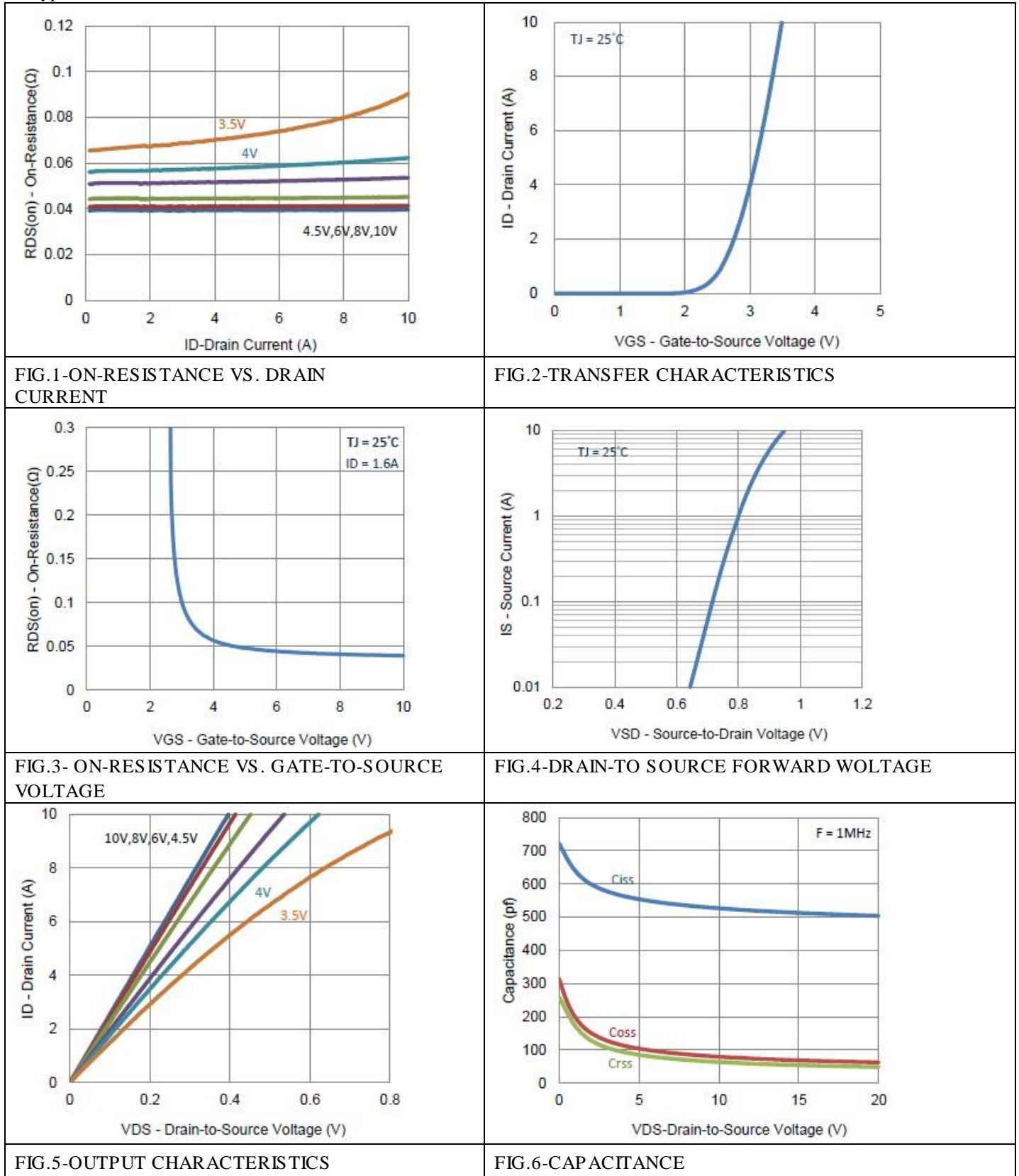
Notes

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

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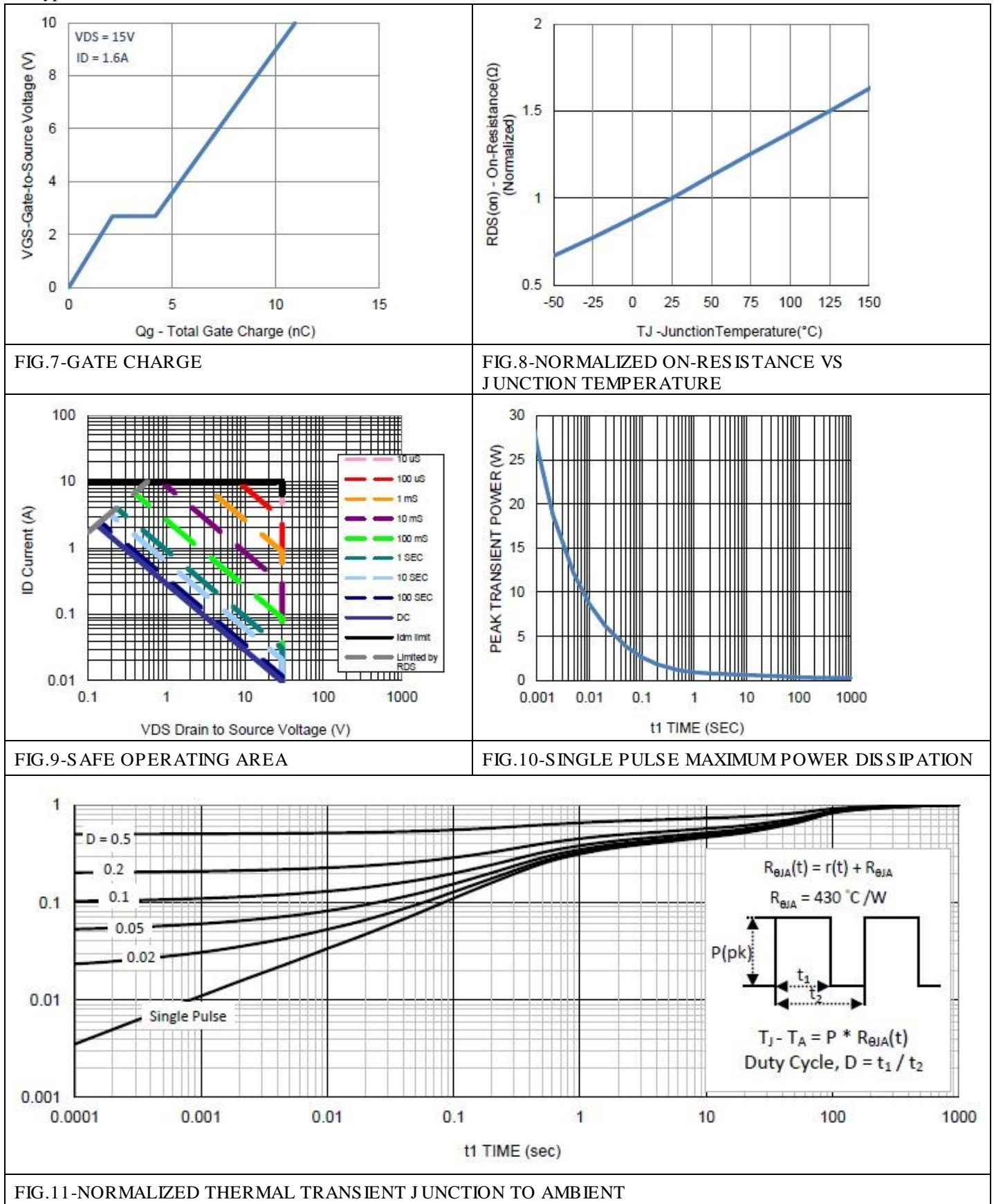
Typical Electrical Characteristics



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Disclaimer

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