

MSD20N10

N-Channel 100-V (D-S) MOSFET

Description

The MSD4N60 is a N-channel enhancement-mode MOSFET , providing the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost effectiveness. The TO-252 package is universally preferred for all commercial-industrial applications

Features

- Low rDS(on) trench technology
- Low thermal impedance
- Fast switching speed
- RoHS compliant package

Application

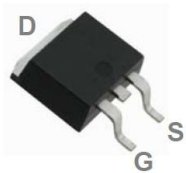
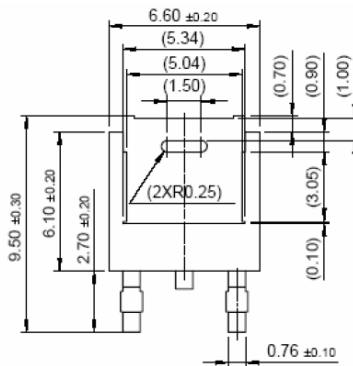
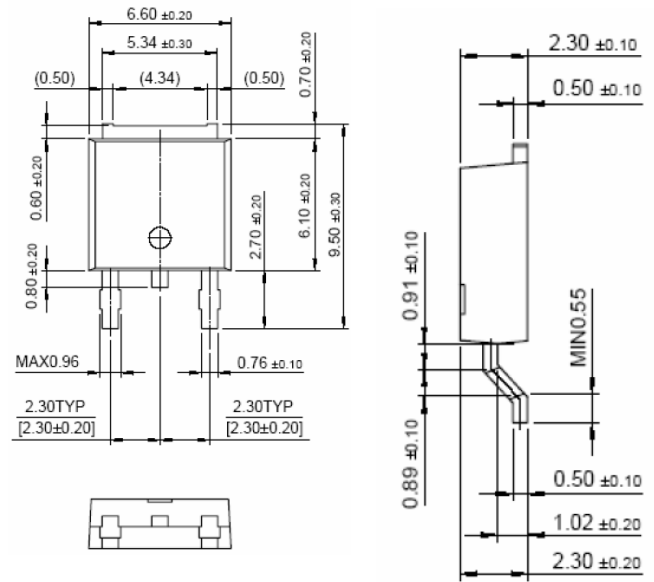
- PoE Power Sourcing Equipment
- PoE Powered Devices
- Telecom DC/DC converters
- White LED boost converters

Package type : TO-252

Packing & Order Information

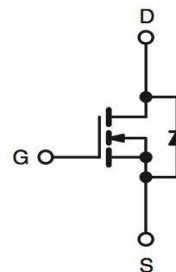
Part No./ R : 2,500/Reel

Part No./ T : 80/Tube , 4,000/Box



**RoHS
COMPLIANT**

Graphic symbol



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MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

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

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current ($T_C=25^\circ\text{C}$)	11	A
I_{DM}	Pulsed Drain Current ^b	50	A
I_S	Continuous Source Current (Diode Conduction)	28	mJ
P_D	Power Dissipation ($T_C=25^\circ\text{C}$)	50	W
T_J, T_{STG}	Operating Junction and Storage Temperature	-55 to +175	$^\circ\text{C}$

Thermal Resistance Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Maximum Junction-to-Case	--	3	$^\circ\text{C/W}$
$R_{\theta JA}$	Maximum Junction-to- Ambient ^a	--	40	

Notes

a. Surface Mounted on 1" x 1" FR4 Board, drain pad using 2 oz copper, value dependent on PC board thermal characteristics

b. Pulse width limited by maximum junction temperature

Static

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	1		3.5	V
I_{GSS}	Gate-Body Leakage	$V_{DS} = 0\text{ V}, V_{GS} = 20\text{ V}$			± 100	nA
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 80\text{ V}, V_{GS} = 0\text{ V}$ $V_{DS} = 80\text{ V}, V_{GS} = 0\text{ V}, T_J = 55^\circ\text{C}$			1 25	μA
$I_{D(on)}$	On-State Drain Current	$V_{DS} = 5\text{ V}, V_{GS} = 10\text{ V}$	34			A
$r_{DS(on)}$	Drain-Source On-Resistance	$V_{GS} = 10\text{ V}, I_D = 4.5\text{ A}$ $V_{GS} = 4.5\text{ V}, I_D = 4\text{ A}$			280 355	$\text{m}\Omega$
g_{fs}	Forward Transconductance	$V_{GS} = 15\text{ V}, I_D = 4.5\text{ A}$		5		S
V_{SD}	Diode Forward Voltage	$I_S = 14\text{ A}, V_{GS} = 0\text{ V}$		0.95		V

Dynamic

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
$t_{d(on)}$	Turn-On Time	$V_{DD} = 50\text{ V}, I_D = 4.5\text{ A},$ $R_{GEN} = 6\ \Omega, R_L = 14.3\ \Omega$ $V_{GEN} = 10\text{ V}$	--	4.8	--	ns
t_r	Turn-On Time		--	3.9	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	12.7	--	ns
t_f	Turn-Off Fall Time		--	3.2	--	ns

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Dynamic						
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
Q_g	Total Gate Charge	$V_{DS} = 50\text{ V}, I_D = 4.5\text{ A},$ $V_{GS} = 4.5\text{ V}$	--	3.8	--	nC
Q_{gs}	Gate-Source Charge		--	1.3	--	nC
Q_{gd}	Gate-Drain Charge		--	1.7	--	nC
C_{ISS}	Input Capacitance	$V_{DS} = 15\text{ V}, V_{GS} = 0\text{ V},$ $f = 1.0\text{ MHz}$	--	332	--	pF
C_{OSS}	Output Capacitance		--	40	--	pF
C_{RSS}	Reverse Transfer Capacitance		--	29	--	pF
R_g	Gate Resistance	$f = 1.0\text{ MHz}$	--	0.3	--	Ω

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

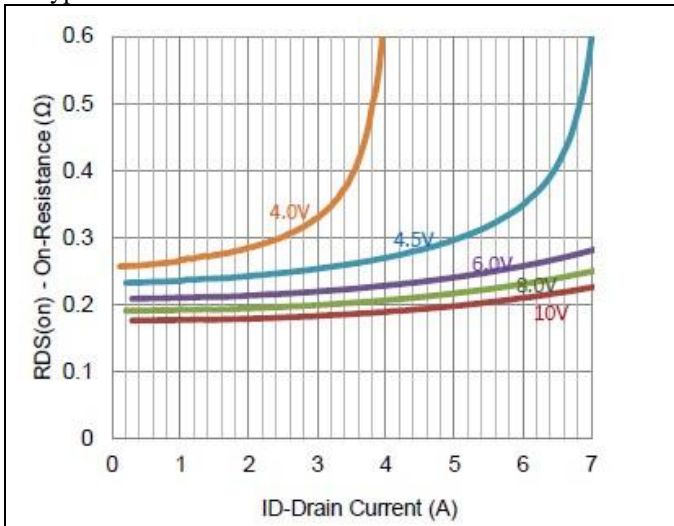


FIG.1-ON REGION VS DRAIN CURRENT

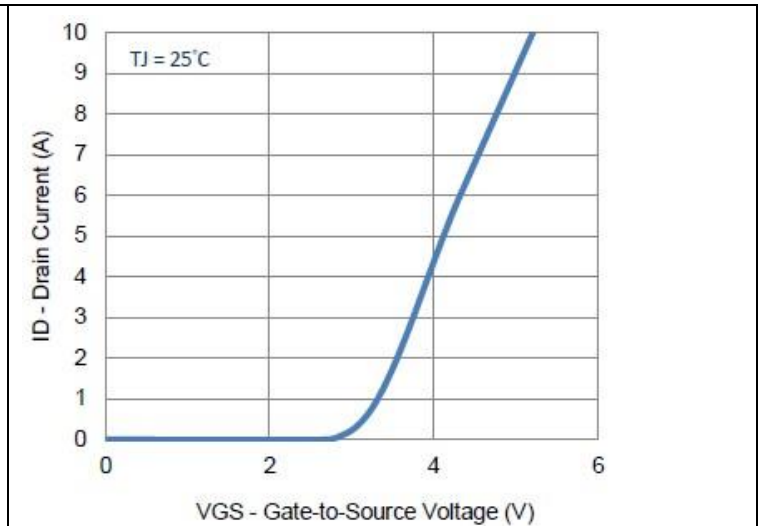


FIG.2-TRANSFER CHARACTERISTICS

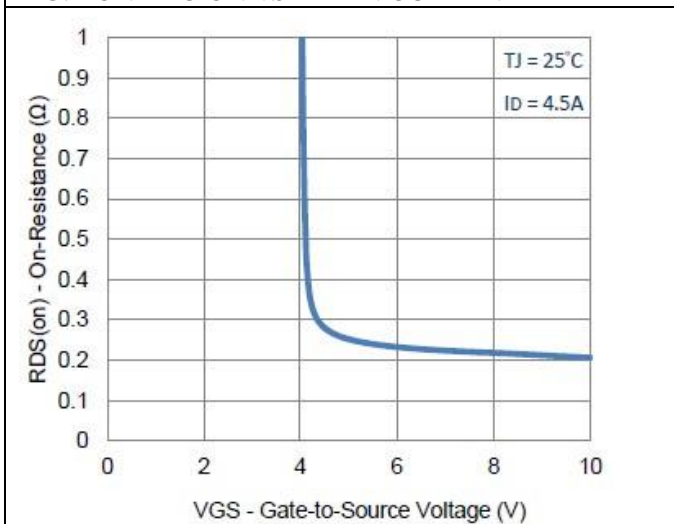


FIG.3-ON-RESISTANCE VS GATE-TO-SOURCE VOLTAGE

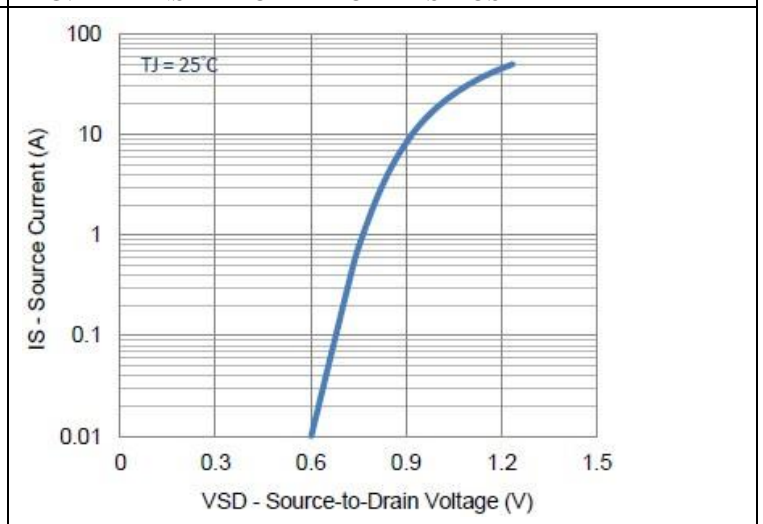


FIG.4-DRAIN-TO-SOURCE FORWARD VOLTAGE

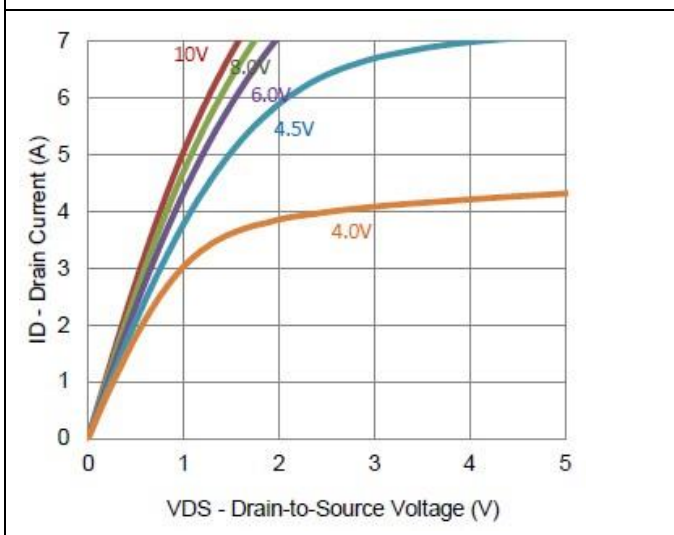


FIG.5-OUTPUT CHARACTERISTICS

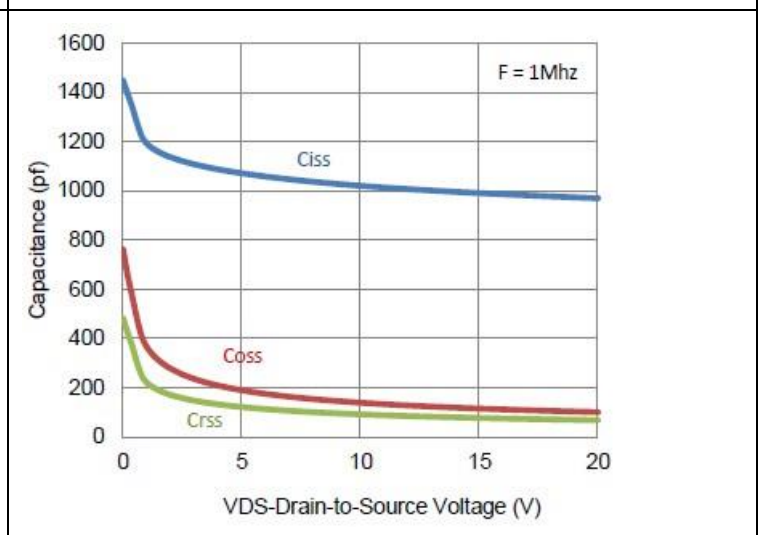


FIG.6-CAPACITANCE

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Typical Electrical Characteristics

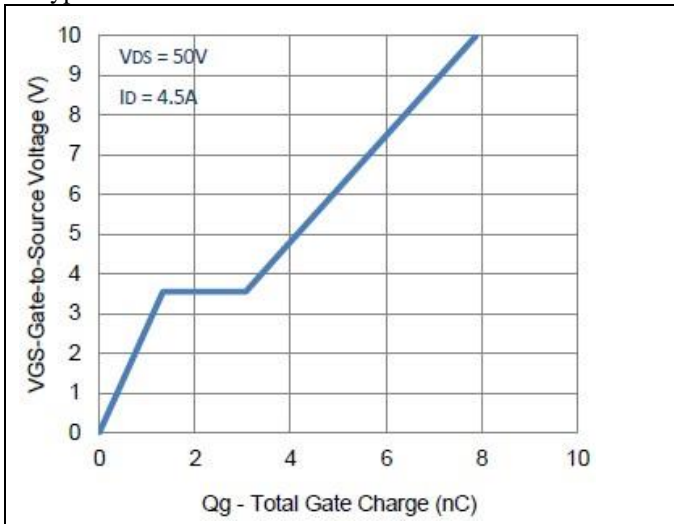


FIG.7-GATE CHARGE

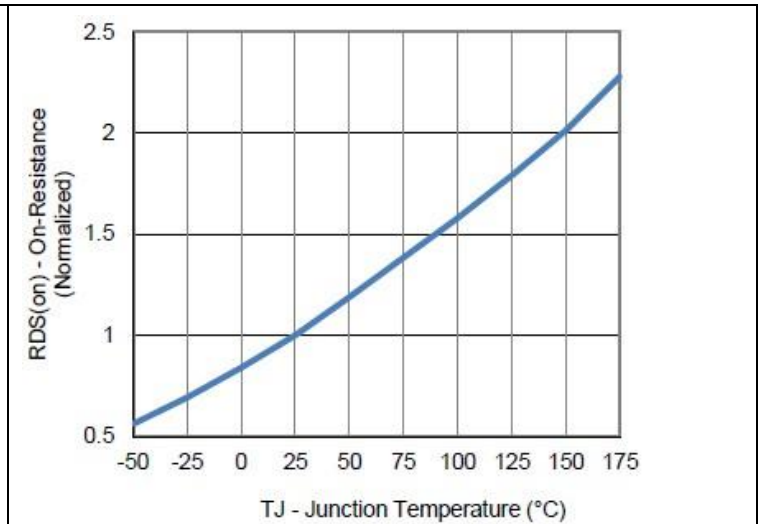


FIG.8-NORMALIZED ON-RESISTANCE VS JUNCTION TEMPERATURE

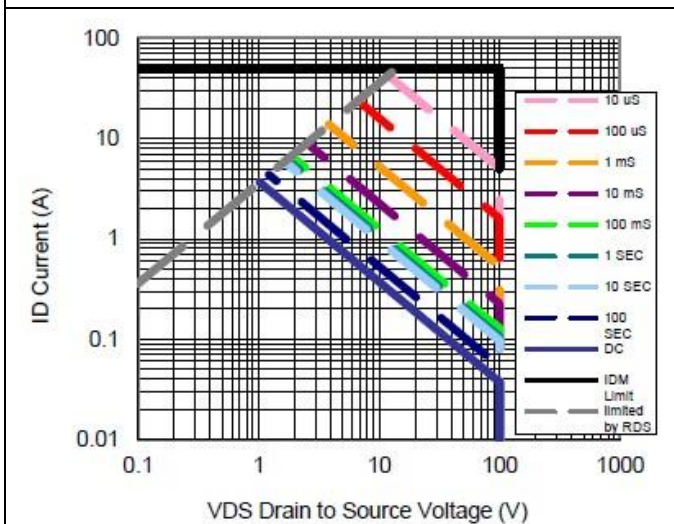


FIG.9-SAFE OPERATING AREA

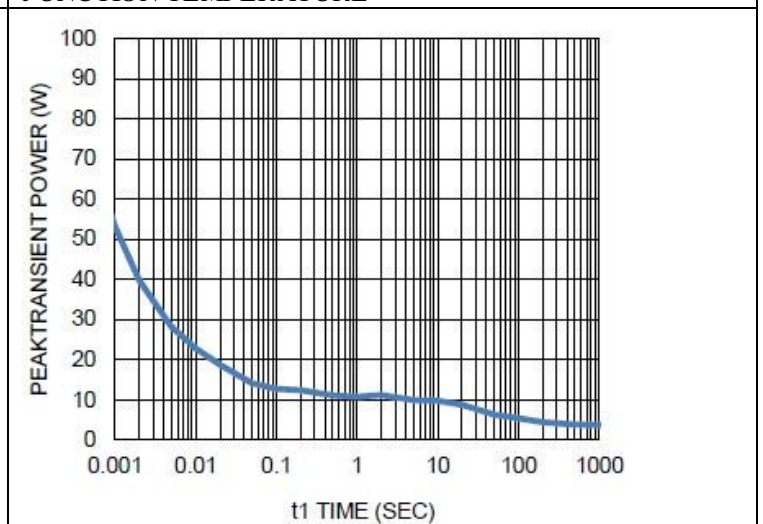


FIG.10-SINGLE PULSE MAXIMUM POWER DISSIPATION

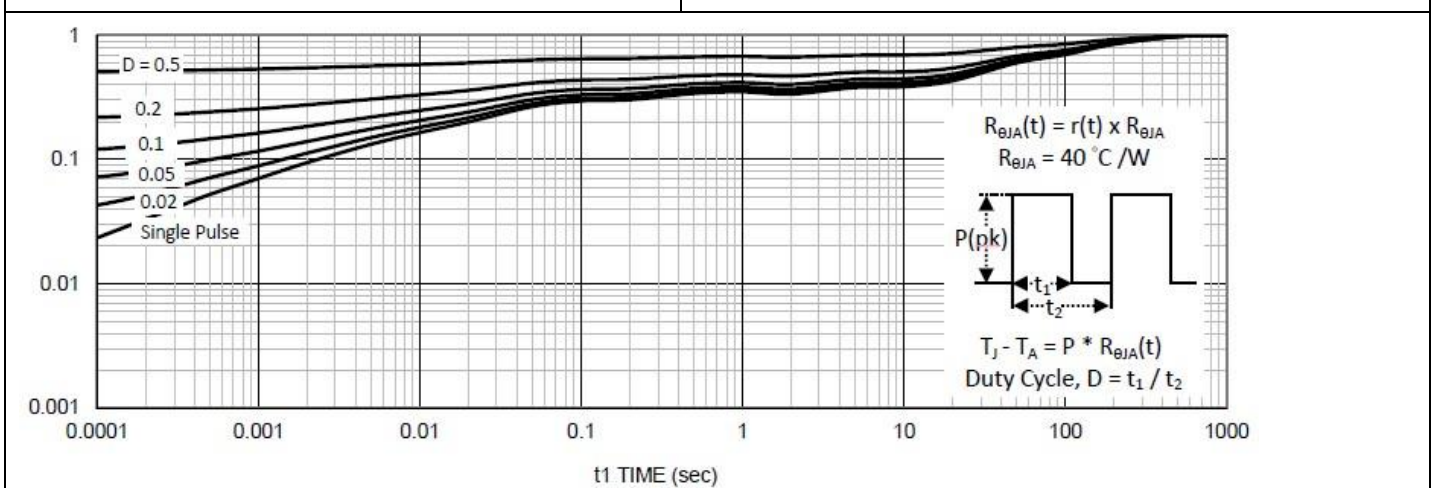


FIG.11-NORMALIZED THERMAL TRANSIENT JUNCTION TO AMBIENT

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