MSD4N70

700V N-Channel MOSFET

Description

The MSD4N70 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

- Originative New Design
- 100% EAS Test
- Rugged Gate Oxide Technology
- Extremely Low Intrinsic Capacitances
- Remarkable Switching Characteristics
- Unequalled Gate Charge: 15 nC (Typ.)
- Extended Safe Operating Area
- Lower RDS(ON) : 2.5 Ω (Typ.) @VGS=10V
- RoHS compliant package

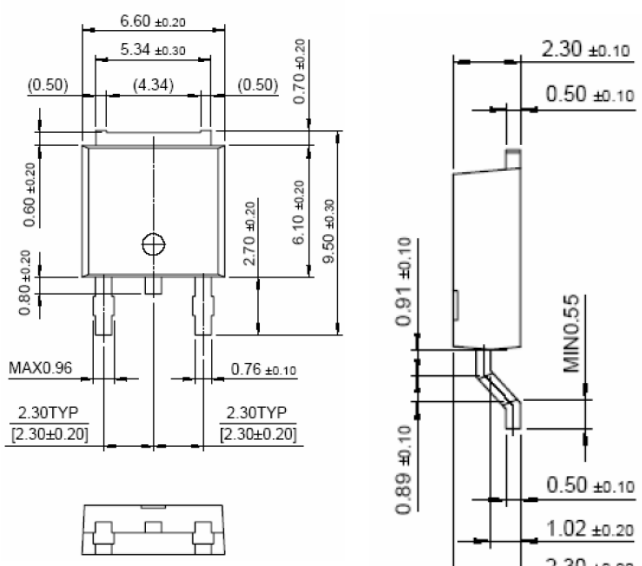
Application

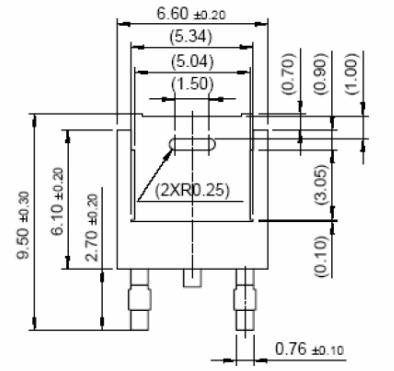
- Low power battery chargers
- Switch mode power supply (SMPS)
- DC-AC converters.

Packing & Order Information

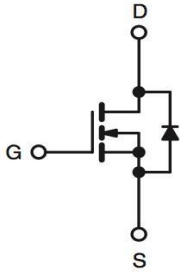
Part No./ T：2,500/Tape&Reel

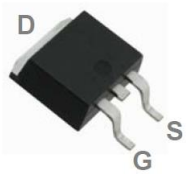
Part No./ R：80/Tube , 4,000/Box





Graphic symbol





RoHS
COMPLIANT

MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings (Tc=25°C unless otherwise noted)

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-Source Voltage	700	V
V_{GS}	Gate-Source Voltage	±30	V
I_D	Continuous Drain Current (TC=25°C)	3.6	A
	Continuous Drain Current (T_C=100°C)	2.3	A

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Absolute Maximum Ratings (Tc=25°C unless otherwise noted)			
Symbol	**Parameter**	**Value**	**Unit**
I_{DM}	Pulsed Drain Current	14.4	A
EAS	Single Pulsed Avalanche Energy	240	mJ
EAR	Repetitive Avalanche Energy	4.4	mJ
dV/dt	Peak Diode Recovery dV/dt	5.5	V/ns
P_D	Power Dissipation (T_C=25°C)	55	W
	-Derate above 25C	0.4	W/°C
T_J,T_{STG}	Operating and Storage Temperature Range	-55 to + 150	°C
T_L	Maximum lead temperature for soldering purposes, 1/8'' from case for 5 seconds	300	°C

• Drain current limited by maximum junction temperature

Thermal Resistance Characteristics				
Symbol	**Parameter**	**Typ.**	**Max.**	**Units**
$R_{\theta JC}$	Junction-to-Case	--	2.5	°C/W
$R_{\theta JA}$	Junction-to- Ambient	--	110	

On Characteristics						
Symbol	**Parameter**	**Test Conditions**	**Min**	**Typ.**	**Max.**	**Units**
V_{GS}	Gate Threshold Voltage	V_{DS} = V_{GS} , I_D = 250μA	2.0	--	4.0	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS} = 10 V , I_D = 2.25 A	--	2.2	2.4	Ω

Off Characteristics						
Symbol	**Parameter**	**Test Conditions**	**Min**	**Typ.**	**Max.**	**Units**
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V , I_D=250μA	700	--	--	V
ΔBV_{DSS} /ΔT_J	Breakdown Voltage Temperature Coefficient	I_D = 250μA, Referenced to 25°C	--	0.6	--	V/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 700 V , V_{GS} = 0 V V_{DS} = 560 V , T_C = 125°C	--	--	1 10	μA
I_{GSSF}	Gate-Body Leakage Current, Forward	V_{GS} = 30 V , V_{DS} = 0 V	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	V_{GS} = -30 V , V_{DS} = 0 V	--	--	-100	nA

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Dynamic Characteristics						
Symbol	**Parameter**	**Test Conditions**	**Min**	**Typ.**	**Max.**	**Units**
C_{ISS}	Input Capacitance	V_{DS} = 25 V, V_{GS} = 0 V, F = 1.0MHz	--	550	730	pF
C_{OSS}	Output Capacitance		--	60	80	pF
C_{RSS}	Reverse Transfer Capacitance		--	8	11	pF
$t_{d(on)}$	Turn-On Time	V_{DS} = 325 V, I_D = 3.6 A, R_G = 25 Ω	--	10	20	ns
t_r	Turn-On Time		--	35	70	ns
$t_{d(off)}$	Turn-Off Delay Time		--	45	90	ns
tf	Turn-Off Fall Time		--	40	80	ns
Q_g	Total Gate Charge	V_{DS} = 520 V,I_D = 3.6 A, V_{GS} = 10 V	--	15	20	nC
Q_{gs}	Gate-Source Charge		--	2.8	--	nC
Q_{gd}	Gate-Drain Charge		--	6.0	--	nC

Source-Drain Diode Maximum Ratings and Characteristics						
Symbol	**Parameter**	**Test Conditions**	**Min**	**Typ.**	**Max.**	**Units**
I_S	Continuous Source-Drain Diode Forward Current		--	--	3.6	A
I_{SM}	Pulsed Source-Drain Diode Forward Current		--	--	16	
V_{SD}	Source-Drain Diode Forward Voltage	I_S = 4.0 A , V_{GS} = 0 V	--	--	1.5	V
t_{rr}	Reverse Recovery Time	I_S = 4.0 A , V_{GS} = 0 V diF/dt = 100A/μs	--	300	--	ns
Q_{rr}	Reverse Recovery Charge		--	2.2	--	μC

Notes;

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. I_{AS}=4A, V_{DD}=50V, R_G=25W, Starting T_J=25℃
3. I_{SD}≦4A, di/dt≦300A/μs,V_{DD}≦BV_{DSS}, Starting T_J=25℃
4. Pulse Test: Pulse Width ≦ 300μs, Duty Cycle≦ 2%
5. Essentially Independent of Operating Temperature

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■Characteristics Curve

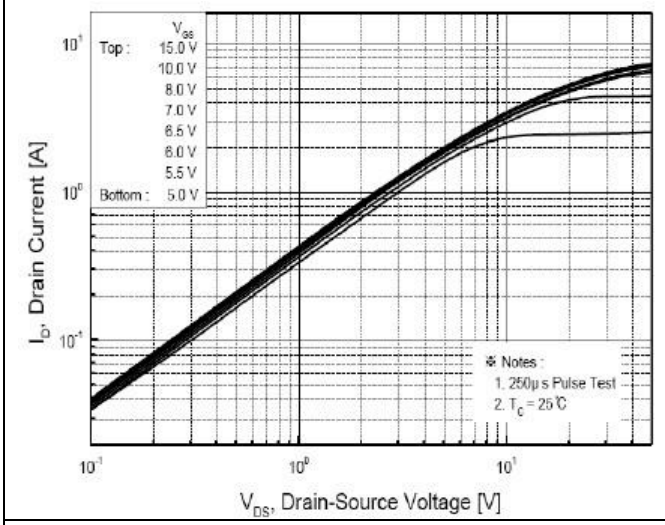

FIG.1-ON REGION CHARACTERISTICS

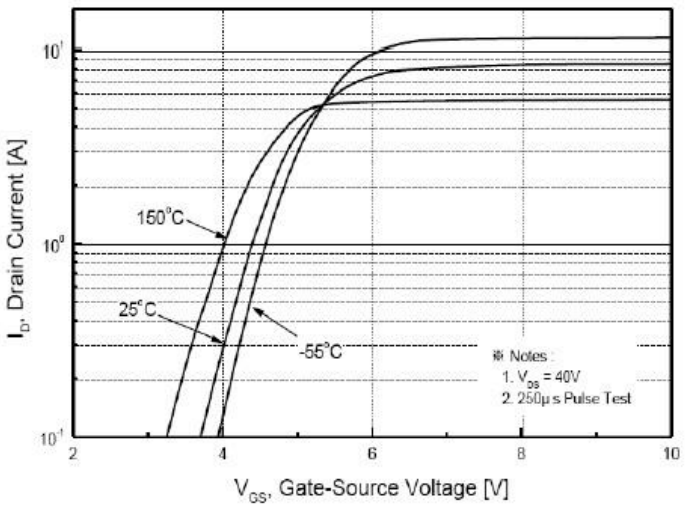

FIG.2-TRANSFER CHARACTERISTICS

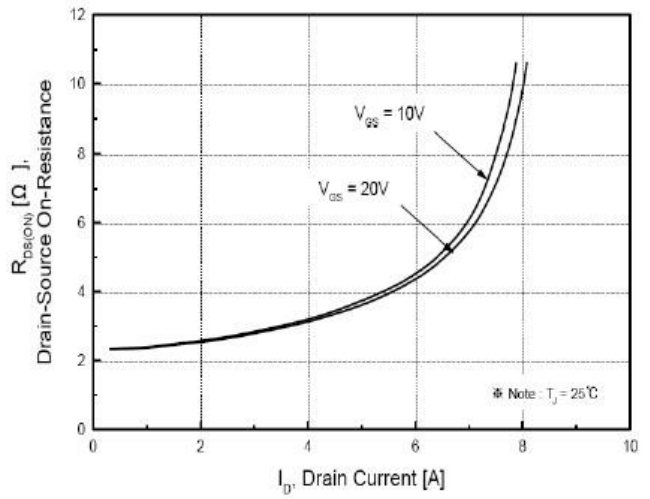

FIG.3-ON RESISTANCE VARIATION VS DRAIN CURRENT AND GATE VOLTAGE

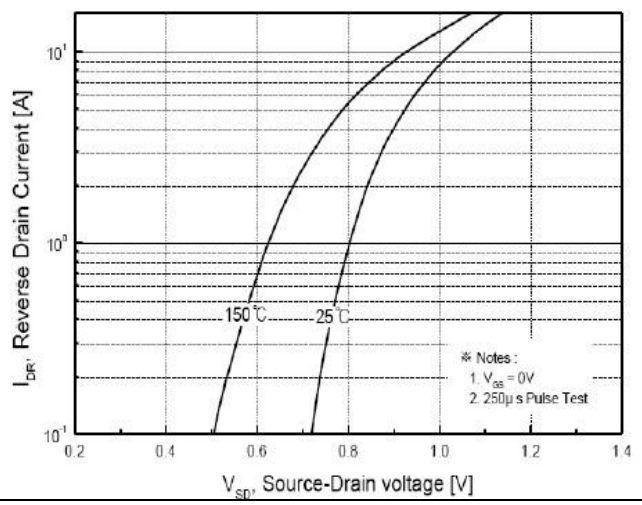

FIG.4-BODY DIODE FORWARD VOLTAGE VARIATION WITH SOURCE CURRENT AND TEMPERATURE

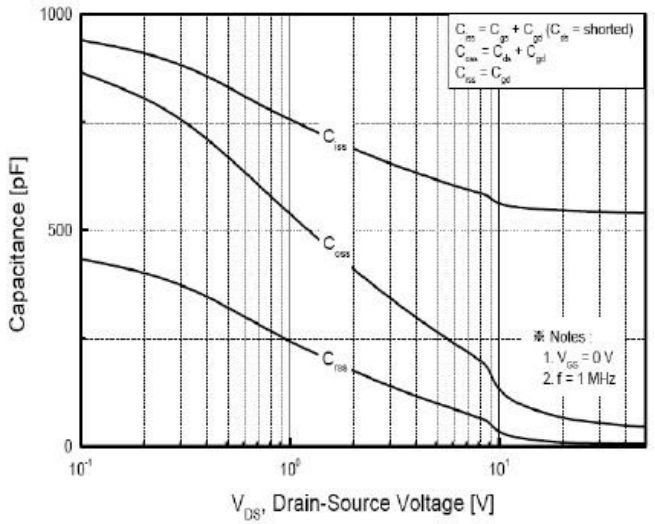

FIG.5-CAPACITANCE CHARACTERISTICS

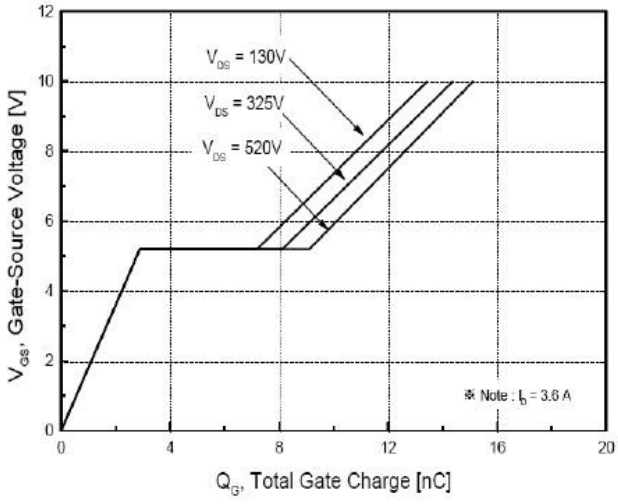

FIG.6-GATE CHARGE CHARACTERISTICS

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■Characteristics Curve

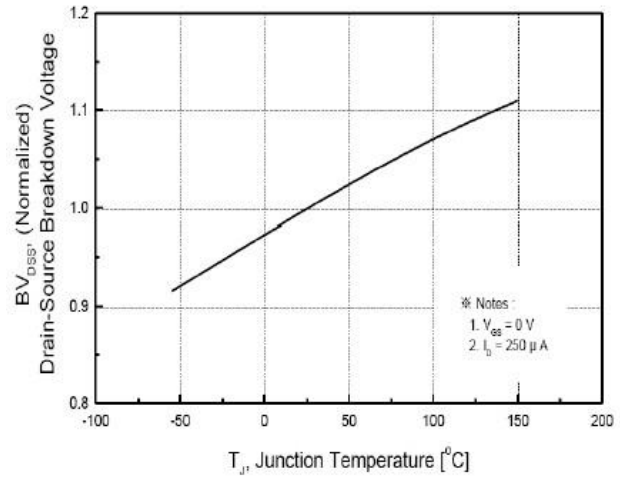

FIG.7-BREAKDOWN VOLTAGE VARIATION VS TEMPERATURE

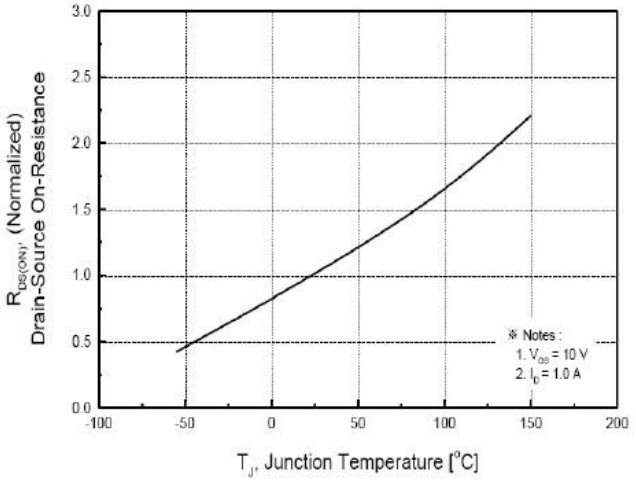

FIG.8-ON-RESISTANCE VARIATION VS TEMPERATURE

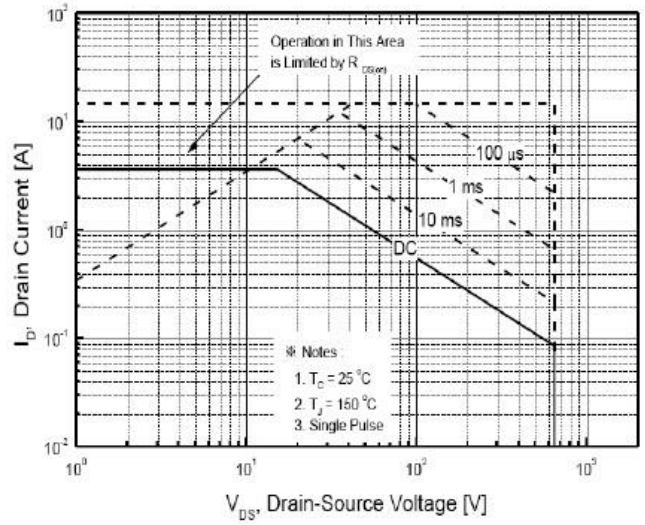

FIG.9-MAXIMUM SAFE OPERATING AREA

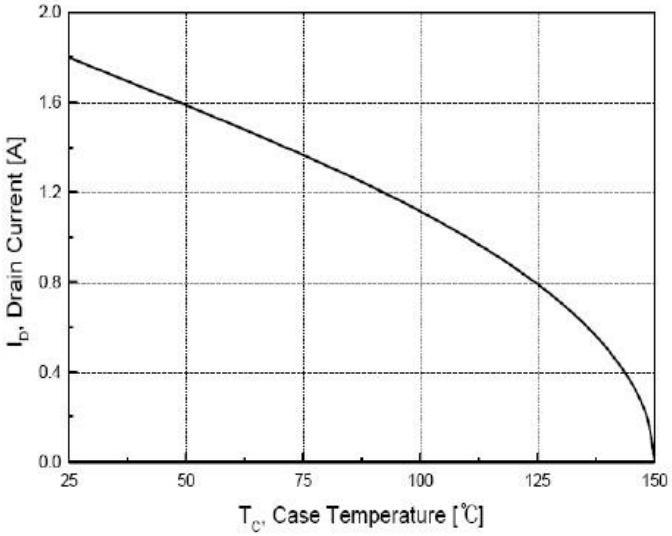

FIG.10-MAXIMUM DRAIN CURRENT VS CASE TEMPERATURE

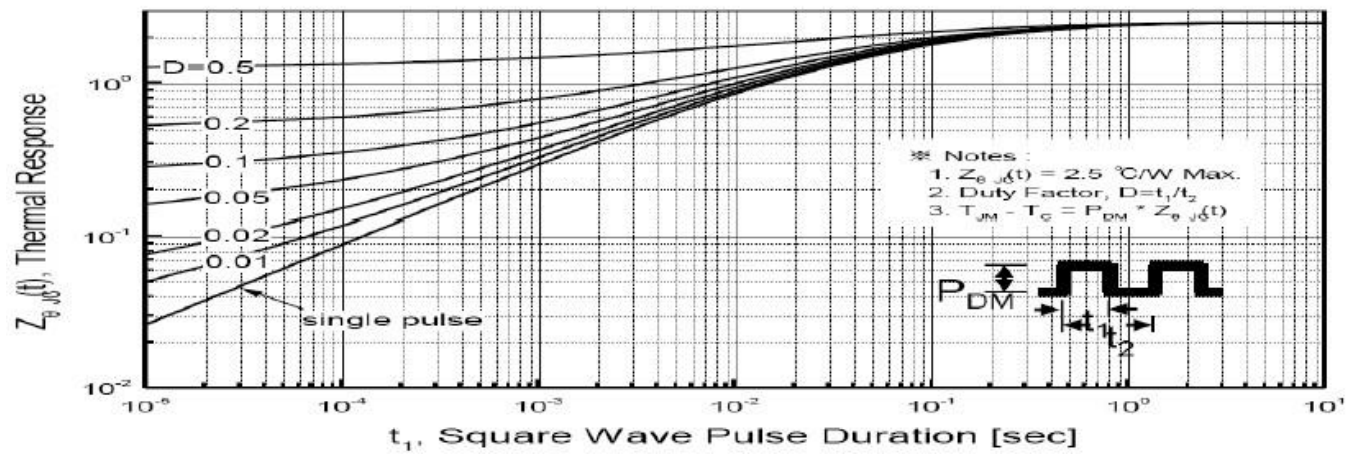

FIG.11-TRANSIENT THERMAL RESPONSE CURVE

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