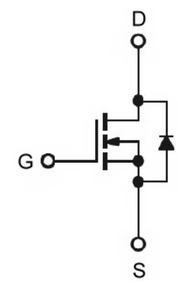
MSP800N500

N-Channel 800-V (D-S) MOSFET

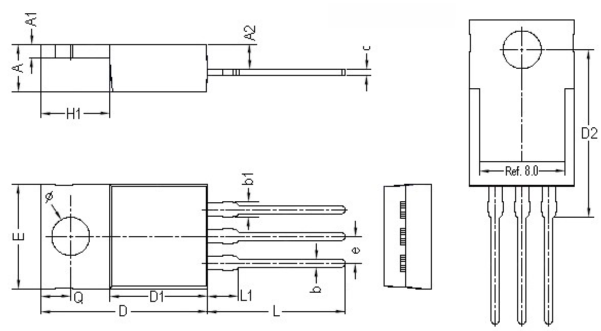
Description

The device is using advanced Super-Junction technology. This advanced technology has been especially tailored to minimize conduction loss, provide superior switching performance and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for AC/DC power conversion in switching mode operation for higher efficiency.

Graphic Symbol



Package Dimension



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	4.30	4.70	D2	15.70	17.00
A1	1.20	1.40	E	9.70	10.36
A2	2.30	2.79	e	2.54 BSC	
b	0.70	0.90	H1	6.10	6.70
b1	1.20	1.75	L	12.80	13.90
c	0.34	0.60	L1	-	4.00
D	14.70	16.10	Q	2.60	3.00
D1	8.60	9.30	Ø	3.55	3.95

Features

- 11A, 800V, $R_{DS(ON)typ}$ =0.46Ω@ V_{GS} =10V
- Low Gate Charge (typical 38nC)
- High Ruggedness
- Fast Switching
- 100% Avalanche Tested
- Improved dv/dt Capability
-

Typical Applications

- Switching Mode Power Supply
- Adapter / Charger
- Server Power

Package type：TO-220

RoHS Compliant

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MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings

Symbol	Parameter	Value	Units
V_{DS}	Drain-Source Voltage	800	V
V_{GS}	Gate-Source Voltage	±30	V
I_D	Continuous Drain Current[1] (T_C =25°C)	11	A
	Continuous Drain Current[1] (T_C =100°C)	6.7	A
I_{DM}	Pulsed Drain Current[1,2]	30	A
I_{AS}	Single Pulse Avalanche Current, L =79mH[3]	2.1	A
E_{AS}	Single Pulse Avalanche Energy, L =79mH[3]	132	mJ
dv/dt	Peak Diode Recovery dv/dt	50	V/ns
P_D	Power Dissipation[4] (T_C =25°C)	83	W
	Derating Factor Above 25°C	0.67	W/°C
T_J/T_{STG}	Operating Junction and Storage Temperature	-55 to +150	°C

Thermal Resistance Ratings

Symbol	Parameter	Maximum	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient[1]	62.5	°C/W
$R_{\theta JC}$	Maximum Junction-to-Case[1]	1.5	°C/W

Electrical Characteristics (T_J=25°C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{GS\ (th)}$	Gate Threshold Voltage	V_{DS} =V_{GS}, I_D =250μA	2.5	-	4.5	V
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} =0V, I_D =250μA	800	-	-	V
BV_{DSS} / ΔT_J	Breakdown Voltage Temperature Coefficient	I_D = 250μA, referenced to 25°C	-	0.6	-	V/°C
I_{GSS}	Gate-Source Leakage Current	V_{DS} =0V, V_{GS} =±30V	-	-	±100	nA
I_{DSS}	Drain-Source Leakage Current	V_{DS} =800V, V_{GS} =0V, T_C =25°C V_{DS} =640V, V_{GS} =0V, T_C =125°C	-	-	1 10	μA
$R_{DS\ (on)}$	Static Drain-Source On-Resistance	V_{GS} =10V, I_D =5.5A	-	0.46	0.5	Ω

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Dynamic						
Symbol	**Parameter**	**Test Conditions**	**Min.**	**Typ.**	**Max.**	**Units**
Q_g	Total Gate Charge[2]	V_{DS} =640V I_D =11A V_{GS} =10V	--	38	--	nC
Q_{gs}	Gate-Source Charge		--	4	--	
Q_{gd}	Gate-Drain Charge		--	4.4	--	
$t_{d(on)}$	Turn-On Delay Time[2]	V_{DS} =400V I_D =5.5A V_{GS} =10V R_G =25Ω	--	26	--	ns
t_r	Rise Time		--	60	--	
$t_{d(off)}$	Turn-Off Delay Time		--	75	--	
t_f	Fall Time		--	44	--	
C_{ISS}	Input Capacitance	V_{DS} =100V V_{GS} =0V f =1.0MHz	--	680	--	pF
C_{OSS}	Output Capacitance		--	140	--	
C_{RSS}	Reverse Transfer Capacitance		--	5	--	

Source-Drain Diode						
Symbol	**Parameter**	**Test Conditions**	**Min.**	**Typ.**	**Max.**	**Units**
I_S	Continuous Source Current[1,5]	V_G =V_D =0V, Force Current	-	-	11	A
I_{SM}	Pulsed Source Current[2,5]		-	-	30	
V_{SD}	Diode Forward Voltage[2]	I_S =11A, V_{GS} =0V, T_J =25°C	-	-	1.5	V
t_{rr}	Reverse Recovery Time[2]	I_S =11A, V_{GS} =0V, dI_F / dt = 100A/μs		270		ns
Q_{rr}	Reverse Recovery Charge[2]			3.3		μC

Notes

1. The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
2. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
3. The EAS data shows maximum rating. The test condition is V_{DD}=100V, L=79mH, I_{AS}=2.4A.
4. The power dissipation is limited by 150℃ junction temperature.
5. The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.

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- **Typical Electrical Characteristics**

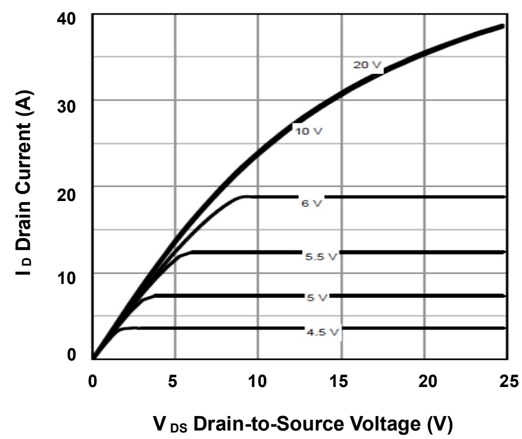

FIG.1-Typical Output Characteristics

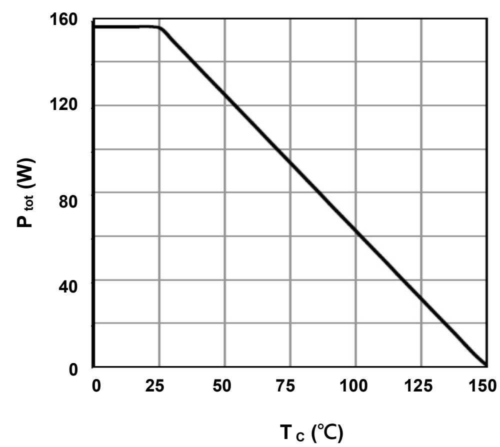

FIG.2-Power Dissipation

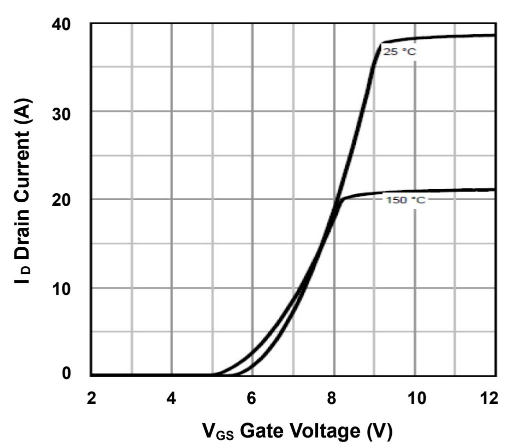

FIG.3-Transfer Characteristics

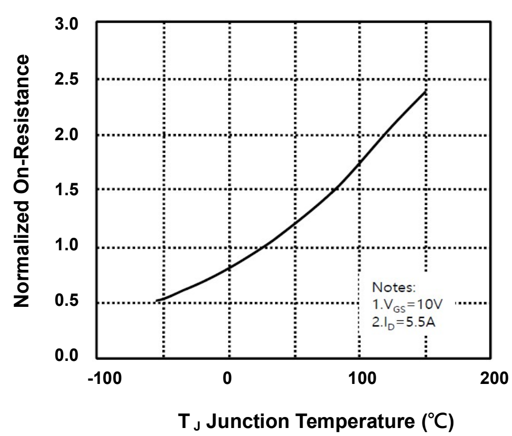

FIG.4-Normalized R_{DSON} vs. T_J

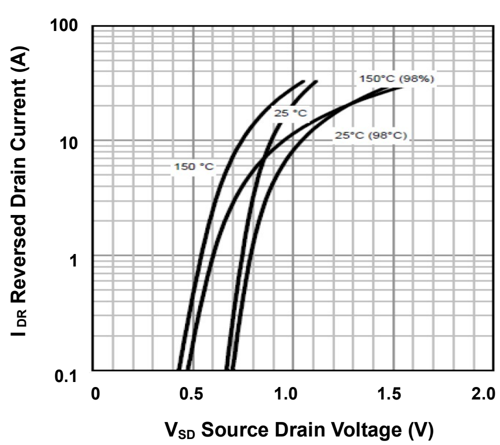

FIG.5-Body Diode Forward Voltage Variation

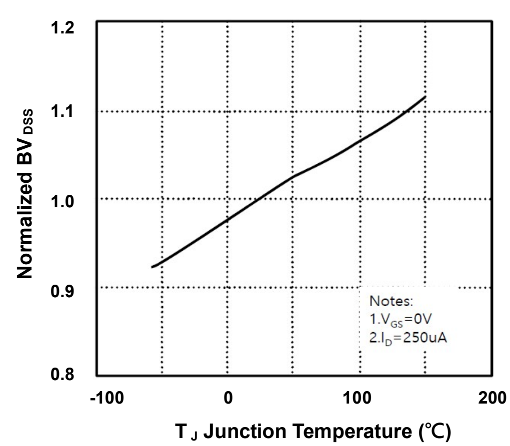

FIG.6-Breakdown Voltage Variation vs Temperature

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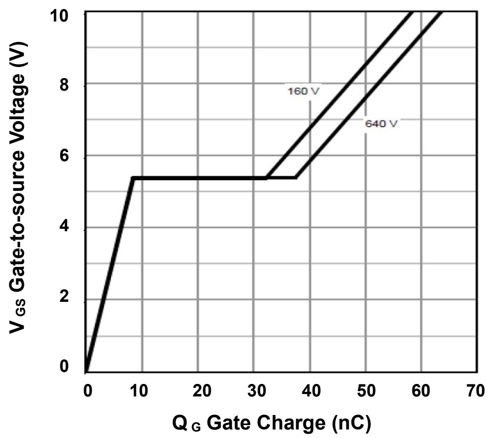

FIG.7-Gate Charge Characteristics

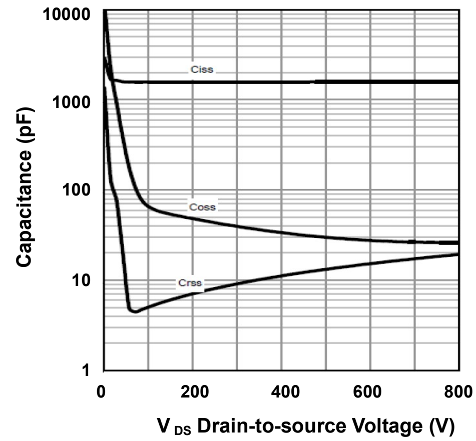

FIG.8-Capacitance Characteristics

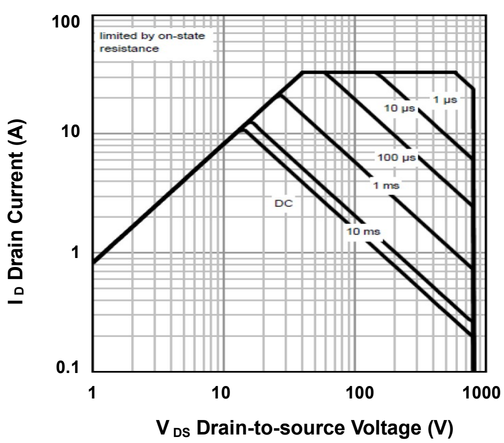

FIG.9-Safe Operating Area

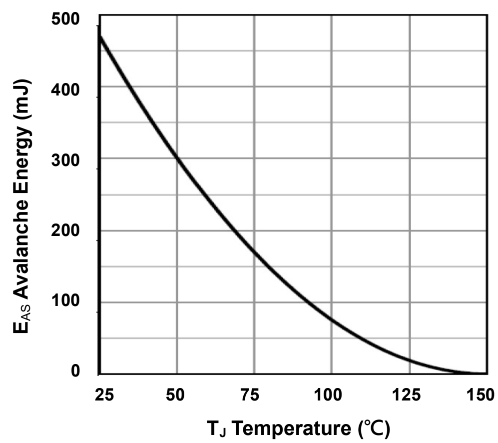

FIG.10-Avanlanche Energy

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