MS6N40

N-Channel Enhancement Mode Power MOSFET

Description

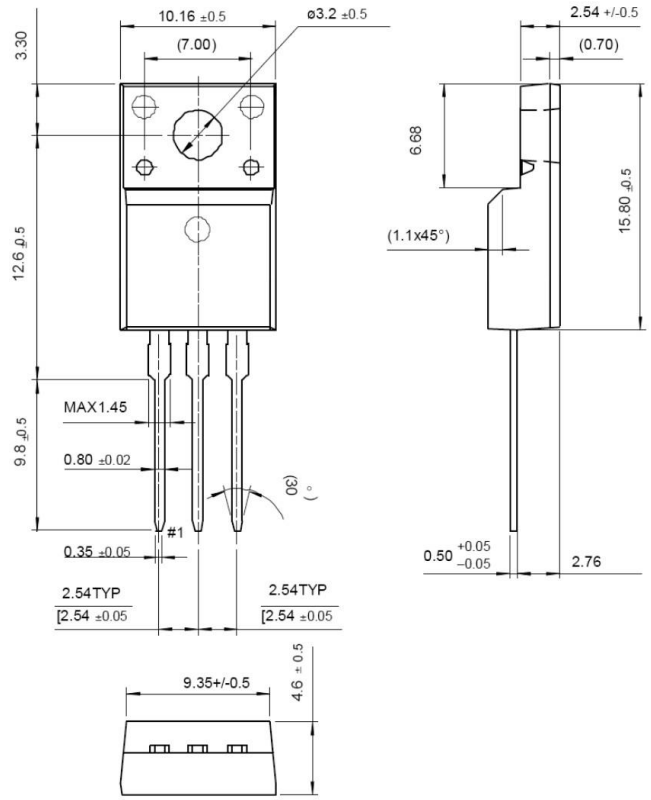
The MS6N40 is a N-channel enhancement-mode MOSFET, providing the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost effectiveness. The TO-220 package is universally preferred for all commercial-industrial applications

Features

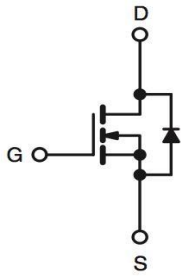
- BVDSS=650V typically @ Tj=150°C
- Low On Resistance
- Simple Drive Requirement
- Low Gate Charge
- Fast Switching Characteristic
- RoHS compliant package

Application

- Adapter
- Switching Mode Power Supply



Graphic symbol



Packing & Order Information

50/Tube ; 1,000/Box

RoHS COMPLIANT

MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

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

Symbol	Parameter	Value	Unit
V_{DSS}	Drain to Source Voltage	400	V
V_{GS}	Gate to Source Voltage	±30	V
I_D	Continuous Drain Current (TC=25°C) Continuous Drain Current (TC=100°C)	5.5 3.5	A
I_{DM}	Drain Current Pulsed	16.4	A
E_{AS}	Single Pulsed Avalanche Energy	240	mJ
E_{AR}	Repetitive Avalanche Energy	10	mJ
dv/dt	Peak Diode Recovery dv/dt	5.5	V/ns

• Drain current limited by maximum junction temperature

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Absolute Maximum Ratings (Tc=25°C unless otherwise specified)			
Symbol	**Parameter**	**Value**	**Unit**
T_L	TL Maximum Temperature for Soldering @ Lead at 0.125 in(0.318mm) from case for 10 seconds	300	°C
T_{PKG}	TPKG Maximum Temperature for Soldering @ Package Body for 10 seconds	260	°C
P_D	Total Power Dissipation(@TC = 25 °C) 100 W	100	W
	Derating Factor above 25 °C	0.8	W/°C
T_{STG}	Operating Junction Temperature	-55 to +150	°C
T_J	Storage Temperature	150	°C

Note:

1.Repetitive rating; pulse width limited by maximum junction temperature.

2. IAS=4A, VDD=50V, L=8mH, VG=10V, starting TJ=+25°C.

3. ISD≤4A, dI/dt≤100A/μs, VDD≤BVDSS, starting TJ=+25°C.

Thermal Characteristics					
Symbol	**Parameter**	**Value**			**Units**
		Min.	**Typ.**	**Max.**	
$R_{\theta JC}$	Thermal Resistance,Junction-to-Case	--	--	1.25	°C/W
$R_{\theta JA}$	Thermal Resistance,Junction-to-Ambient	--	--	62.5	°C/W

Static Characteristics					
Symbol	**Test Conditions**	**Min**	**Typ.**	**Max.**	**Units**
V_{GS}	V_{DS} = V_{GS}, I_D = 250μA	2.0	--	4.0	V
*$R_{DS(ON)}$	V_{GS} = 10 V, I_D = 2.75 A	--	0.8	1.0	Ω
BV_{DSS}	V_{GS} = 0 V , I_D = 250μA	400	--	--	V
$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C, I_D = 250μA		0.4		
I_{DSS}	V_{DS} = 400 V, V_{GS} = 0 V V_{DS} = 320 V, V_{GS} = 0 V, Tj = 125°C	--	--	1 10	uA
I_{GSS}	V_{GS} = 30 V, V_{DS} =0 V	--	--	100	nA
$R_{DS(ON)}$	V_{GS} = 30 V, V_{DS} =0 V	--	--	-100	nA

Dynamic Characteristics					
Symbol	**Test Conditions**	**Min**	**Typ.**	**Max.**	**Units**
Q_g	VDS = 320 V, ID = 5.5 A, VGS =10 V	--	25	33	nC
Q_{gs}		--	5.0	--	
Q_{gd}		--	10	--	

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Dynamic Characteristics					
Symbol	**Test Conditions**	**Min**	**Typ.**	**Max.**	**Units**
$t_{d(on)}$	V_{DS} = 200 V, I_D = 5.5 A, R_G = 25 Ω	--	20	50	ns
t_r		--	50	110	ns
$t_{d(off)}$		--	90	190	ns
tf		--	55	120	ns
C_{ISS}	V_{GS} = 0 V, V_{DS} = 25 V, f= 1MHz	--	670	870	pF
C_{OSS}		--	95	125	pF
C_{RSS}		--	16	21	pF

Source-Drain Diode Characteristics					
Symbol	**Test Conditions**	**Min**	**Typ.**	**Max.**	**Units**
I_S		--	--	5.5	A
I_{SM}		--	--	22	A
V_{SD}	I_S = 4.5 A , V_{GS} = 0 V	--	--	1.5	V
t_{rr}	I_S = 5.5 A, V_{GS} = 0 V diF/dt = 100 A/μs	--	220	--	ns
Q_{rr}		--	2	--	uC

NOTE:

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. I_{AS}=5.5 A, V_{DD}=50V, R_G=25W, Starting TJ =25°C
3. I_{SD}≤5.5 A, di/dt≤300A/μs, VDD≤BVDSS , Starting TJ =25 °C
4. Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%
5. Essentially Independent of Operating Temperature

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■Characteristics Curve

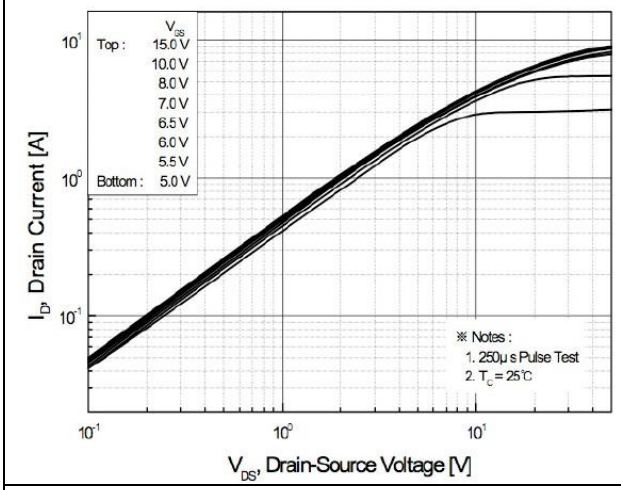

FIG.1-ON REGION CHARACTERISTICS

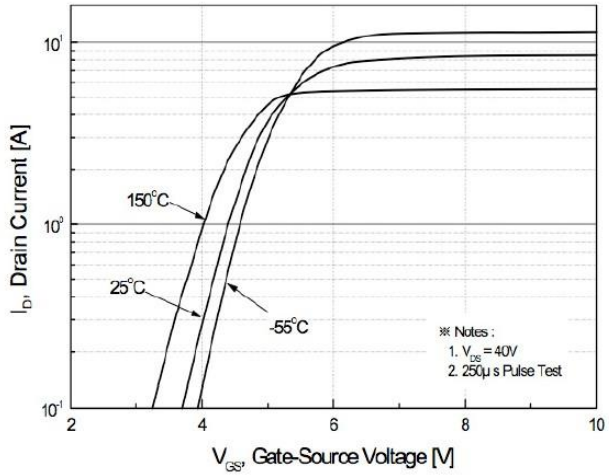

FIG.2-TRANSFER CHARACTERISTICS

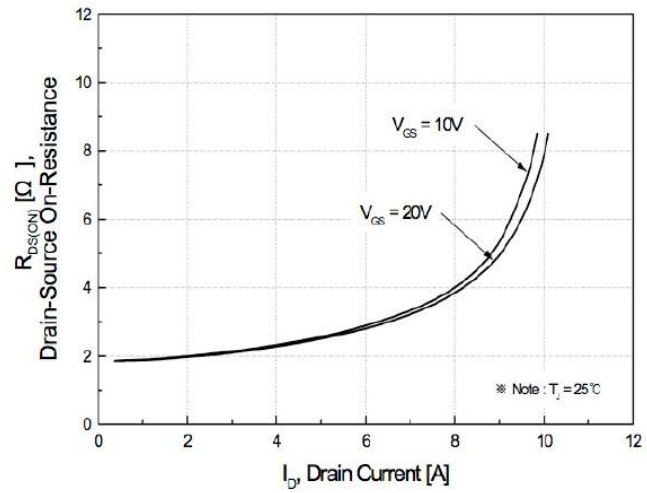

FIG.3-ON RESISTANCE VARIATION VS DRAIN CURRENT AND GATE VOLTAGE

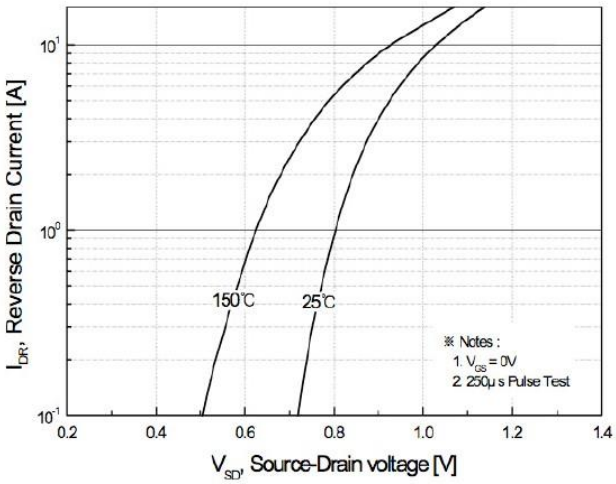

FIG.4-BODY DIODE FORWARD VOLTAGE VARIATION WITH SOURCE CURRENT AND TEMPERATURE

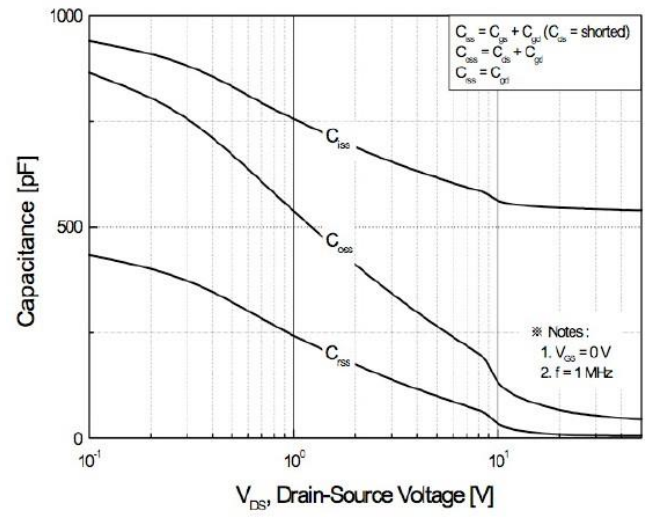

FIG.5-CAPACITANCE CHARACTERISTICS

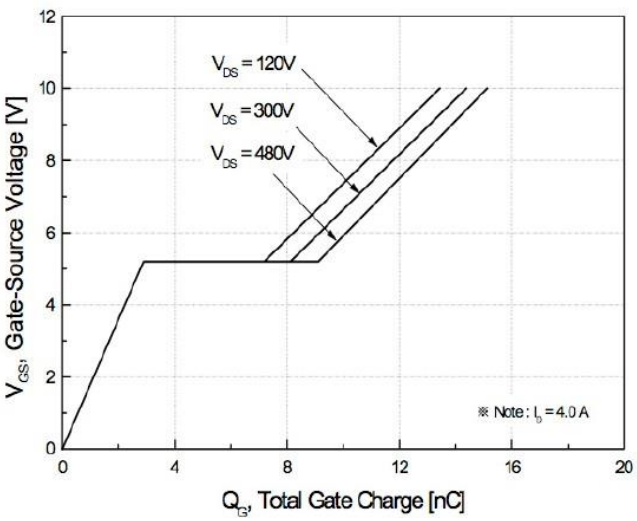

FIG.6-GATE CHARGE CHARACTERISTICS

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■Characteristics Curve

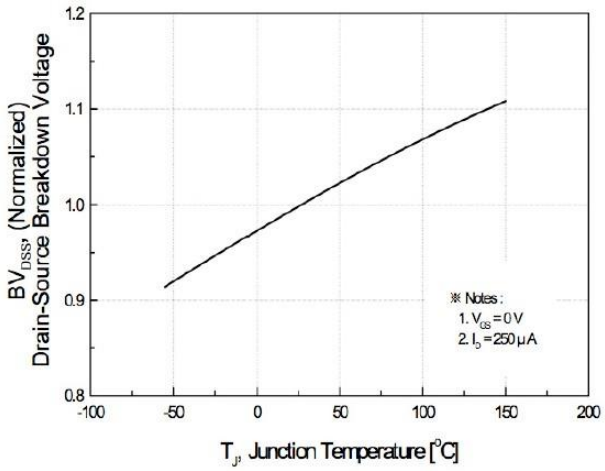

FIG.7-BREAKDOWN VOLTAGE VARIATION VS TEMPERATURE

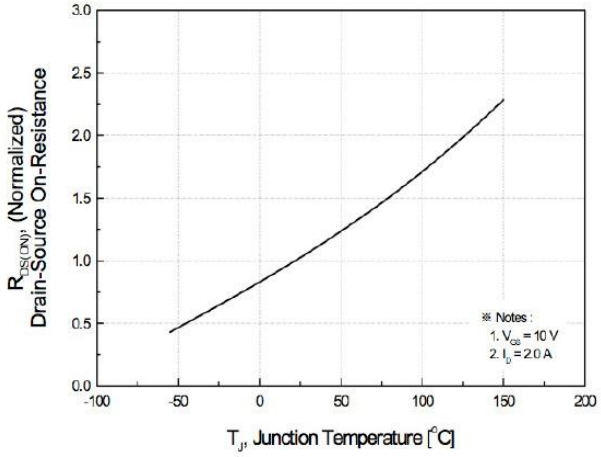

FIG.8-ON-RESISTANCE VARIATION VS TEMPERATURE

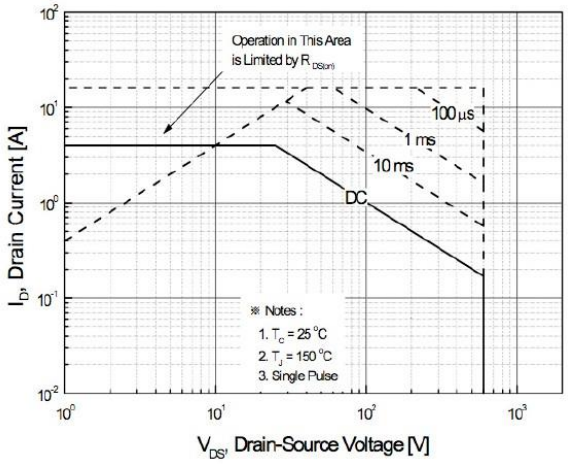

FIG.9-MAXIMUM SAFE OPERATING AREA

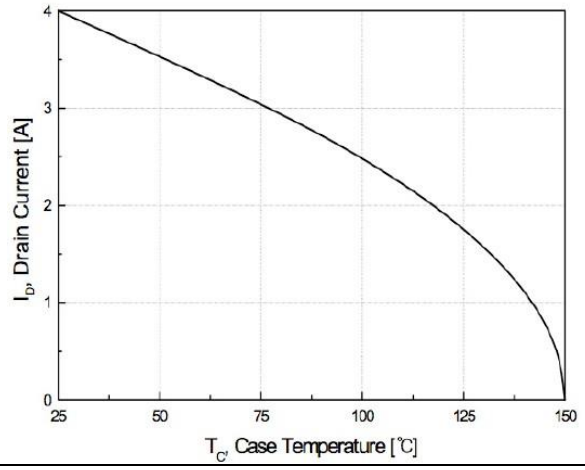

FIG.10-MAXIMUM DRAIN CURRENT VS CASE TEMPERATURE

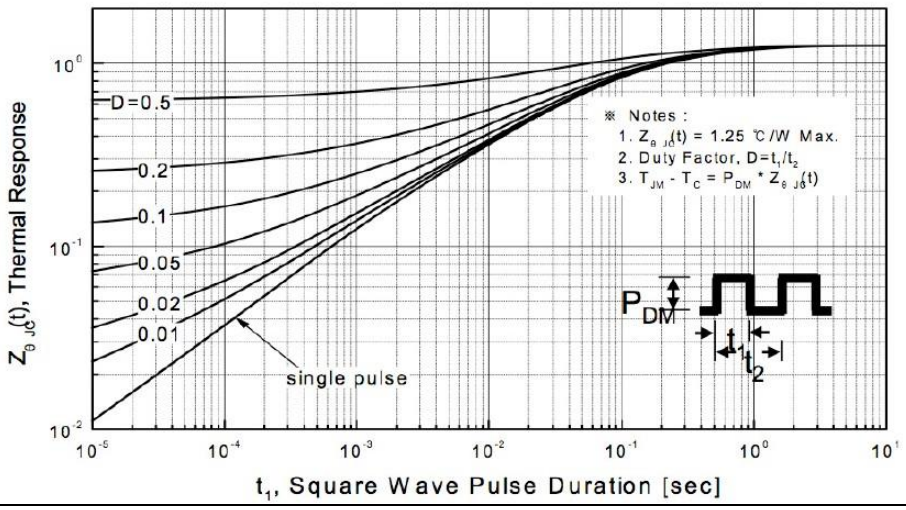

FIG.11-TRANSIENT THERMAL RESPONSE CURVE

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