MSU4N65

650V N-Channel MOSFET

Description

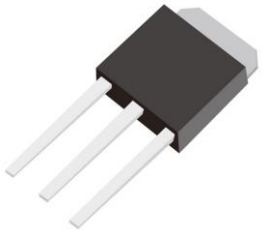
The MSU4N65 is a N-channel enhancement-mode MOSFET , providing the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost effectiveness. The TO-251 package is universally preferred for all commercial-industrial applications

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) : 2.4 Ω (Typ.) @VGS=10V
- RoHS compliant package

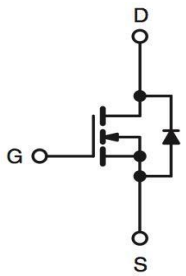
Packing & Order Information

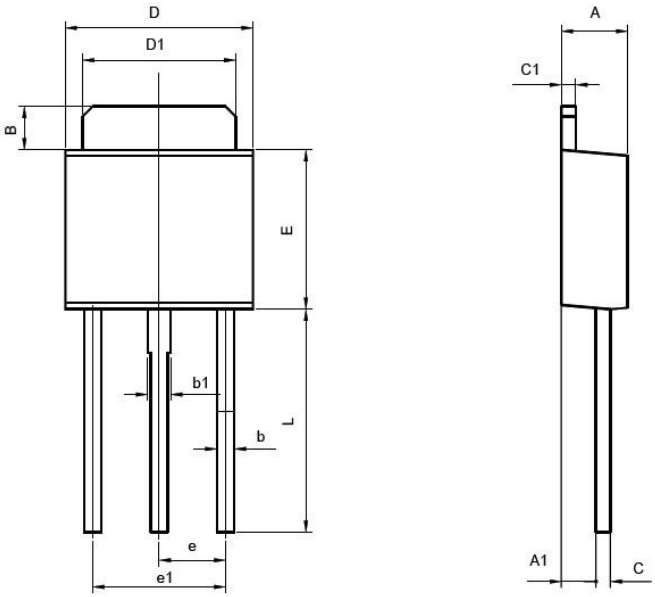
80/Tube ; 4,000/Box



RoHS COMPLIANT

Graphic symbol





	Dimensions in Millimeters		Dimensions in Inches	
Symbol	min	max	min	max
A	2.15	2.45	0.85	0.96
A1	1.00	1.40	0.39	0.55
B	1.25	1.75	0.49	0.69
b	0.45	0.75	0.18	0.3
b1	0.65	0.95	0.26	0.37
C	0.38	0.64	0.15	0.25
C1	0.38	0.64	0.15	0.25
D	6.30	6.70	2.48	2.64
D1	5.10	5.50	2.01	2.17
E	5.30	5.70	2.09	2.24
e	2.3 (typ.)		0.91 (typ.)	
e1	4.4	4.8	1.73	1.89
L	7.4	8.0	2.91	3.15

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MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

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

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-Source Voltage	650	V
V_{GS}	Gate-Source Voltage	±30	V
I_D	Drain Current -Continuous (TC=25°C)	3.6	A
	Drain Current -Continuous (TC=100°C)	2.3	A
I_{DM}	Drain Current Pulsed	14.4	A
E_{AS}	Single Pulsed Avalanche Energy	240	mJ
E_{AR}	Repetitive Avalanche Energy	4.4	mJ
dV/dt	Peak Diode Recovery dV/dt	5.5	V/ns
P_D	Power Dissipation (TC = 25 °C)	55	W
	- Derate above 25°C	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	Max.	Units
$R_{\theta JC}$	Junction-to-Case	2.5	°C/W
$R_{\theta JA}$	Junction-to-Ambient	110	

On 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 = 1.8 A	--	2.4	2.9	Ω

Off Characteristics

Symbol	Test Conditions	Min	Typ.	Max.	Units
BV_{DSS}	V_{GS} = 0 V , I_D=250μA	650	710	--	V
$\Delta BV_{DSS}/\Delta T_J$	I_D = 250μA, Referenced to 25°C	--	0.6	--	V/°C
I_{DSS}	V_{DS} = 650 V , V_{GS} = 0 V V_{DS} = 520 V , V_C = 125°C	--	--	1 10	μA
I_{GSSF}	V_{GS} = 30 V , V_{DS} = 0 V	--	--	100	nA
I_{GSSR}	V_{GS} = -30 V , V_{DS} = 0 V	--	--	-100	nA

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Switching Characteristics					
Symbol	Test Conditions	Min	Typ.	Max.	Units
$t_{d(on)}$	V_{DS} = 325 V, I_D = 3.6 A, R_G = 25 Ω	--	10	20	ns
t_r		--	35	70	ns
$t_{d(off)}$		--	45	90	ns
tf		--	40	80	ns
Q_g	V_{DS} = 520 V, I_D = 3.6 A, V_{GS} = 10 V	--	15	20	nC
Q_{gs}		--	2.8	--	nC
Q_{gd}		--	6.0	--	nC
C_{ISS}	V_{DS} = 25 V, V_{GS} = 0 V, F = 1.0MHz	--	545	710	pF
C_{OSS}		--	60	80	pF
C_{RSS}		--	8	11	pF

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

Notes;

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. I_{AS}=3.6A, V_{DD}=50V, R_G=25W, Starting T_J=25℃
3. I_{SD}≦3.6A, 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

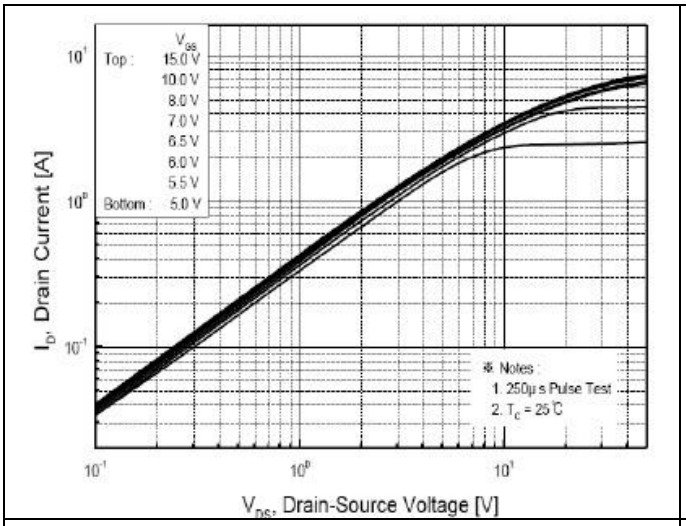

FIG.1-ON REGION CHARACTERISTICS

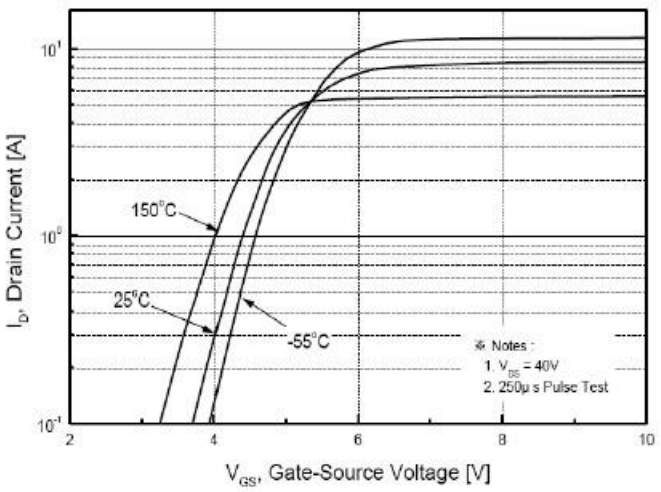

FIG.2-TRANSFER CHARACTERISTICS

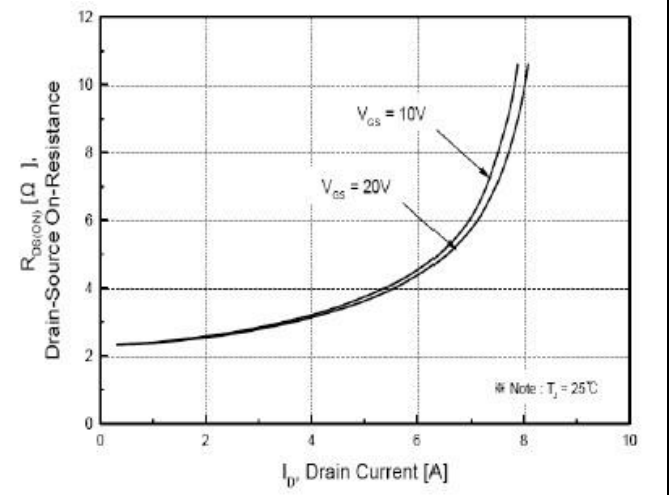

FIG.3-ON RESISTANCE VARIATION VS DRAIN CURRENT AND GATE VOLTAGE

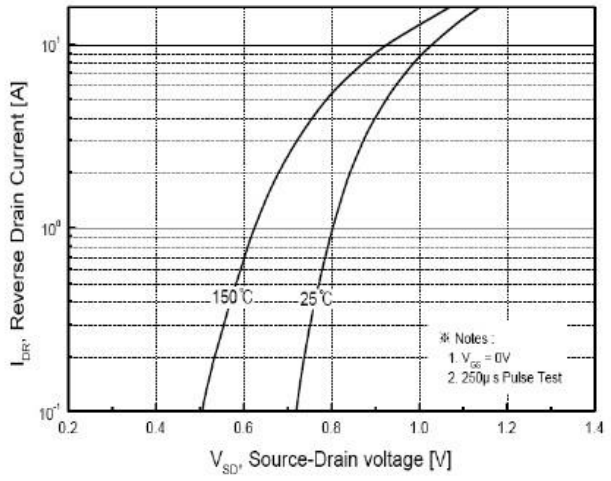

FIG.4-BODY DIODE FORWARD VOLTAGE VARIATION WITH SOURCE CURRENT AND TEMPERATURE

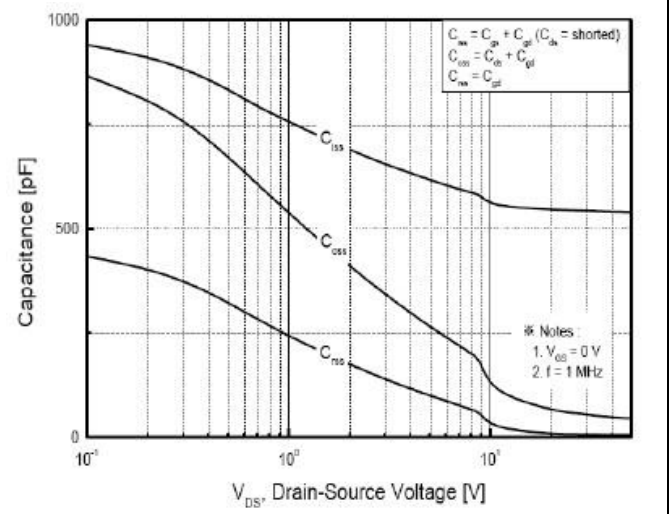

FIG.5-CAPACITANCE CHARACTERISTICS

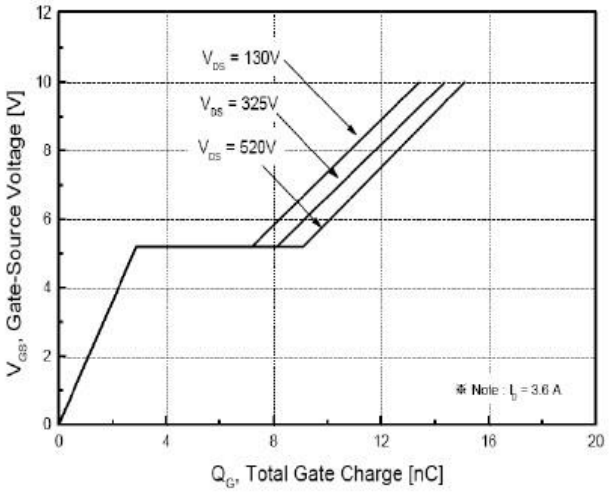

FIG.6-GATE CHARGE CHARACTERISTICS

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■Characteristics Curve

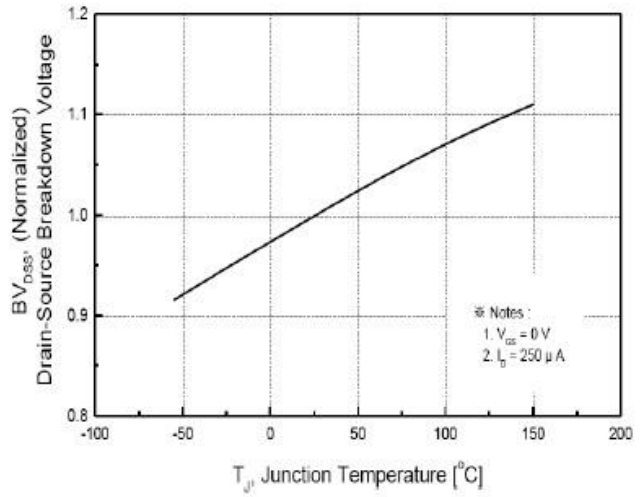

FIG.7-BREAKDOWN VOLTAGE VARIATION VS TEMPERATURE

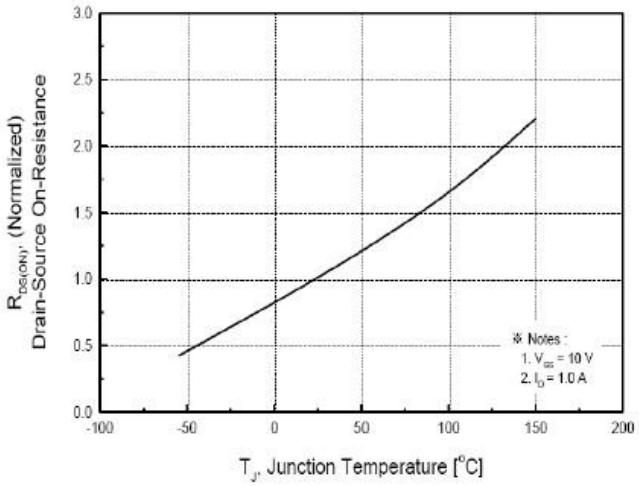

FIG.8-ON-RESISTANCE VARIATION VS TEMPERATURE

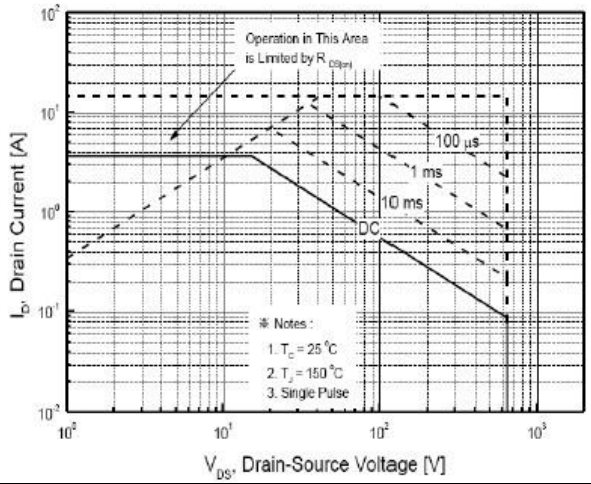

FIG.9-MAXIMUM SAFE OPERATING AREA

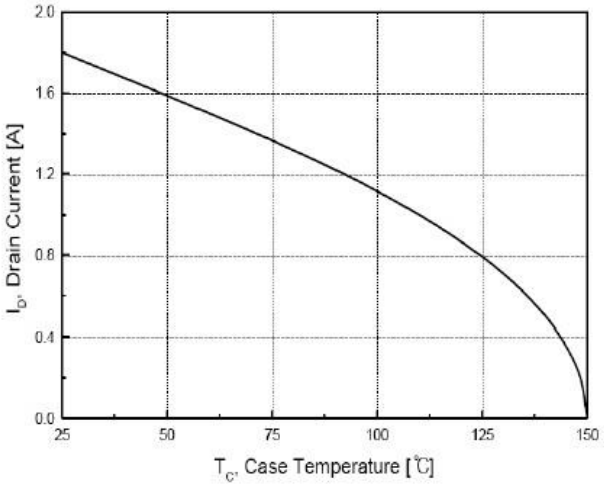

FIG.10-MAXIMUM DRAIN CURRENT VS CASE TEMPERATURE

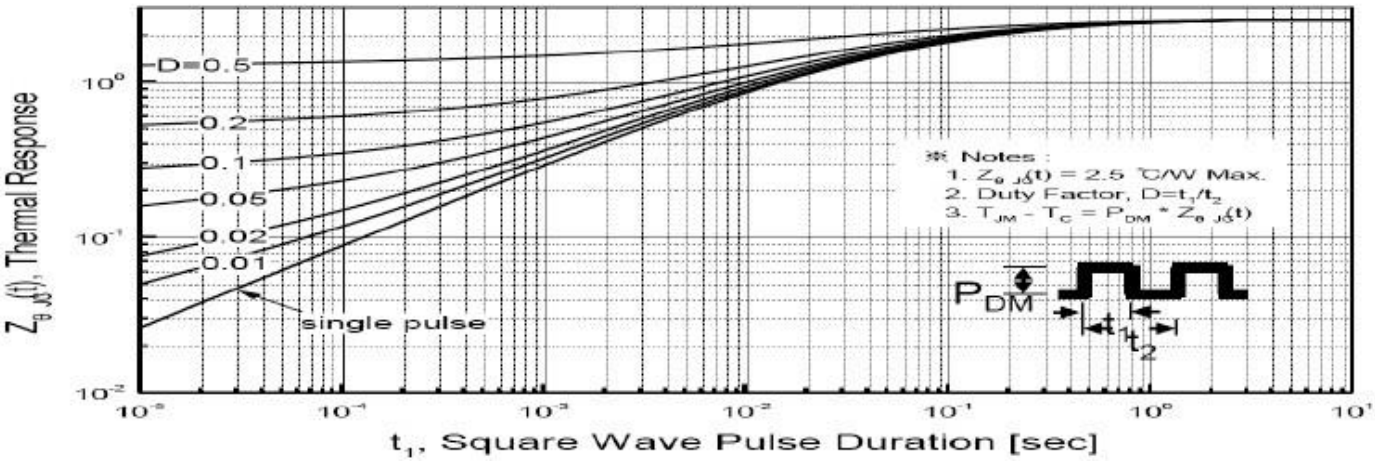

FIG.11-TRANSIENT THERMAL RESPONSE CURVE

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