

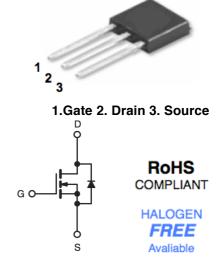
GENERAL DESCRIPTION

TO-251

The MSU6N70 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

- · Low On Resistance
- · Simple Drive Requirement
- · Low Gate Charge
- · Fast Switching Characteristic
- RoHS compliant / Halogen free package available



Symbol	Parameter	Value	Units
V _{DSS}	Drain to Source Voltage	700	V
V _{GS}	Gate to Source Voltage	±30	V
I _D	Continuous Drain Current(@T _C = 25 °C)	6.0	А
	Continuous Drain Current(@T _C = 100 °C)	4.8	А
I _{DM}	Drain Current Pulsed	28	А
E _{AS}	Single Pulsed Avalanche Energy	230	mJ
I _{AR}	Avalanche Current	7.0	А
E _{AR}	Repetitive Avalanche Energy	14.7	mJ
dv/dt	Peak Diode Recovery dv/dt	4.5	V/ns
TL	Maximum Temperature for Soldering @ Lead at 0.125 in(0.318mm)	300	°C
	from case for 10 seconds		
TPKG	Maximum Temperature for Soldering @ Package Body for 10	260	°C
	seconds		
P_{D}	Total Power Dissipation(@T _C = 25 °C)	48	W
	Derating Factor above 25 °C	0.38	W/°C
T _{STG}	Operating Junction Temperature	-55 ~ 150	°C
TJ	Storage Temperature	150	°C

Note:

- 1.Repetitive rating; pulse width limited by maximum junction temperature.
- 2. IAS≤6A, VDD=50V, L=7mH, VG=10V, starting TJ=+25°C.
- 3. ISD≤6A, dI/dt≤200A/µs, VDD≤BVDSS, starting TJ=+25°C.



Brückewell MSU6N70 700V N-Channel MOSFET

Thermal Characteristics

Symbol	Parameter	Value		Units	
		Min.	Тур.	Max.	
$R_{ heta JC}$	Thermal Resistance, Junction-to-Case	-	-	2.6	°C/W
$R_{ heta JA}$	Thermal Resistance, Junction-to-Ambient	-	-	62.5	°C/W

Electrical Characteristics ($T_C = 25$ °C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Тур	Max	Units	
Static Chara	cteristics						
BV_{DSS}	Drain-Source Breakdown	$V_{GS} = 0 V,$	700	-	-	V	
	Voltage	I _D = 250 uA					
ΔBV_{DSS} /	Breakdown Voltage Temperature	I _D = 250 uA, referenced to 25	-	0.70	-	V/°C	
ΔT_{J}	coefficient	°C					
$V_{\text{GS(th)}}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$	2.0	-	4.0	V	
		I _D = 250 uA					
I _{DSS}	Drain-Source Leakage Current	V _{DS} = 700 V,	-	-	1	uA	
		$V_{GS} = 0 V$					
		V _{DS} = 560 V,	-	-	10	uA	
		T _C = 125 °C					
I _{GSS}	Gate-Source Leakage, Forward	VGS=±30	-	-	±100	nA	
R _{DS(ON)}	Static Drain-Source On-state	V _{GS} = 10 V,	-	1.2	1.5	Ω	
	Resistance	I _D = 3.0 A					
Dynamic Ch	aracteristics						
Q_g	Total Gate Charge	ID. 6A	-	29	-		
Q_gs	Gate-Source Charge	ID=6A,	-	4.7	-	nC	
Q_{gd}	Gate-Drain Charge (Miller	VDD=560V, VGS=10V	-	12.5	-		
	Charge)	VG3=10V					
t _{d(on)}	Turn-on Delay Time	ID=6A,	-	20	-		
t _r	Rise Time	VDD=350V,	-	50	-]	
$t_{d(off)}$	Turn-off Delay Time	VGS=10V	-	80	-	ns	
t _f	Fall Time	RG=10Ω	-	70	-		
C _{iss}	Input Capacitance		-	1482	-		
C _{oss}	Output Capacitance	VGS=0V, VDS=25V, f=1MHz	-	121.7	-	pF	
C _{rss}	Reverse Transfer Capacitance		-	14	-	1	



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Symbol	Parameter	Test Conditions	Min	Тур	Max	Units	
Source-Drain Diode							
VSD		IS=6.0A, VGS=0V	-	-	1.4	V	
IS		VD=VG=0,	-	-	7.0	А	
ISM		VS=1.3V	-	-	28	А	
trr		VCC 0 IF 74 dl/dt 1004/vc	-	350	-	ns	
Qrr		VGS=0, IF=7A, dl/dt=100A/us	-	3.3	-	uC	

*Pulse Test : Pulse Width ≤300µs, Duty Cycle≤2%

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· Characteristic Curves

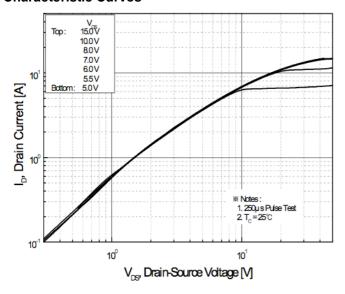


Figure 1. On Region Characteristics

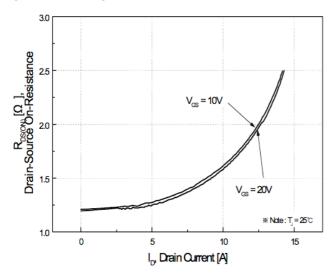


Figure 3. On Resistance Variation vs Drain Current and Gate Voltage

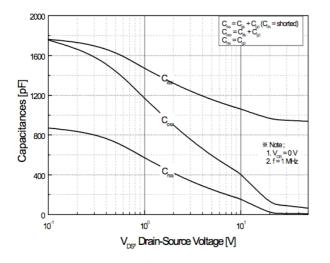


Figure 5. Capacitance Characteristics

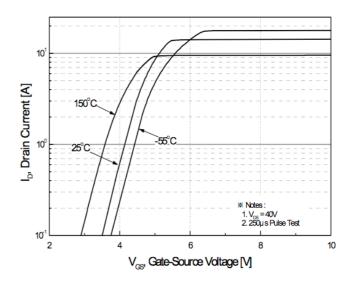


Figure 2. Transfer Characteristics

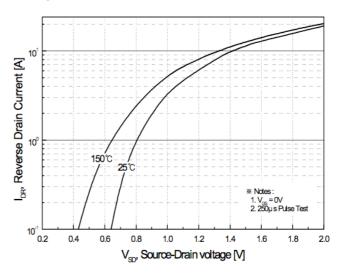


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

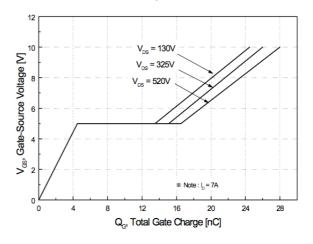
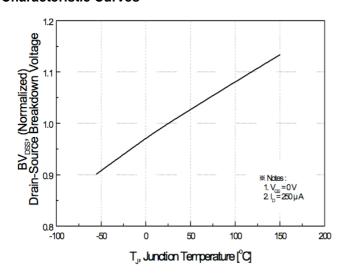


Figure 6. Gate Charge Characteristics

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· Characteristic Curves



3.0 (Normalized Control of the cont

Figure 7. Breakdown Voltage Variation vs. Temperature

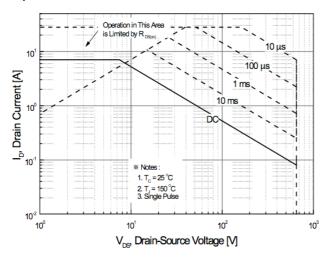


Figure 8. On-Resistance Variation vs. Temperature

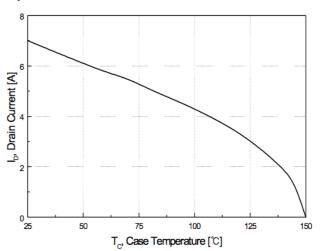


Figure 9. Maximum Safe Operating Area

Figure 10. Maximum Drain Current vs. Case Temperature

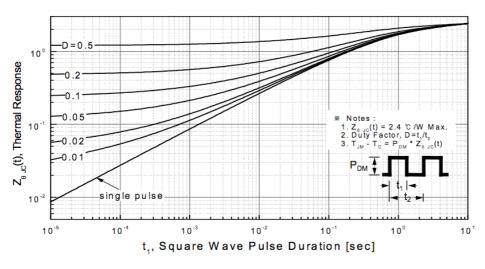


Figure 11. Transient Thermal Response Curve



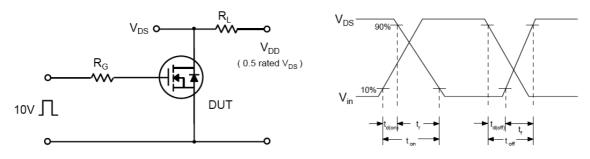


Fig 12. Resistive Switching Test Circuit & Waveforms

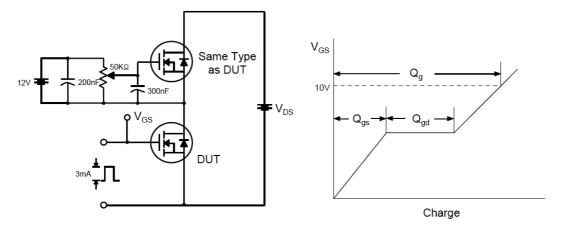


Fig 13. Gate Charge Test Circuit & Waveform

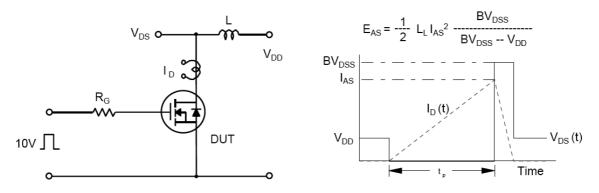


Fig 14. Unclamped Inductive Switching Test Circuit & Waveforms



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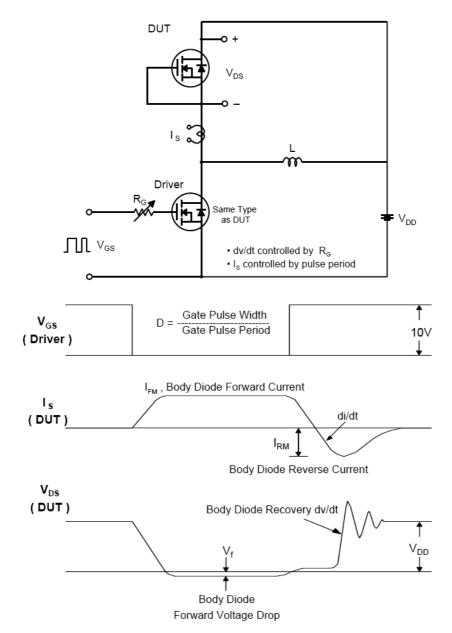
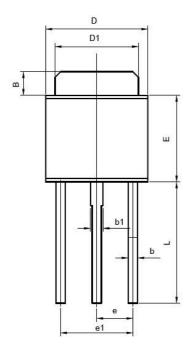


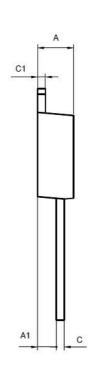
Fig 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms



Package Dimensions

Dimensions in Millimeters





	Dimensions	in Millimeters	Dimensions in Inches		
Symbol	min	max	min	max	
Α	2.15	2.45	0.85	0.96	
A1	1.00	1.40	0.39	0.55	
В	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	
С	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	
Е	5.30	5.70	2.09	2.24	
е	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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