

## GJ03N70

### N-CHANNEL ENHANCEMENT MODE POWER MOSFET

BV <sub>DSS</sub>	600V
R <sub>DS(ON)</sub>	4.0Ω
I <sub>D</sub>	3.3A

### Description

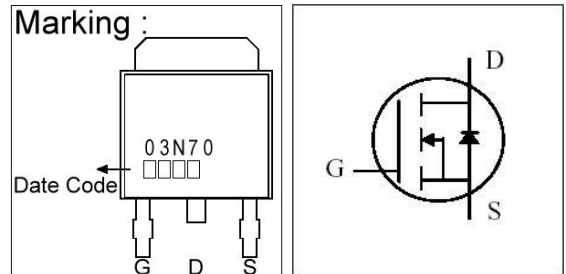
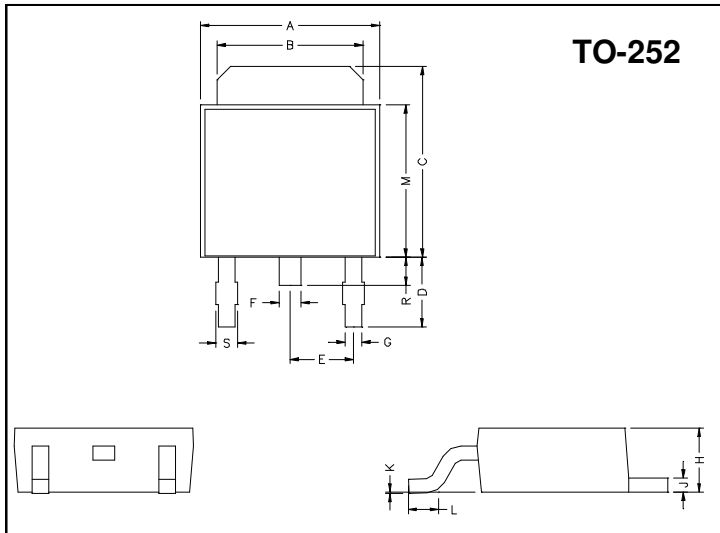
The GJ03N70 is specially designed as main switching devices for universal 90~265VAC off-line AC/DC converter applications.

The TO-252 package is universally preferred for all commercial-industrial surface mount applications and suited for AC/DC converters.

### Features

- \*Dynamic dv/dt Rating
- \*Simple Drive Requirement
- \*Repetitive Avalanche Rated
- \*Fast Switching Speed

### Package Dimensions



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	6.40	6.80	G	0.50	0.70
B	5.20	5.50	H	2.20	2.40
C	6.80	7.20	J	0.45	0.55
D	2.40	3.00	K	0	0.15
E	2.30 REF.		L	0.90	1.50
F	0.70	0.90	M	5.40	5.80
S	0.60	0.90	R	0.80	1.20

### Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	V <sub>DS</sub>	600	V
Gate-Source Voltage	V <sub>GS</sub>	±30	V
Continuous Drain Current, V <sub>GS</sub> @10V	I <sub>D</sub> @T <sub>C</sub> =25°C	3.3	A
Continuous Drain Current, V <sub>GS</sub> @10V	I <sub>D</sub> @T <sub>C</sub> =100°C	2.1	A
Pulsed Drain Current <sup>1</sup>	I <sub>DM</sub>	13.2	A
Total Power Dissipation	P <sub>D</sub> @T <sub>C</sub> =25°C	45	W
Linear Derating Factor		0.36	W/°C
Single Pulse Avalanche Energy <sup>2</sup>	E <sub>AS</sub>	85	mJ
Avalanche Current	I <sub>AR</sub>	3.3	A
Repetitive Avalanche Energy	E <sub>AR</sub>	3.3	mJ
Operating Junction and Storage Temperature Range	T <sub>j</sub> , T <sub>stg</sub>	-55 ~ +150	°C

### Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance Junction-case Max.	R <sub>thj-c</sub>	2.8	°C/W
Thermal Resistance Junction-ambient Max.	R <sub>thj-a</sub>	110	°C/W

**Electrical Characteristics (T<sub>j</sub> = 25°C unless otherwise specified)**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	600	-	-	V	V <sub>GS</sub> =0, I <sub>D</sub> =250uA
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS} / \Delta T_j$	-	0.6	-	V/°C	Reference to 25°C, I <sub>D</sub> =1mA
Gate Threshold Voltage	V <sub>GS(th)</sub>	2.0	-	4.0	V	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA
Forward Transconductance	g <sub>fs</sub>	-	2.0	-	S	V <sub>DS</sub> =10V, I <sub>D</sub> =1.6A
Gate-Source Leakage Current	I <sub>GSS</sub>	-	-	±1	uA	V <sub>GS</sub> = ±30V
Drain-Source Leakage Current(T <sub>j</sub> =25°C)	I <sub>DSS</sub>	-	-	100	uA	V <sub>DS</sub> =600V, V <sub>GS</sub> =0
Drain-Source Leakage Current(T <sub>j</sub> =150°C)		-	-	500	uA	V <sub>DS</sub> =480V, V <sub>GS</sub> =0
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	-	-	4.0	Ω	V <sub>GS</sub> =10V, I <sub>D</sub> =1.6A
Total Gate Charge <sup>3</sup>	Q <sub>g</sub>	-	11.4	-	nC	I <sub>D</sub> =3.3A V <sub>DS</sub> =480V V <sub>GS</sub> =10V
Gate-Source Charge	Q <sub>gs</sub>	-	3.1	-		
Gate-Drain ("Miller") Change	Q <sub>gd</sub>	-	4.2	-		
Turn-on Delay Time <sup>3</sup>	T <sub>d(on)</sub>	-	8.4	-	ns	V <sub>DD</sub> =300V I <sub>D</sub> =3.3A V <sub>GS</sub> =10V R <sub>G</sub> =10Ω R <sub>D</sub> =91Ω
Rise Time	T <sub>r</sub>	-	6	-		
Turn-off Delay Time	T <sub>d(off)</sub>	-	17.7	-		
Fall Time	T <sub>f</sub>	-	5.9	-		
Input Capacitance	C <sub>iss</sub>	-	600	-	pF	V <sub>GS</sub> =0V V <sub>DS</sub> =25V f=1.0MHz
Output Capacitance	C <sub>oss</sub>	-	45	-		
Reverse Transfer Capacitance	C <sub>rss</sub>	-	4	-		

**Source-Drain Diode**

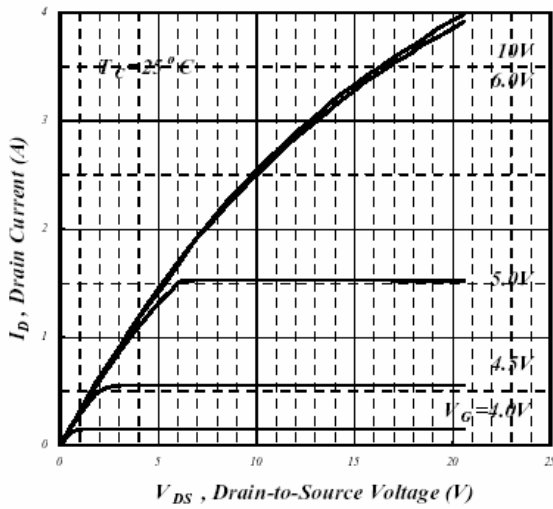
Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Forward On Voltage <sup>3</sup>	V <sub>SD</sub>	-	-	1.5	V	I <sub>S</sub> =3.3A, V <sub>GS</sub> =0V, T <sub>j</sub> =25°C
Continuous Source Current (Body Diode)	I <sub>S</sub>	-	-	3.3	A	V <sub>D</sub> = V <sub>G</sub> =0V, V <sub>S</sub> =1.5V
Pulsed Source Current (Body Diode) <sup>1</sup>	I <sub>SM</sub>	-	-	13.2	A	

Notes: 1. Pulse width limited by safe operating area.

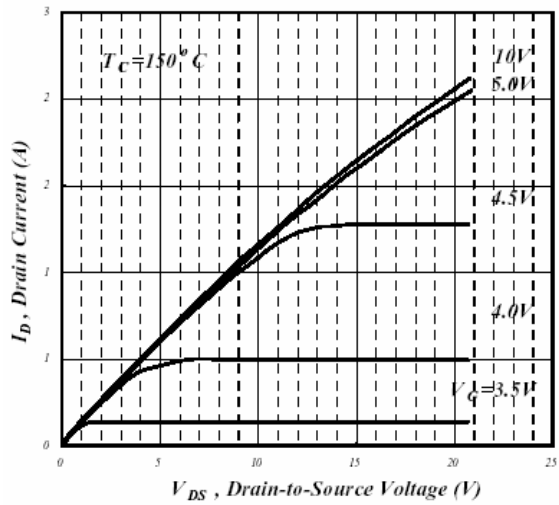
2. Staring T<sub>j</sub>=25°C, V<sub>DD</sub>=50V, L=15mH, R<sub>G</sub>=25Ω, I<sub>AS</sub>=3.3A.

3. Pulse width ≤ 300us, duty cycle ≤ 2%.

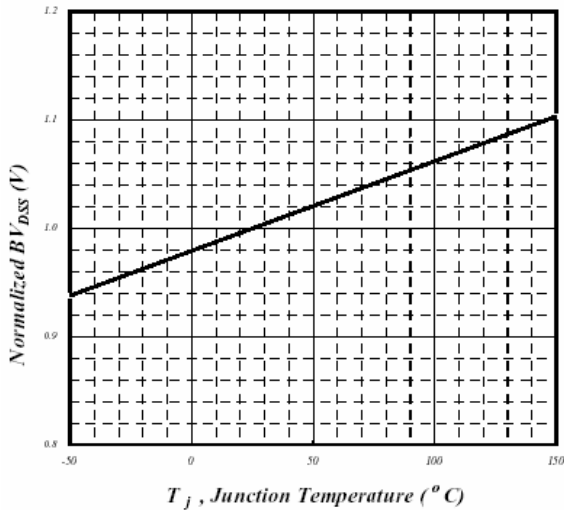
**Characteristics Curve**



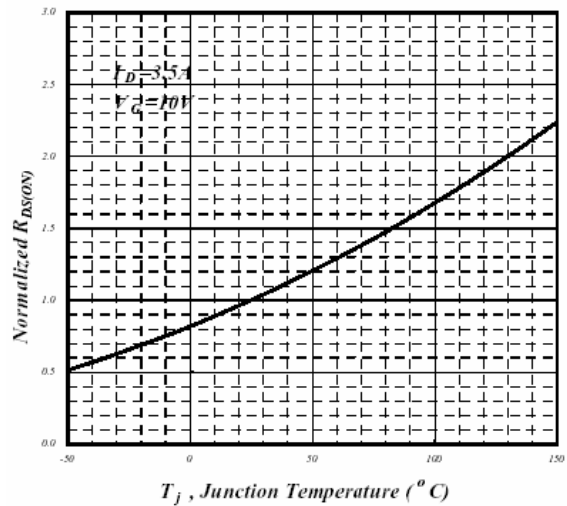
**Fig 1. Typical Output Characteristics**



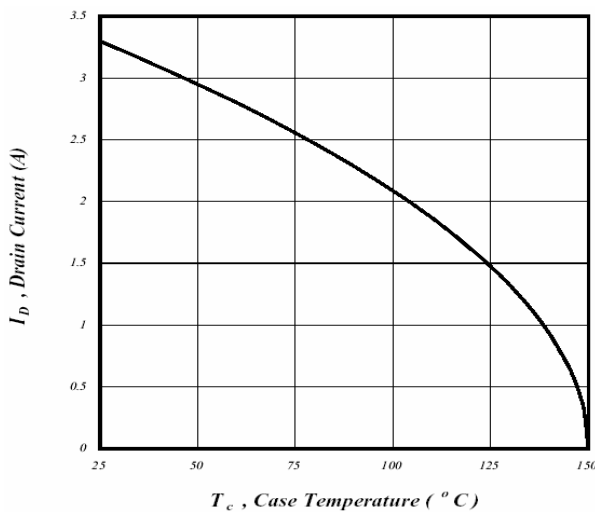
**Fig 2. Typical Output Characteristics**



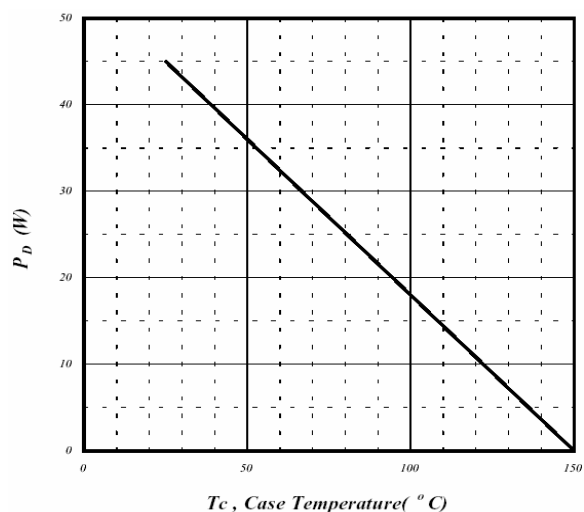
**Fig 3. Normalized BV<sub>DSS</sub> v.s. Junction Temperature**



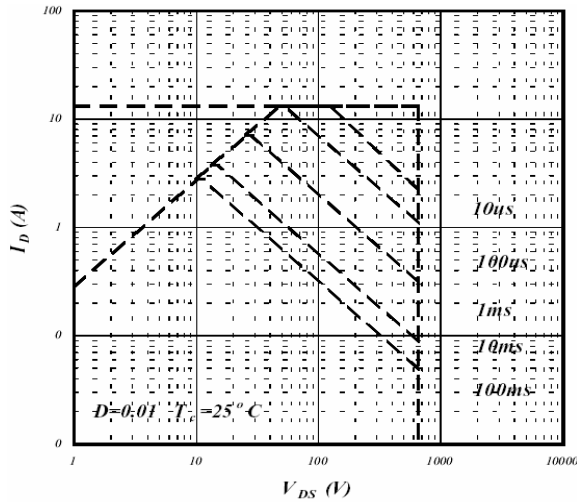
**Fig 4. Normalized On-Resistance v.s. Junction Temperature**



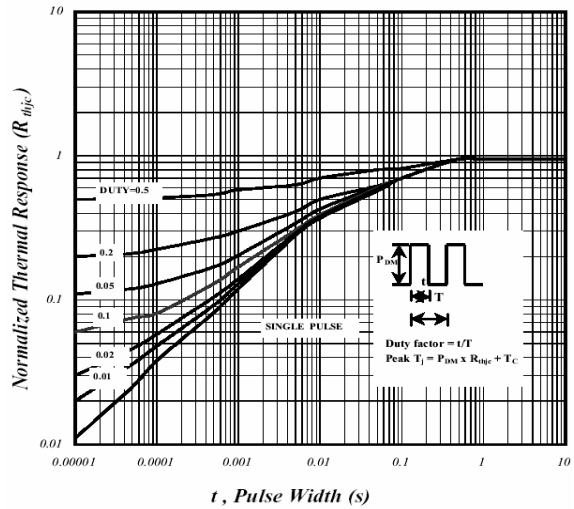
**Fig 5. Maximum Drain Current v.s. Case Temperature**



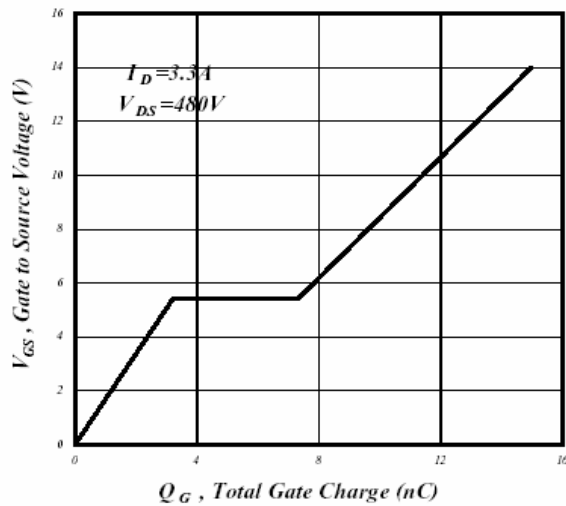
**Fig 6. Type Power Dissipation**



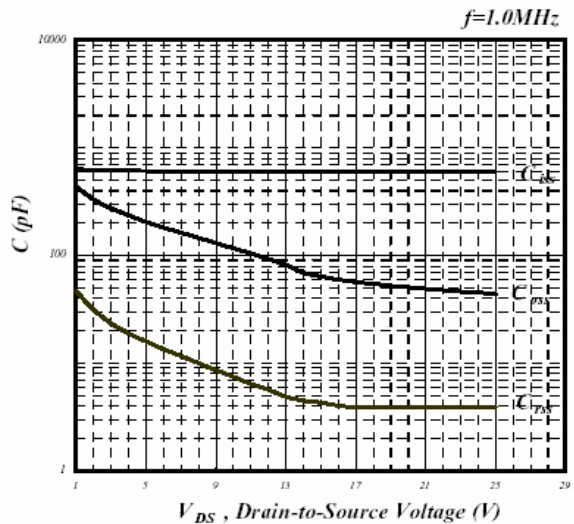
**Fig 7. Maximum Safe Operating Area**



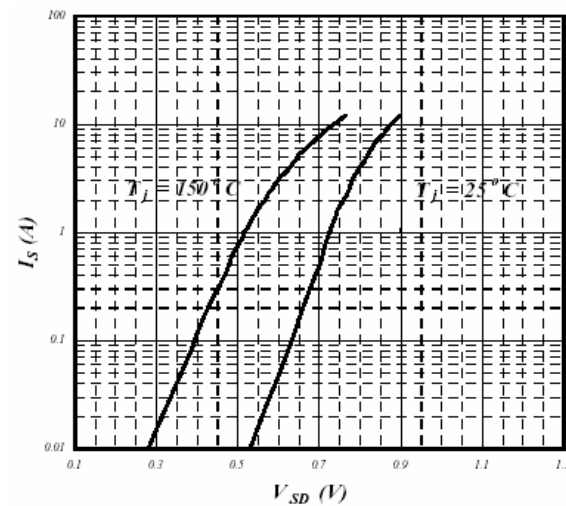
**Fig 8. Effective Transient Thermal Impedance**



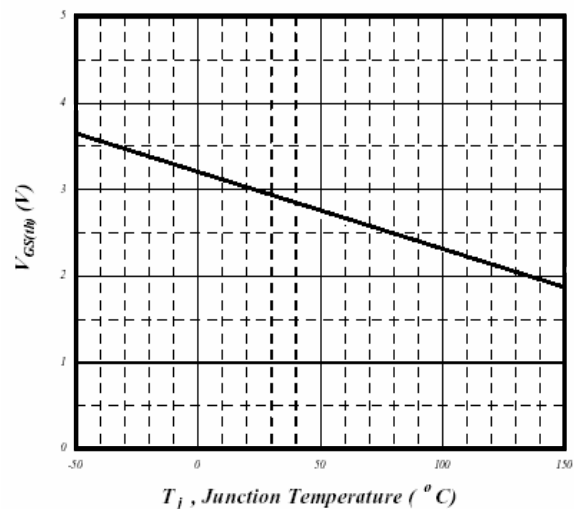
**Fig 9. Gate Charge Characteristics**



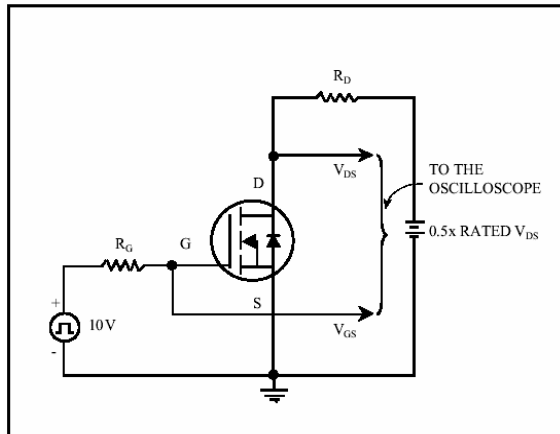
**Fig 10. Typical Capacitance Characteristics**



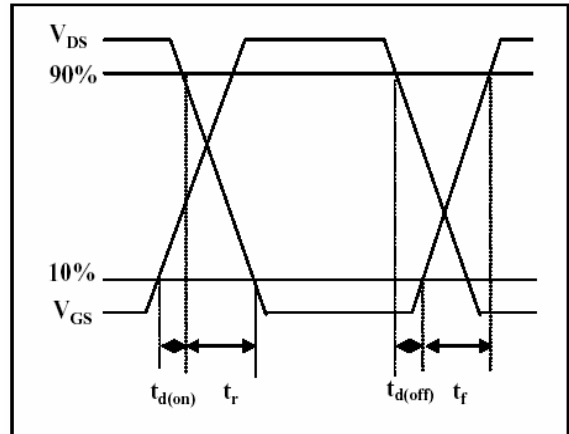
**Fig 11. Forward Characteristics of Reverse Diode**



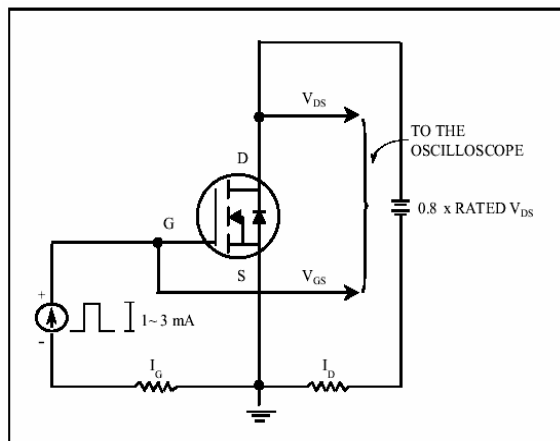
**Fig 12. Gate Threshold Voltage v.s. Junction Temperature**



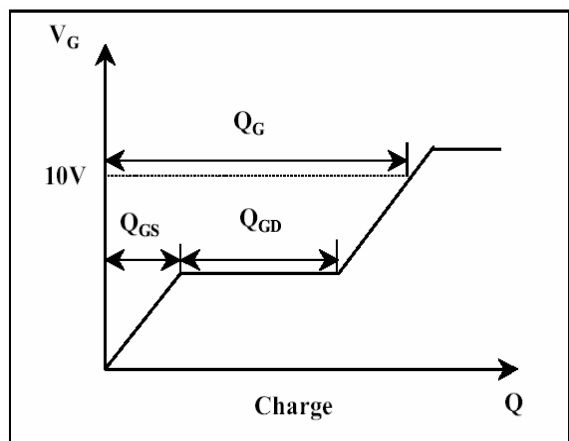
**Fig 13. Switching Time Circuit**



**Fig 14. Switching Time Waveform**



**Fig 15. Gate Charge Circuit**



**Fig 16. Gate Charge Waveform**

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