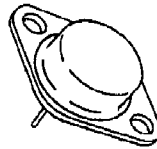


**2N6769/2N6770**  
**N-Channel Power MOSFETs,**  
**12 A, 450 V/500 V**

**Description**

These devices are n-channel, enhancement mode, power MOSFETs designed especially for high voltage, high speed applications, such as off-line switching power supplies, UPS, AC and DC motor controls, relay and solenoid drivers.

TO-204AA



- $V_{GS}$  Rated at  $\pm 20$  V
- Silicon Gate for Fast Switching Speeds
- $I_{DSS}$ ,  $V_{DS(on)}$ , SOA and  $V_{GS(th)}$  Specified at Elevated Temperature
- Rugged

2N6769  
 2N6770

**Maximum Ratings**

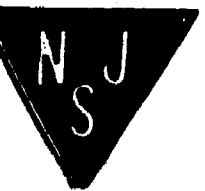
Symbol	Characteristic	Rating 2N6770	Rating 2N6769	Unit
$V_{DSS}$	Drain to Source Voltage	500	450	V
$V_{DGR}$	Drain to Gate Voltage $R_{GS} = 1.0 \text{ M}\Omega$	500	450	V
$V_{GS}$	Gate to Source Voltage	$\pm 20$	$\pm 20$	V
$T_J, T_{stg}$	Operating Junction and Storage Temperatures	-55 to +150	-55 to +150	$^{\circ}\text{C}$
$T_L$	Maximum Lead Temperature for Soldering Purposes, 1/16" From Case for 10 s	300	300	$^{\circ}\text{C}$

**Maximum On-State Characteristics**

$R_{DS(on)}$	Static Drain-to-Source On Resistance	0.4	0.5	$\Omega$
$I_D$	Drain Current Continuous at $T_C = 25^{\circ}\text{C}$ Continuous at $T_C = 100^{\circ}\text{C}$	12 4.75	11 7.0	A
$I_{DM}$	Pulsed	$25^2$	$20^2$	

**Maximum Thermal Characteristics**

$R_{\theta JC}$	Thermal Resistance, Junction to Case	0.83	0.83	$^{\circ}\text{C/W}$
$P_D$	Total Power Dissipation at $T_C = 25^{\circ}\text{C}$ at $T_C = 100^{\circ}\text{C}$	150 60	150 60	W
	Linear Derating Factor	1.2	1.2	W/ $^{\circ}\text{C}$



## 2N6769/2N6770

### Electrical Characteristics (T<sub>C</sub> = 25°C unless otherwise noted)

Symbol	Characteristic	Min	Max	Unit	Test Conditions
<b>Off Characteristics</b>					
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage <sup>1</sup> 2N6770 2N6769			V	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 4 mA
		500 <sup>2</sup>			
		450 <sup>2</sup>			
I <sub>DSS</sub>	Zero Gate Voltage Drain Current		1	mA	V <sub>DS</sub> = Rated V <sub>DSS</sub> , V <sub>GS</sub> = 0 V V <sub>DS</sub> = Rated V <sub>DSS</sub> , V <sub>GS</sub> = 0 V, T <sub>C</sub> = 125°C
			4		
I <sub>GSS</sub>	Gate-Body Leakage Current		± 100	nA	V <sub>GS</sub> = ± 20 V, V <sub>DS</sub> = 0 V
<b>On Characteristics</b>					
V <sub>GS(th)</sub>	Gate Threshold Voltage	2.0	4.0	V	I <sub>D</sub> = 1 mA, V <sub>DS</sub> = V <sub>GS</sub>
R <sub>DS(on)</sub>	Static Drain-Source On-Resistance <sup>1</sup> 2N6770 2N6769 2N6770 2N6769			Ω	V <sub>GS</sub> = 10 V I <sub>D</sub> = 7.75 A I <sub>D</sub> = 7.0 A I <sub>D</sub> = 7.75 A, T <sub>C</sub> = 125°C I <sub>D</sub> = 7.0 A, T <sub>C</sub> = 125°C
			0.4		
			0.5		
			0.88		
			1.10		
V <sub>DS(on)</sub>	Drain-Source On-Voltage <sup>1</sup> 2N6770 2N6769		6.0	V	V <sub>GS</sub> = 10 V I <sub>D</sub> = 12 A I <sub>D</sub> = 11 A
			6.0		
g <sub>fs</sub>	Forward Transconductance	8.0	24	S (Ω)	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 7.75 A
<b>Dynamic Characteristics</b>					
C <sub>iss</sub>	Input Capacitance	1000	3000	pF	V <sub>DS</sub> = 25 V, V <sub>GS</sub> = 0 V f = 1.0 MHz
C <sub>dss</sub>	Output Capacitance	200	600	pF	
C <sub>rss</sub>	Reverse Transfer Capacitance	50	200	pF	
<b>Switching Characteristics (T<sub>C</sub> = 25°C, Figures 9, 10)</b>					
t <sub>d(on)</sub>	Turn-On Delay Time		35	ns	V <sub>DD</sub> = 210 V, I <sub>D</sub> = 7.75 A V <sub>GS</sub> = 10 V, R <sub>GEN</sub> = 4.7 Ω R <sub>GS</sub> = 4.7 Ω
t <sub>r</sub>	Rise Time		60	ns	
t <sub>d(off)</sub>	Turn-Off Delay Time		150	ns	
t <sub>f</sub>	Fall Time		70	ns	
Q <sub>g</sub>	Total Gate Charge		120 <sup>2</sup>	nC	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 16 A V <sub>DD</sub> = 400 V

### Electrical Characteristics (Cont.) (T<sub>C</sub> = 25°C unless otherwise noted)

Symbol	Characteristic	Min	Typ	Max	Unit	Test Conditions
<b>Source-Drain Diode Characteristics</b>						
I <sub>S</sub>	Continuous Source Current 2N6770 2N6769			12 <sup>2</sup> 11 <sup>2</sup>	A	
I <sub>SM</sub>	Pulsed Source Current 2N6770 2N6769			25 <sup>2</sup> 20 <sup>2</sup>	A	
V <sub>SD</sub>	Diode Forward Voltage 2N6770 2N6769	0.80		1.6	V	V <sub>GS</sub> = 0 V I <sub>S</sub> = 12 A
		0.75		1.5		I <sub>S</sub> = 11 A
t <sub>rr</sub>	Reverse Recovery Time		1300 <sup>2</sup>		ns	V <sub>GS</sub> = 0 V, T <sub>J</sub> = 150°C I <sub>F</sub> = I <sub>SM</sub> , dI <sub>F</sub> /dt = 100 A/μs
Q <sub>RR</sub>	Reverse Recovery Charge		7.4 <sup>2</sup>		μC	V <sub>GS</sub> = 0 V, T <sub>J</sub> = 150°C I <sub>F</sub> = I <sub>SM</sub> , dI <sub>F</sub> /dt = 100 A/μs