Dual N-Channel Power MOSFET

● FEATURES

$R_{DS(ON)}$ ≦16m @V_{GS}=10V

$R_{DS(ON)}$ ≦20m @V_{GS}=4.5V

Super high density cell design for extremely low $R_{DS(ON)}$

Exceptional on-resistance and maximum DC current capability

● APPLICATIONS

Power Management in Note book

Portable Equipment

Battery Powered System

DC/DC Converter

Load Switch

DSC

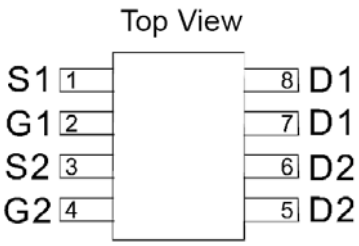
LCD Display inverter

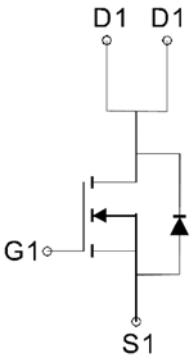
● GENERAL DESCRIPTION

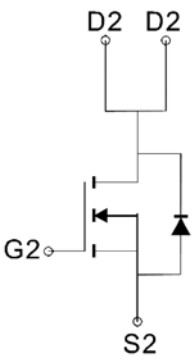
The FS4970 is the Dual N-Channel logic enhancement mode power field effect transistors are produced using high cell density, DMOS trench technology. This high density process is especially tailored to minimize on-state resistance. These devices are particularly suited for low voltage application such as cellular phone and notebook computer power management and other battery powered circuits where high-side switching and low in-line power loss are needed in a very small outline surface mount package.

● PIN CONFIGURATION

(SOP8)







● **Absolute Maximum Ratings** (T_A=25°C unless otherwise noted)

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_A=25°C	I_D	10	A
	T_A=70°C		8.5	
Pulsed Drain Current [C]		I_{DM}	32	
Power Dissipation [B]	T_A=25°C	P_D	2	W
	T_A=70°C		1.5	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	℃

Electrical Characteristics (T_A=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	I_D=250uA, V_{GS}=0V	30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=24V, V_{GS}=0V			1	uA
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}=±20V			± 0.1	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=$V_{GS,}$ I_D=250uA	1	1.4	2	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=10A		13	16	mΩ
		V_{GS}=4.5V, I_D=8A		16.5	20	
V_{SD}	Diode Forward Voltage	I_S=2.3A,V_{GS}=0V		0.8	1.2	V
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=10V, f=1MHz		680		pF
C_{oss}	Output Capacitance			120		
C_{rss}	Reverse Transfer Capacitance			32		
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz		1		Ω
SWITCHING PARAMETERS						
Q_g	Total Gate Charge	V_{GS}=4.5V, V_{DS}=10V, I_D=8.2A		9.5		
Q_{gs}	Gate Source Charge			3.8		
Q_{gd}	Gate Drain Charge			3.2		
$t_{D(on)}$	Turn-On DelayTime	V_{DD}=15V, R_L =15Ω I_D=1A, V_{GEN}=10V R_G=6Ω		12		ns
t_r	Turn-On Rise Time			9		
$t_{D(off)}$	Turn-Off DelayTime			42		
t_f	Turn-Off Fall Time			5		

A. The value of $R_{\theta JA}$ is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A =25°C. The value in any given application depends on the user's specific board design.

B. The power dissipation P_D is based on $T_{J(MAX)}$=150°C, using≤10s junction-to-ambient thermal resistance.

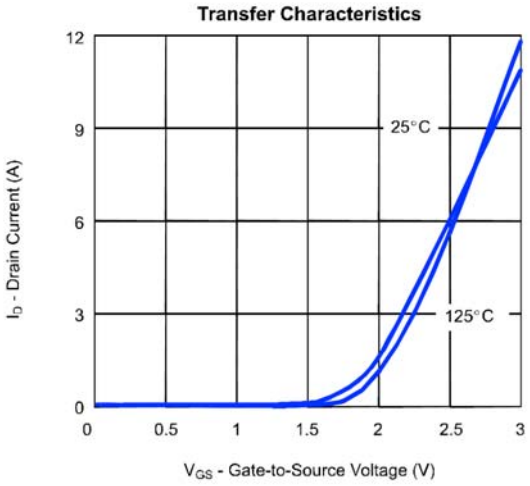
C. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C. Ratings are based on low frequency and duty cycles to keep initialT_J=25°C.

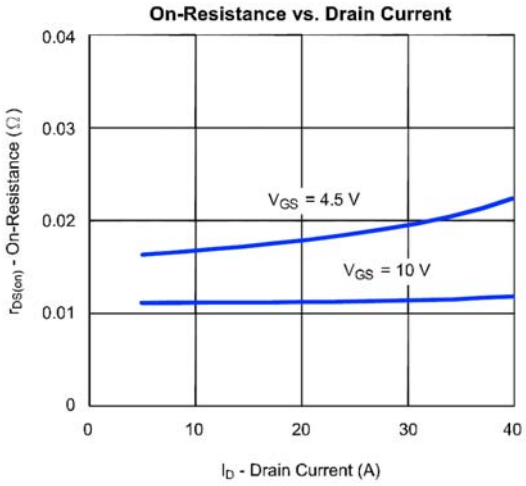
D. The $R_{\theta JA}$ is the sum of the thermal impedence from junction to lead $R_{\theta JL}$ and lead to ambient.

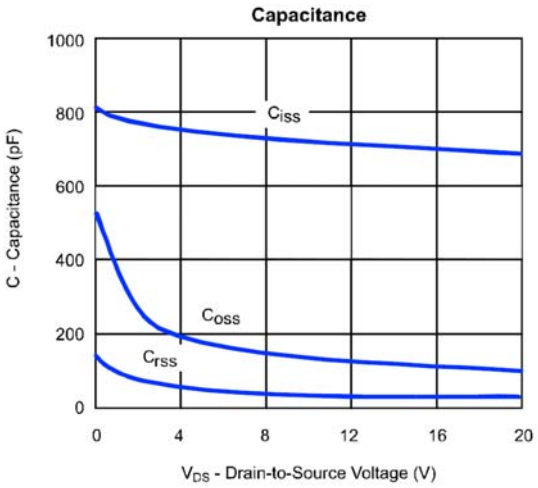
E. The static characteristics in Figures 1 to 6 are obtained using <300us pulses, duty cycle 0.5% max.

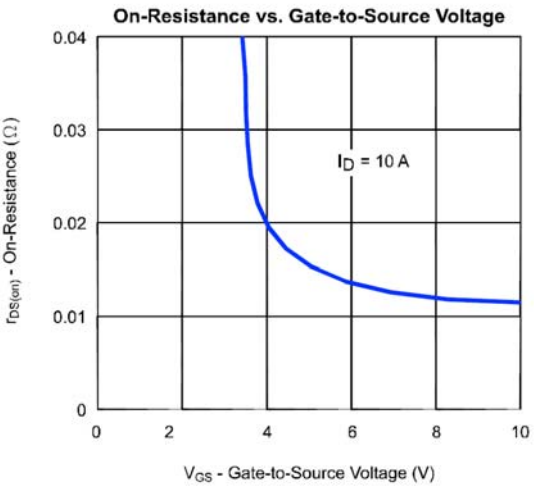
F. These curves are based on the junction-to-ambient thermal impedence which is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, assuming a maximum junction temperature of $T_{J(MAX)}$=150°C. The SOA curve provides a single pulse rating.

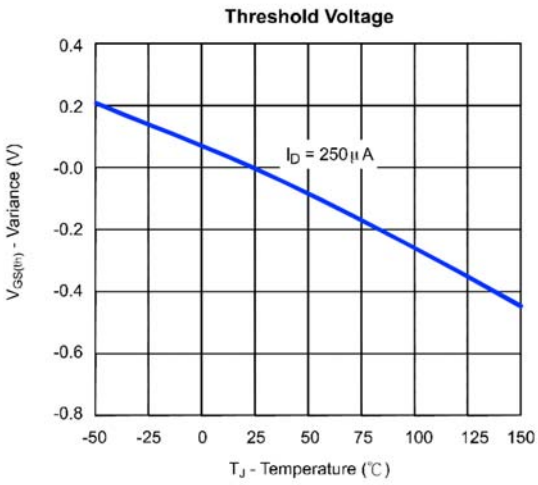
- **TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**

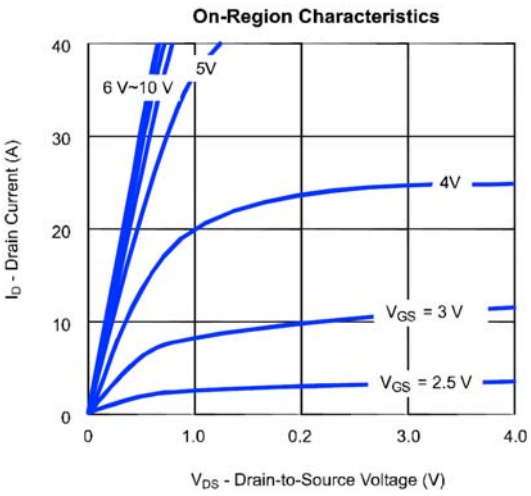






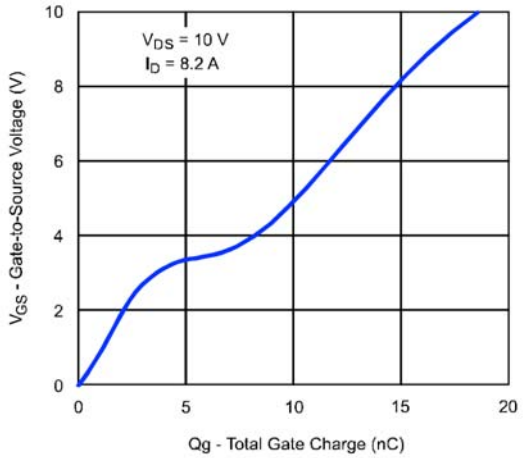




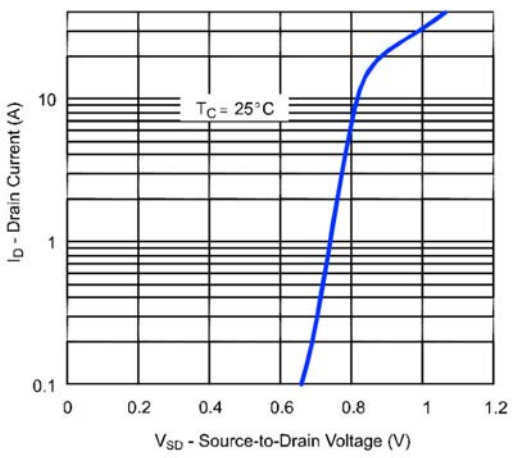


TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

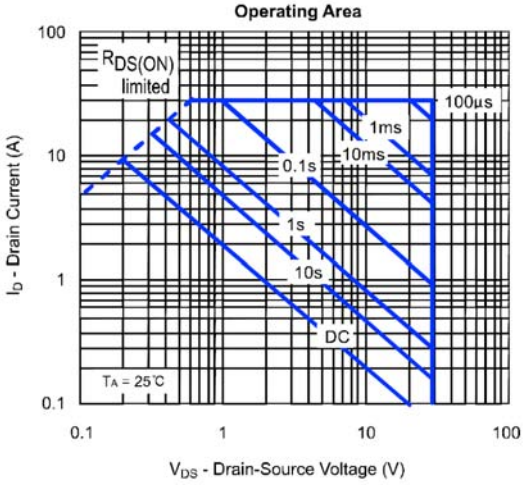
Gate Charge



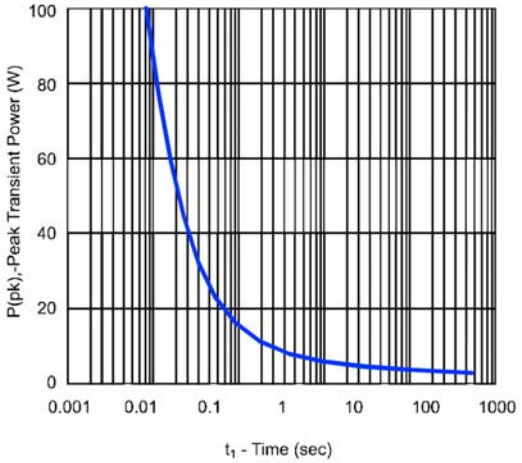
On-Resistance vs. Drain Current



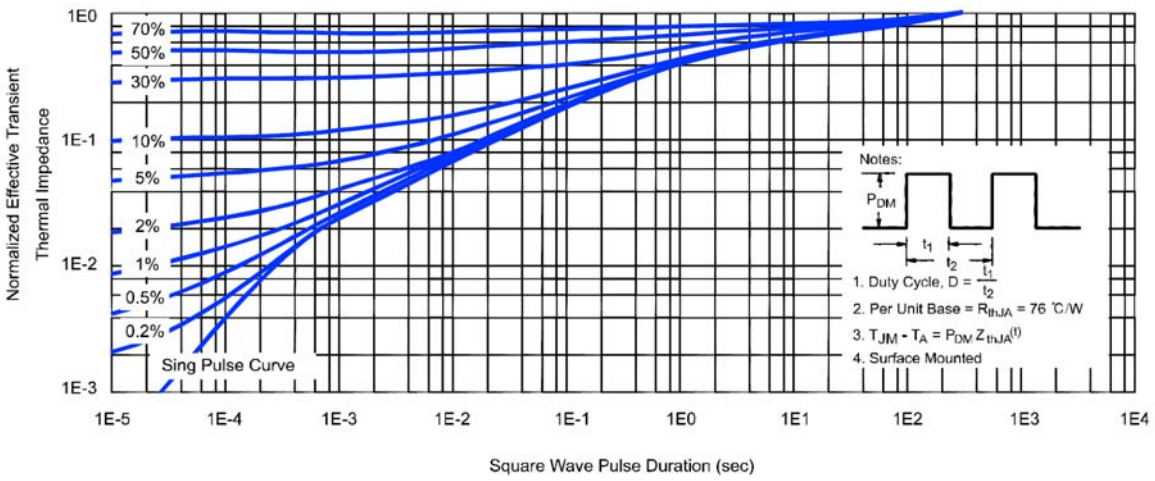
Maximum Forward Biased Safe Operating Area



Single Pulse Maximum Power Dissipation

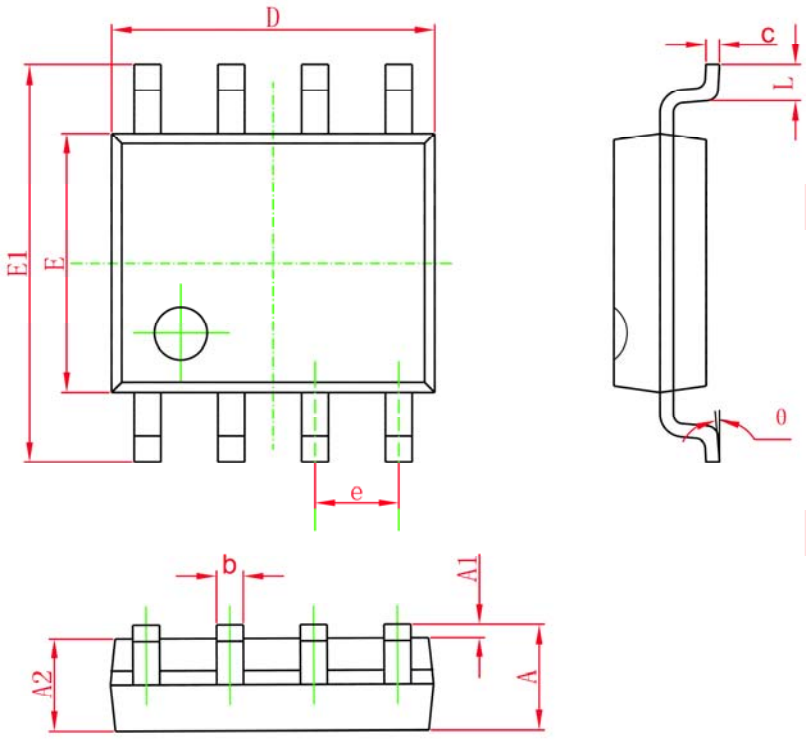


Normalized Thermal Transient Impedance, Junction-to-Ambient



- **Package Information**

SOP8 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°