

N-Channel Enhancement Mode Power MOSFET

Description

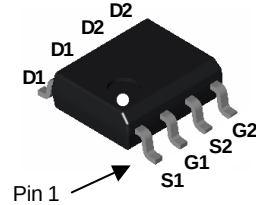
The TF9926B uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. The complementary MOSFETs may be used to form a level shifted high side switch, and for a host of other applications.

General Features

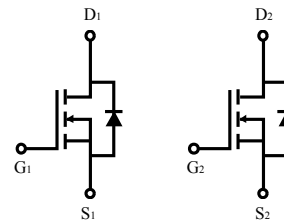
PRODUCT SUMMARY		
V_{DSS}	I_D	$R_{DS(on)}$ (m Ω) Typ
20V	6.5A	10 @ $V_{GS} = 4.5V$
	5.5A	13 @ $V_{GS} = 2.5V$

- High power and current handing capability
- Lead free product is acquired
- Surface mount package

SOP-8L



Equivalent Circuit



MARKING



Y :year code W :week code

Absolute Maximum Ratings $T_A=25^\circ\text{C}$ unless otherwise noted

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current ^A	I_D	6.5	A
Pulsed Drain Current ^B	I_{DM}	30	
Power Dissipation ^A	$T_A=25^\circ\text{C}$	2	W
	$T_A=70^\circ\text{C}$	1.2	
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	48	62.5	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^A		74	110	$^\circ\text{C/W}$
Maximum Junction-to-Lead ^C	$R_{\theta JL}$	35	40	$^\circ\text{C/W}$

SOP-8 Plastic-Encapsulate MOSFETS

TF9926B

Electrical Characteristics ($T_J=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	$I_D = 250\mu\text{A}$, $V_{GS}=0\text{V}$	20			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 16\text{V}$, $V_{GS}=0\text{V}$			500	nA
I_{GSS}	Gate-Body leakage current	$V_{DS}=0\text{V}$, $V_{GS}=\pm 10\text{V}$			± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$, $I_D = 250\mu\text{A}$	0.5	0.65	1.0	V
$I_{D(ON)}$	On state drain current	$V_{GS} = 4.5\text{V}$, $V_{DS} = 5\text{V}$	20			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS} = 4.5\text{V}$, $I_D = 6.5\text{A}$		10	20	$\text{m}\Omega$
		$V_{GS} = 2.5\text{V}$, $I_D = 5.5\text{A}$		13	25	$\text{m}\Omega$
g_{FS}	Forward Transconductance	$V_{DS} = 15\text{V}$, $I_D = 6.5\text{A}$	9			S
V_{SD}	Diode Forward Voltage	$I_S = 3\text{A}$, $V_{GS}=0\text{V}$		0.7	1.2	V
I_S	Maximum Body-Diode Continuous Current				3	A

DYNAMIC PARAMETERS

C_{iss}	Input Capacitance	$V_{GS}=0\text{V}$, $V_{DS}=30\text{V}$, $f=1\text{MHz}$		931		pF
C_{oss}	Output Capacitance			60		pF
C_{rss}	Reverse Transfer Capacitance			50		pF
R_g	Gate resistance	$V_{GS}=0\text{V}$, $V_{DS}=0\text{V}$, $f=1\text{MHz}$			9.5	Ω

SWITCHING PARAMETERS

$Q_g(4.5\text{V})$	Total Gate Charge (4.50V)	$V_{DD} = 15\text{V}$, $V_{GEN} = 4.5\text{V}$, $I_D = 6\text{A}$		13		nC
$Q_g(2.5\text{V})$	Total Gate Charge (2.5V)			11		nC
Q_{gs}	Gate Source Charge			3.2		nC
Q_{gd}	Gate Drain Charge			3.5		nC
$t_{D(on)}$	Turn-On DelayTime	$V_{DD} = 15\text{V}$, $V_{GEN} = 4.5\text{V}$, $R_L=15\Omega$ $R_{GEN}=6\Omega$		24		ns
t_r	Turn-On Rise Time			40		ns
$t_{D(off)}$	Turn-Off DelayTime			50		ns
t_f	Turn-Off Fall Time			20		ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F = 5\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$		23.5		ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F = 5\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$		13.4		nC

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^{\circ}\text{C}$. The value in any given application depends on the user's specific board design. The current rating is based on the $t \leq 10\text{s}$ thermal resistance rating.

B: Repetitive rating, pulse width limited by junction temperature.

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

D: The static characteristics in Figures 1 to 6,12,14 are obtained using 80 μs pulses, duty cycle 0.5% max.

E: These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^{\circ}\text{C}$. The SOA curve provides a single pulse rating.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

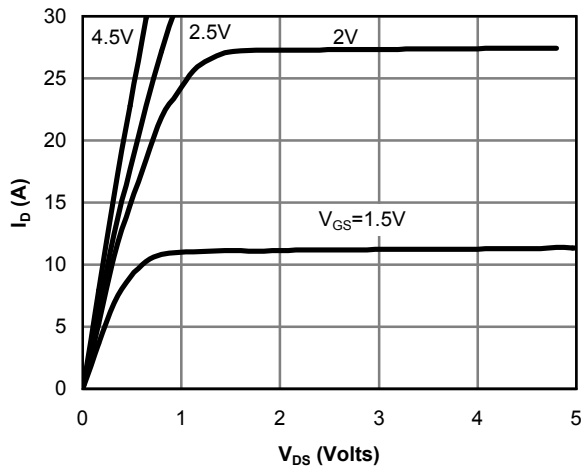


Fig 1: On-Region Characteristics

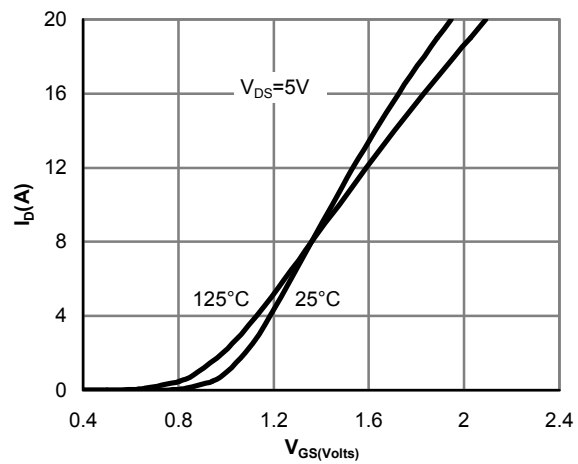


Figure 2: Transfer Characteristics

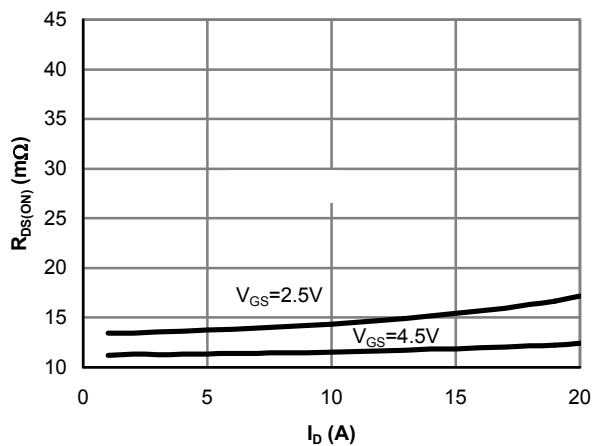


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

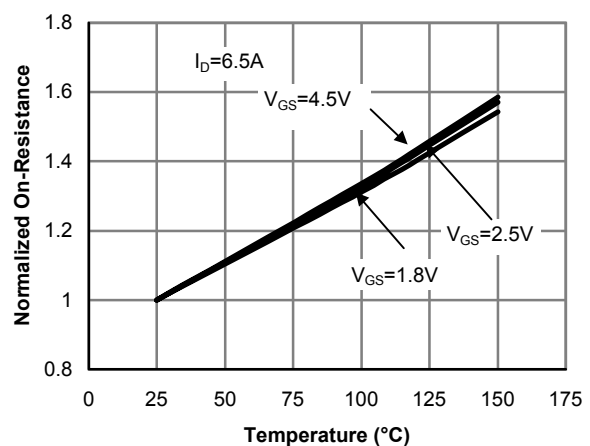


Figure 4: On-Resistance vs. Junction Temperature

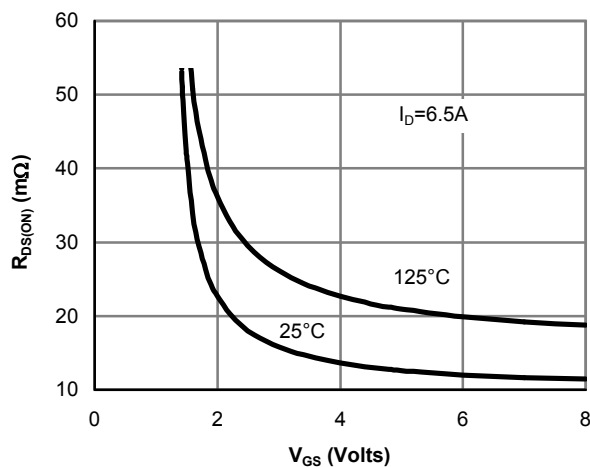


Figure 5: On-Resistance vs. Gate-Source Voltage

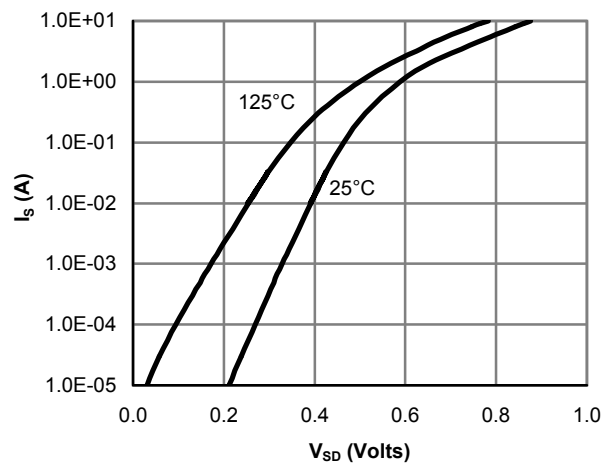
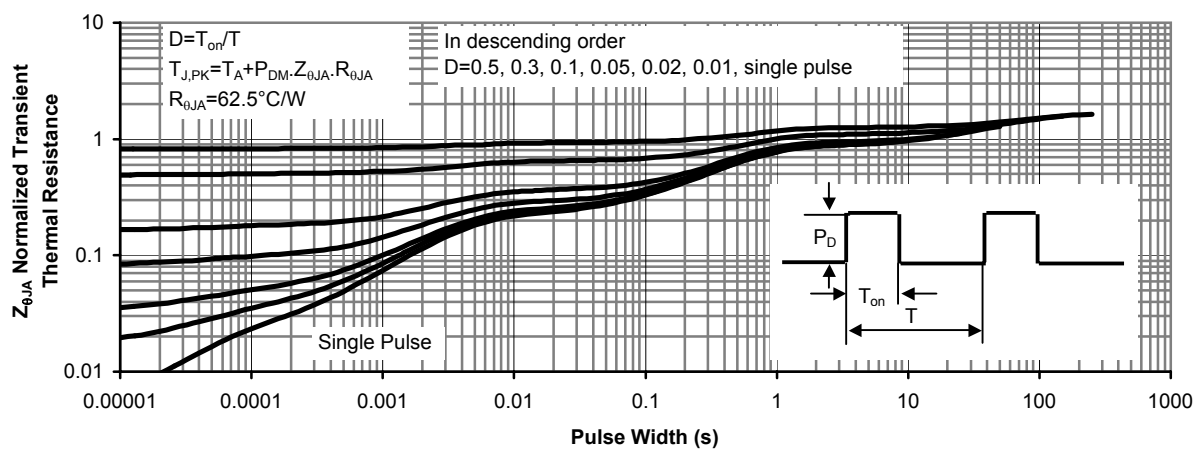
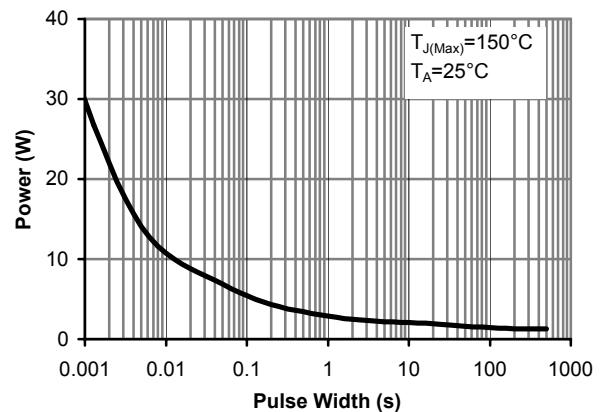
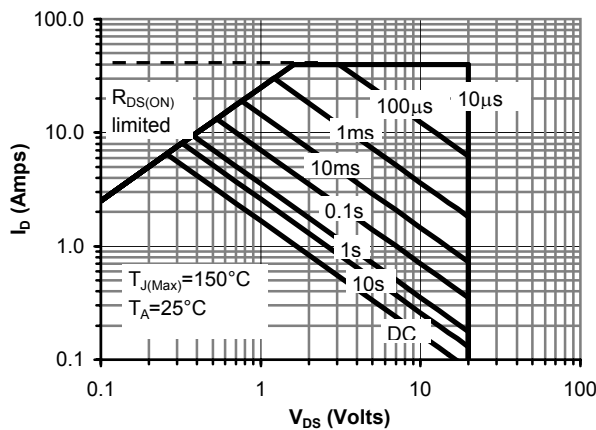
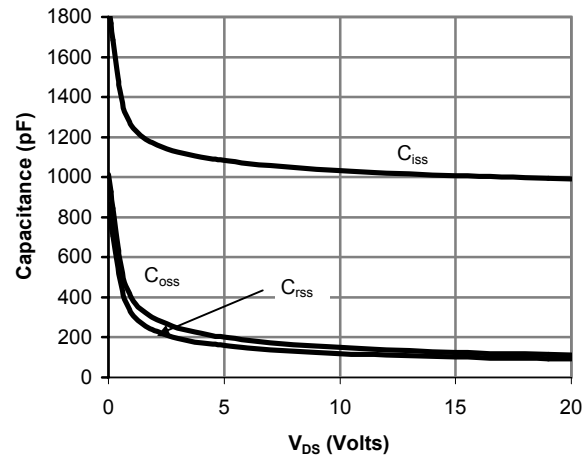
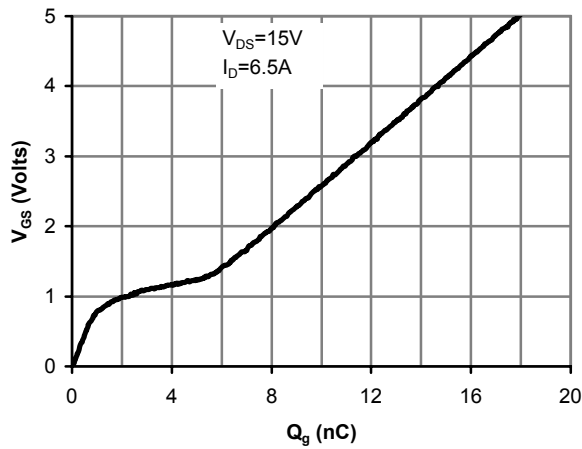


Figure 6: Body-Diode Characteristics

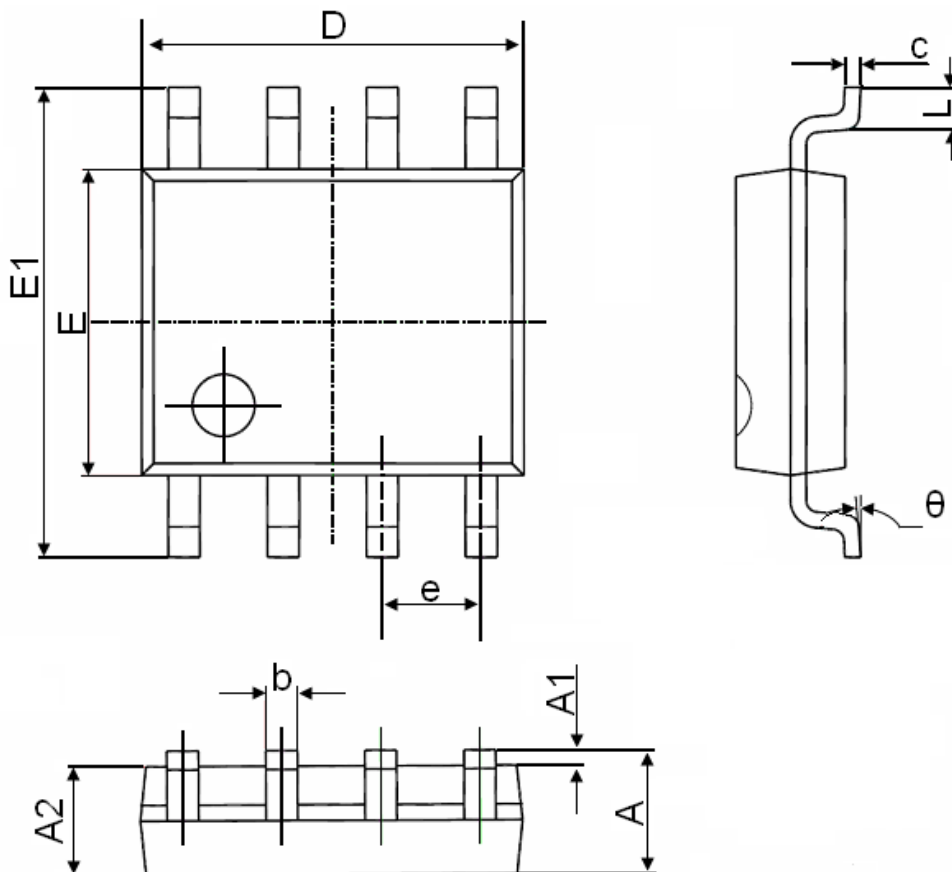
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



SOP-8 Plastic-Encapsulate MOSFETS

TF9926B

SOP-8 Package Information



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°