

TF4953B Dual P-Channel 20-V(D-S) MOSFET

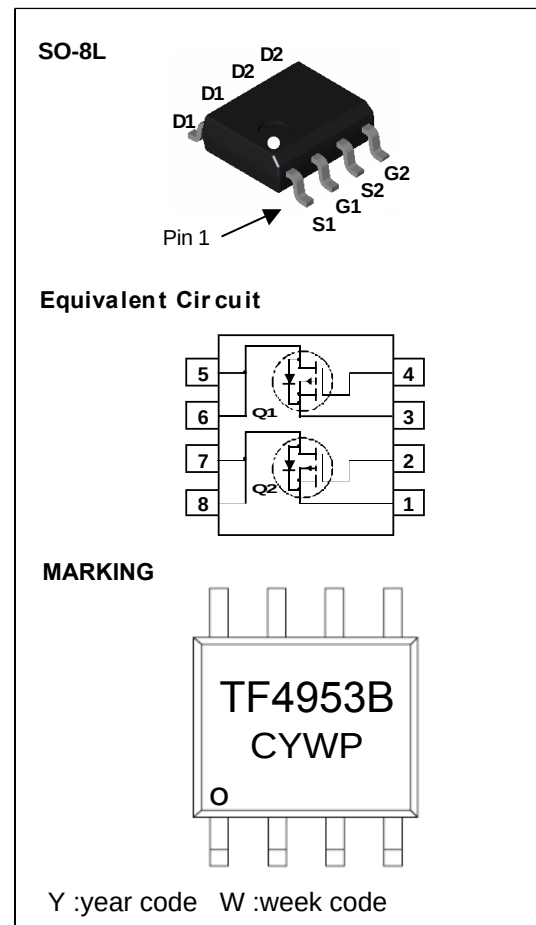
$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
-20V	0.075Ω@-4.5V	-5.0A
	0.110Ω@-2.5V	

General FEATURE

- TrenchFET Power MOSFET
- Lead free product is acquired
- Surface mount package

APPLICATION

- Load Switch for Portable Devices
- DC/DC Converter



Maximum ratings ($T_a=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	±12	
Continuous Drain Current	I_D	-5.0	A
Pulsed Drain Current	I_{DM}	-10	
Continuous Source-Drain Diode Current	I_S	-1.30	
Maximum Power Dissipation	P_D	1.0	W
Thermal Resistance from Junction to Ambient($t \leq 5s$)	$R_{\theta JA}$	125	$^{\circ}\text{C/W}$
Junction Temperature	T_J	150	$^{\circ}\text{C}$
Storage Temperature	T_{stg}	-55 ~+150	

Electrical Characteristics

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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
B _{DSS}	Drain–Source Breakdown Voltage	V _{GS} = 0 V, I _b = −250 μA	−20			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = −16 V, V _{GS} = 0 V			−1	μA
I _{GSSF}	Gate–Body Leakage, Forward	V _{GS} = −10 V, V _{DS} = 0 V			−100	nA
I _{GSSR}	Gate–Body Leakage, Reverse	V _{GS} = 10 V, V _{DS} = 0 V			100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _b = −250 μA	−0.5	−0.7	−1.0	V
R _{DS(on)}	Static Drain–Source On–Resistance	V _{GS} = −2.5 V, I _b = −2.5 A		88	110	mΩ
		V _{GS} = −4.5 V, I _b = −3.5 A		60	75	
I _{b(on)}	On–State Drain Current	V _{GS} = −4.5V, V _{DS} = −4.5 V	−10			A
g _{FS}	Forward Transconductance	V _{DS} = −5 V, I _b = −2 A		5		S
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} = −10 V, V _{GS} = 0 V, f = 1.0 MHz		405		pF
C _{oss}	Output Capacitance			75		pF
C _{rss}	Reverse Transfer Capacitance			55		pF
Switching Characteristics						
t _{d(on)}	Turn–On Delay Time	V _{DD} = −10 V, I _b = −1 A, V _{GS} = −4.5V, R _{GEN} = 10Ω		11		ns
t _r	Turn–On Rise Time			35		ns
t _{d(off)}	Turn–Off Delay Time			30		ns
t _f	Turn–Off Fall Time			10		ns
Q _g	Total Gate Charge	V _{DS} = −10 V, I _b = −3 A, V _{GS} = −2.5V		3.3	12	nC
Q _{gs}	Gate–Source Charge			0.7		nC
Q _{gd}	Gate–Drain Charge			1.3		nC
Drain–Source Diode Characteristics and Maximum Ratings						
I _s	Maximum Continuous Drain–Source Diode Forward Current				−1.3	A
V _{SD}	Drain–Source Diode Forward Voltage	V _{GS} = 0 V, I _s = −1.3 A		−0.8	−1.2	V

Notes:

- $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design.

Typical Electrical and Thermal Characteristics

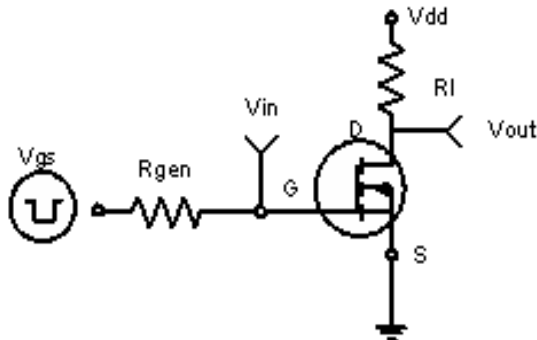


Figure 1: Switching Test Circuit

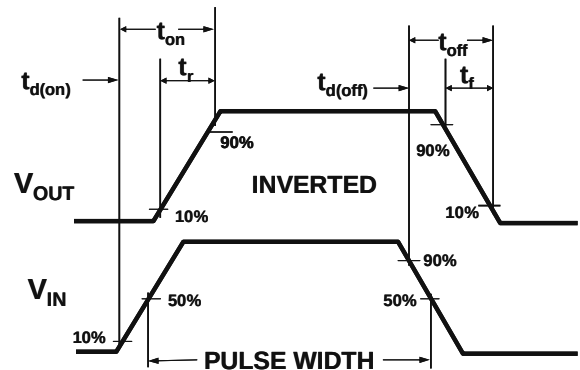


Figure 2: Switching Waveforms

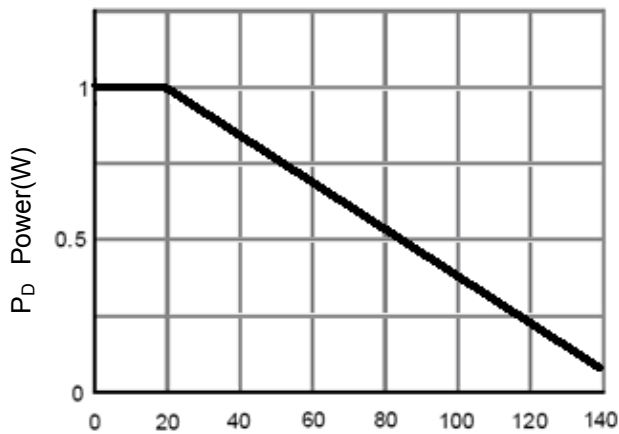


Figure 3 Power Dissipation

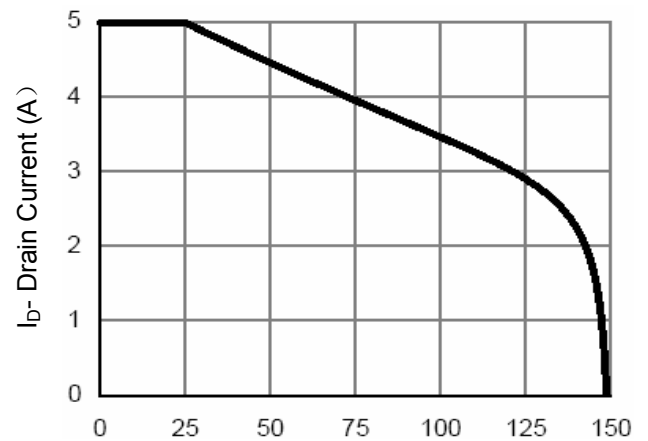


Figure 4 Drain Current

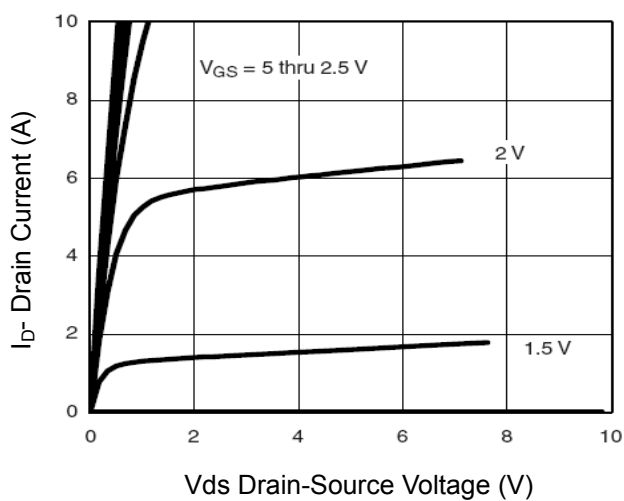


Figure 5 Output Characteristics

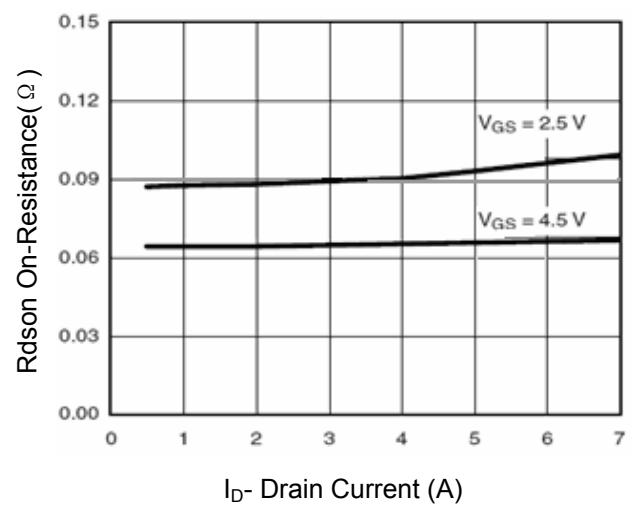
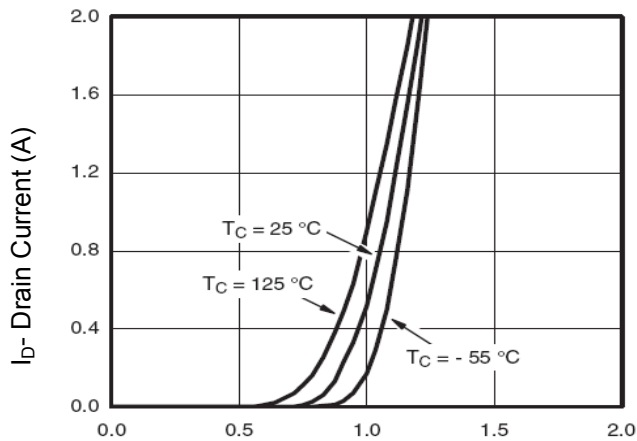
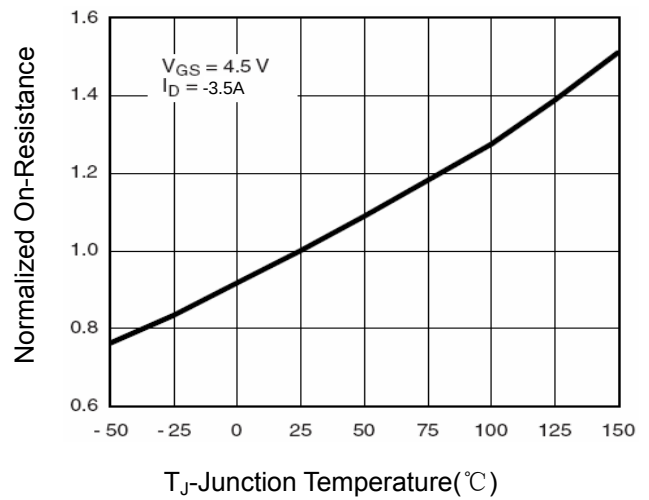


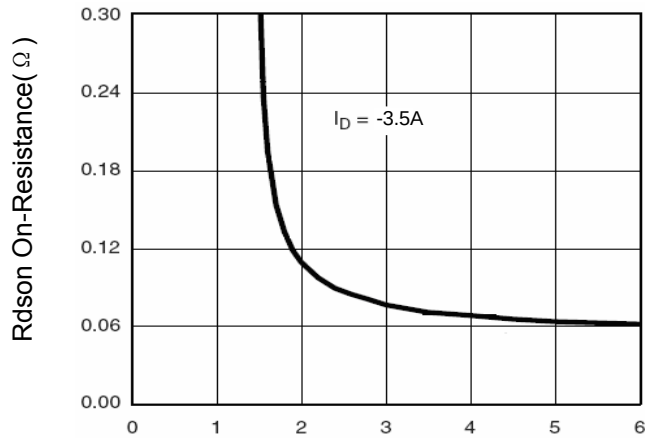
Figure 6 Drain-Source On-Resistance



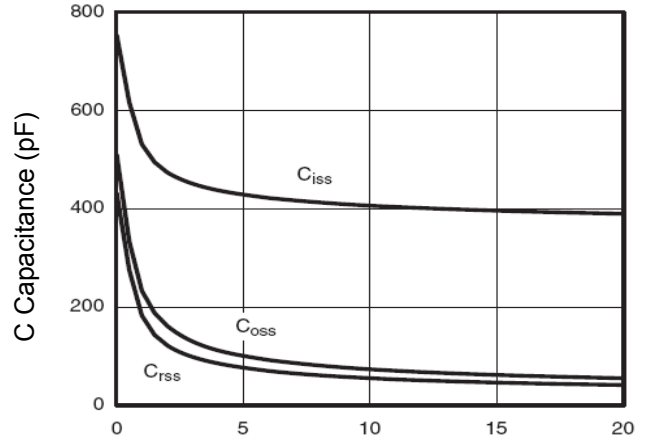
V_{GS} Gate-Source Voltage (V)
Figure 7 Transfer Characteristics



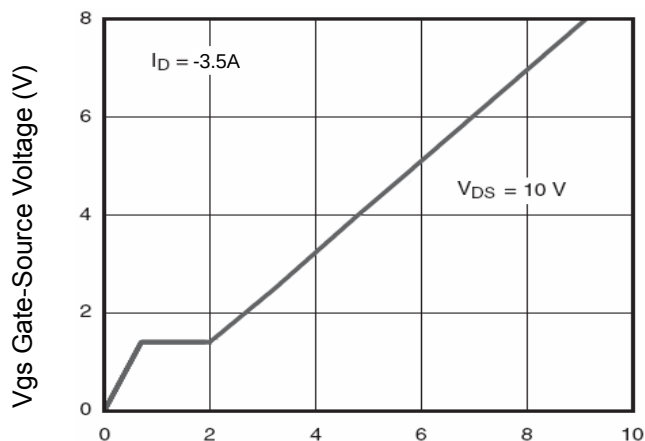
T_J-Junction Temperature(°C)
Figure 8 Drain-Source On-Resistance



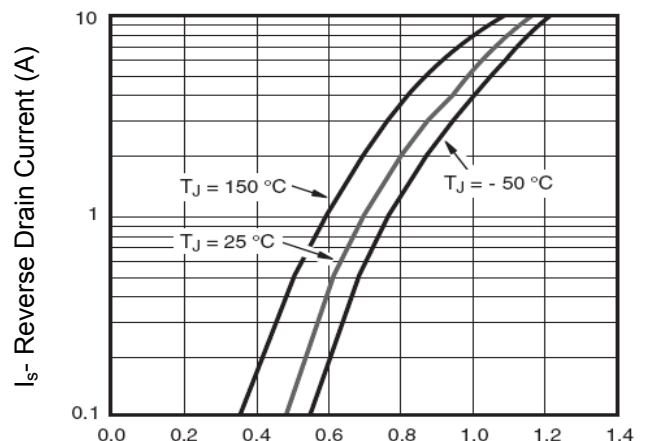
V_{GS} Gate-Source Voltage (V)
Figure 9 Rdson vs Vgs



V_{DS} Drain-Source Voltage (V)
Figure 10 Capacitance vs Vds



Q_g Gate Charge (nC)
Figure 11 Gate Charge



V_{SD} Source-Drain Voltage (V)
Figure 12 Source- Drain Diode Forward

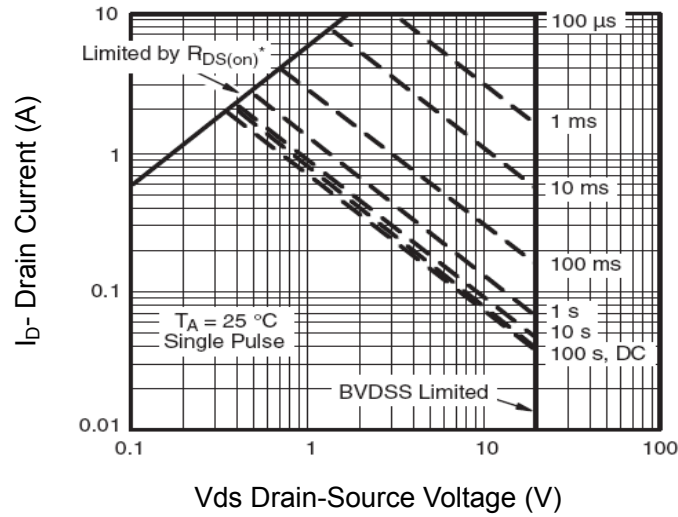


Figure 13 Safe Operation Area

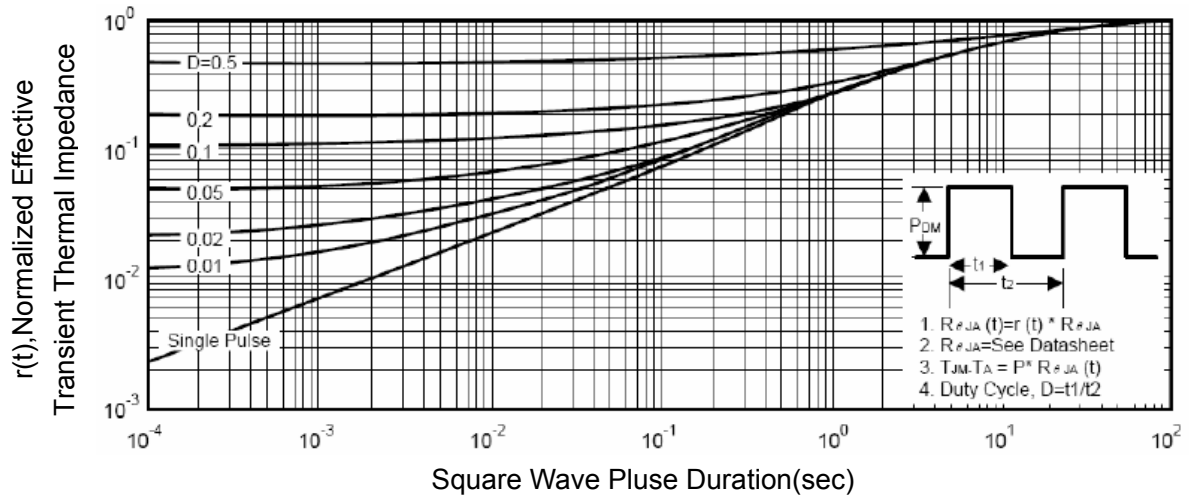
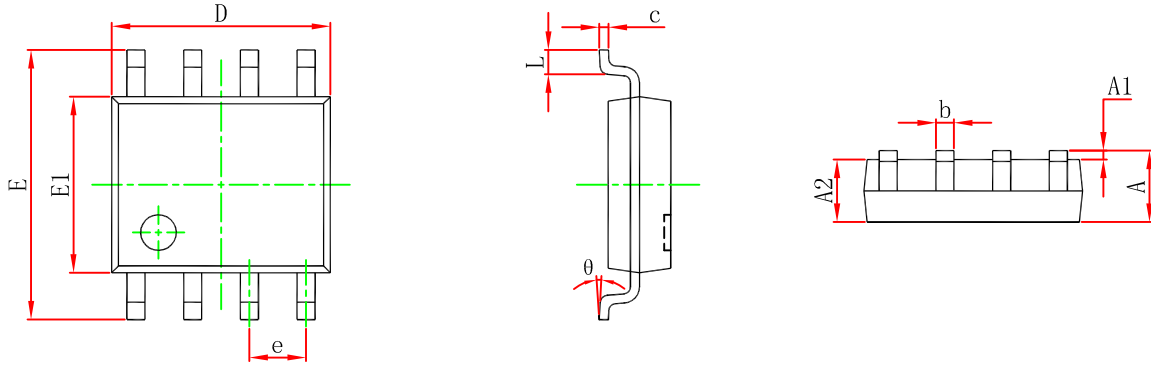


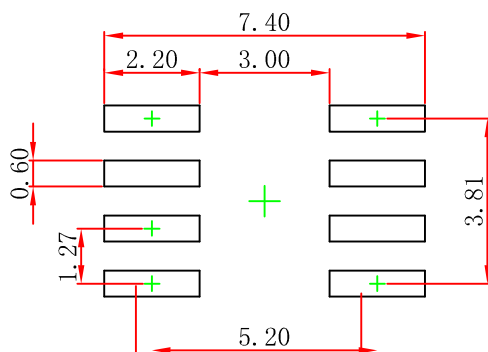
Figure 14 Normalized Maximum Transient Thermal Impedance

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	0.007	0.010
D	4.800	5.000	0.189	0.197
e	1.270 (BSC)		0.050 (BSC)	
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

SOP8 Suggested Pad Layout



Note:

1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.