

Dual P-Ch 30V Fast Switching MOSFETs

RC4953

- ★ 100% EAS Guaranteed
- ★ Green Device Available
- ★ Super Low Gate Charge
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology

Description

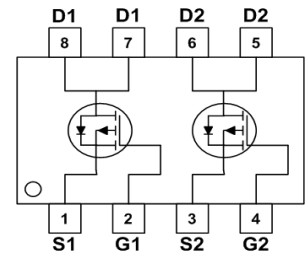
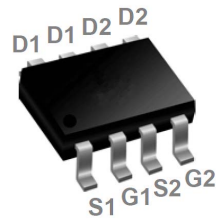
The SS4953 is the high cell density trenched P-ch MOSFETs, which provide excellent R_{DS(on)} and gate charge for most of the synchronous buck converter applications.

The SS4953 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

Product Summary

BVDSS	R _{DS(on)}	ID
-30V	55mΩ	-5A

Dual SOP8 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V _{DS}	Drain-Source Voltage	-30	V
V _{GS}	Gate-Source Voltage	±20	V
I _D @T _A =25°C	Continuous Drain Current, V _{GS} @ 10V ¹	-5	A
I _D @T _A =70°C	Continuous Drain Current, V _{GS} @ 10V ¹	-4	A
I _{DM}	Pulsed Drain Current ²	-10	A
EAS	Single Pulse Avalanche Energy ³	18.1	mJ
I _{AS}	Avalanche Current	-19	A
P _D @T _A =25°C	Total Power Dissipation ⁴	1.5	W
T _{STG}	Storage Temperature Range	-55 to 150	°C
T _J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
R _{θJA}	Thermal Resistance Junction-Ambient ¹	---	85	°C/W
R _{θJC}	Thermal Resistance Junction-Case ¹	---	50	°C/W

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-30	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , $I_D=-1\text{mA}$	---	-0.023	---	$V/^\circ\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=-10V, I_D=-4A$	---	---	55	m Ω
		$V_{GS}=-4.5V, I_D=-3A$	---	---	82	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1.0	---	-2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	4	---	$\text{mV}/^\circ\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-24V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=-24V, V_{GS}=0V, T_J=55^\circ\text{C}$	---	---	5	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
g_{fs}		$V_{DS}=-10V, I_D=-4A$	---	6	---	S
Q_g	Total Gate Charge (-4.5V)		---	6.4	---	nC
Q_{gs}	Gate-Source Charge	$V_{DS}=-20V, V_{GS}=-4.5V, I_D=-4A$	---	2.2	---	
Q_{gd}	Gate-Drain Charge		---	2.3	---	
$T_{d(on)}$	Turn-On Delay Time		---	9	---	ns
T_r	Rise Time	$V_{DD}=-12V, V_{GS}=-10V, R_G=3.3\Omega,$	---	16.6	---	
$T_{d(off)}$	Turn-Off Delay Time	$I_D=-4A$	---	21	---	
T_f	Fall Time		---	21.6	---	
C_{iss}	Input Capacitance		---	632	---	pF
C_{oss}	Output Capacitance	$V_{DS}=-15V, V_{GS}=0V, f=1\text{MHz}$	---	100	---	
C_{rss}	Reverse Transfer Capacitance		---	74	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current ^{1,5}	$V_G=V_D=0V$, Force Current	---	---	-4.9	A
I_{SM}	Pulsed Source Current ^{2,5}		---	---	-10	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V, I_S=-1A, T_J=25^\circ\text{C}$	---	---	-1.2	V

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$
- 3.The EAS data shows Max. rating . The test condition is $V_{DD}=-25V, V_{GS}=-10V, L=0.1\text{mH}, I_{AS}=-19A$
- 4.The power dissipation is limited by 150°C junction temperature
- 5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

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Typical Characteristics

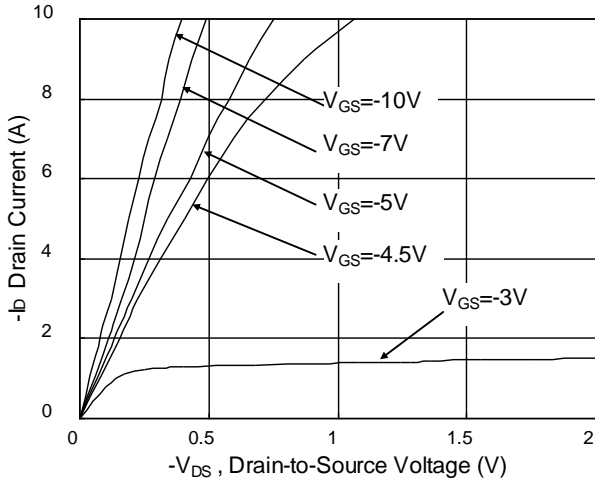


Fig.1 Typical Output Characteristics

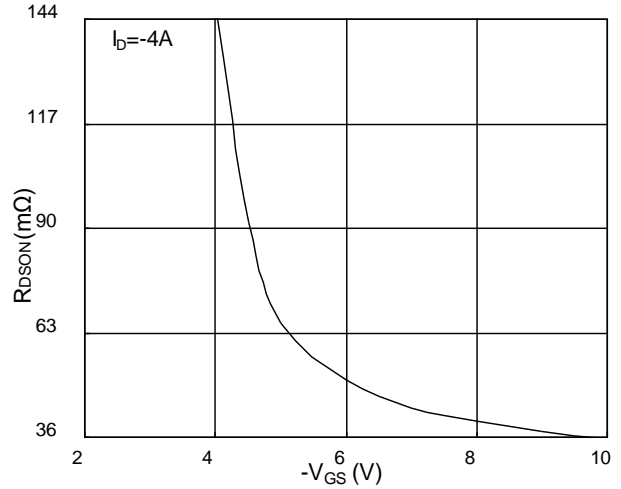


Fig.2 On-Resistance vs. Gate-Source

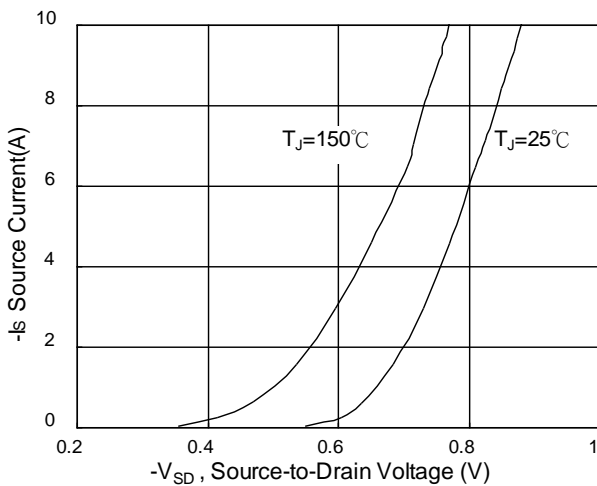


Fig.3 Forward Characteristics of Reverse

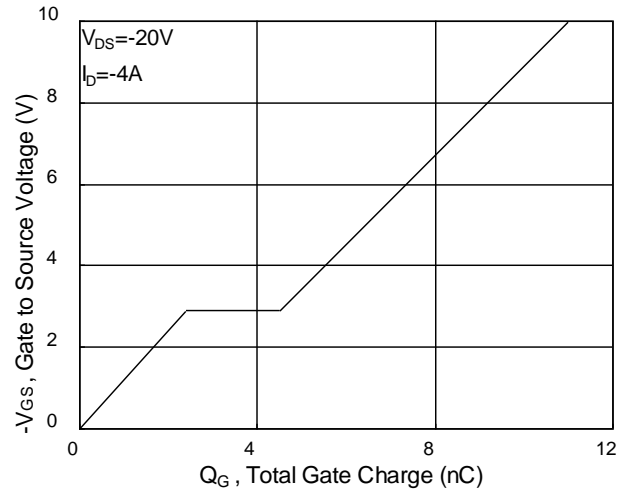


Fig.4 Gate-Charge Characteristics

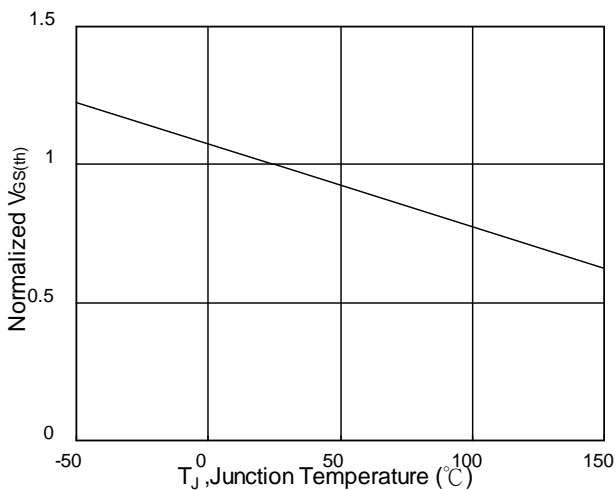


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

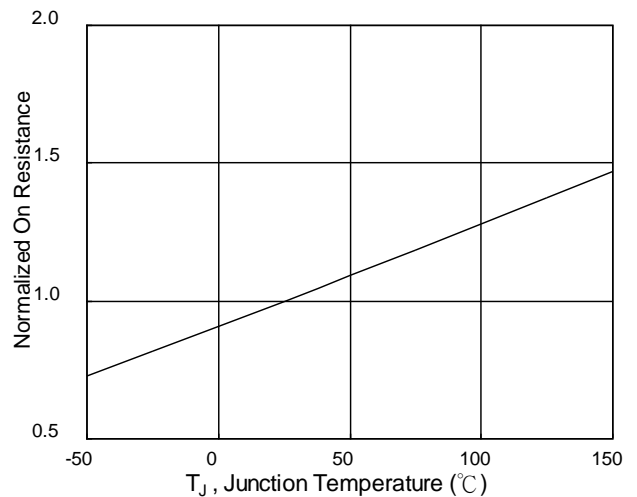


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

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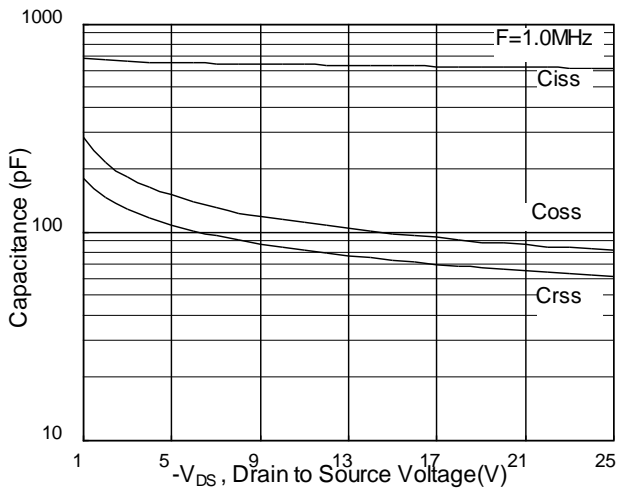


Fig.7 Capacitance

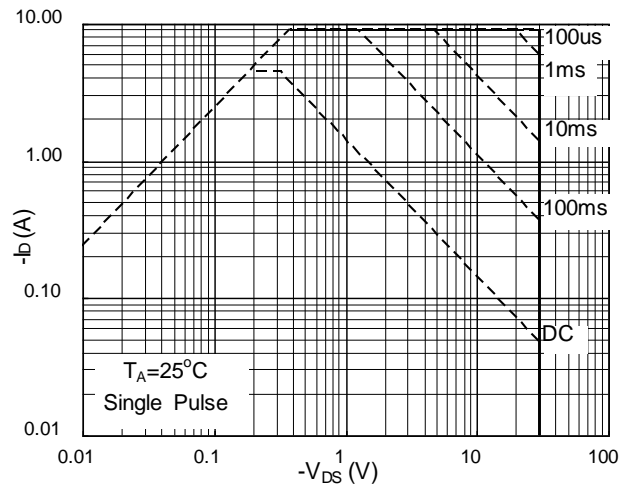


Fig.8 Safe Operating Area

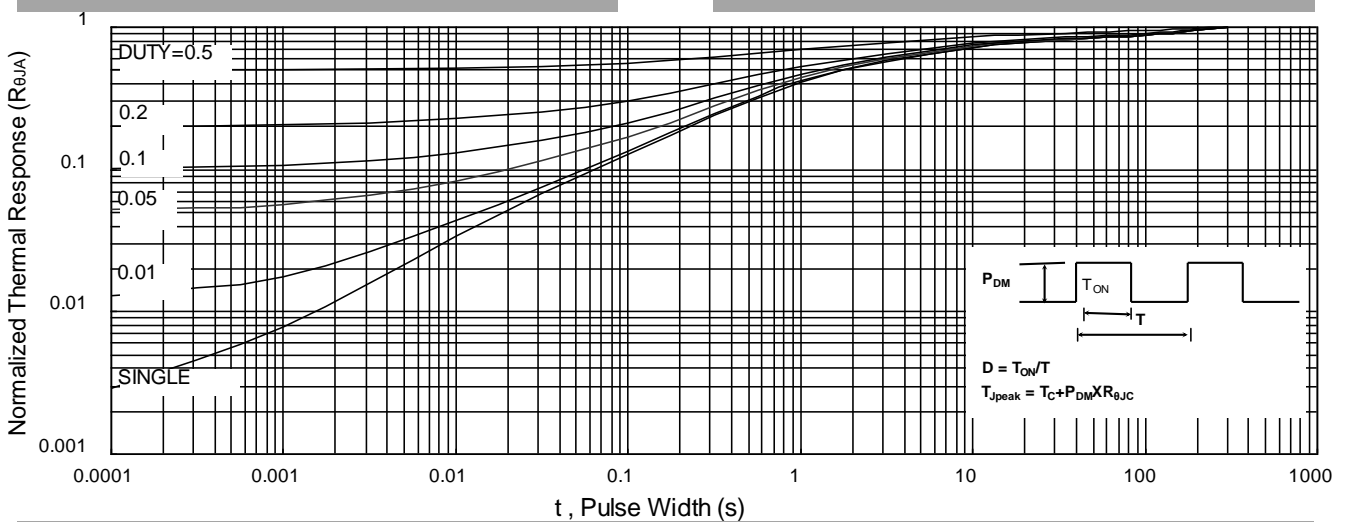


Fig.9 Normalized Maximum Transient Thermal Impedance

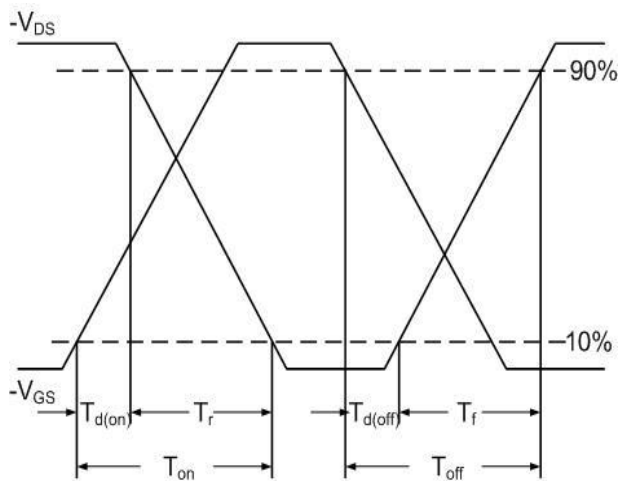


Fig.10 Switching Time Waveform

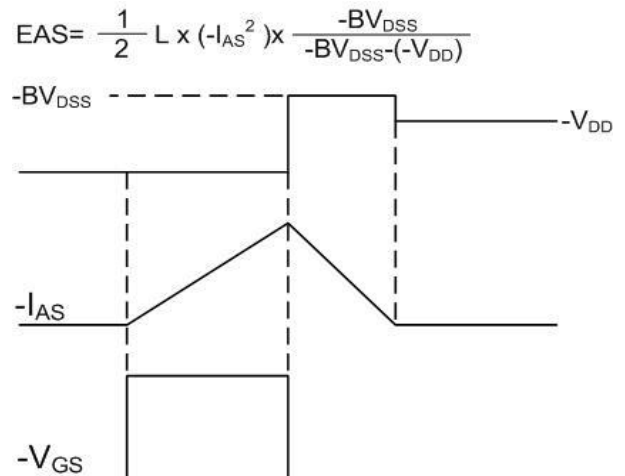


Fig.11 Unclamped Inductive Switching Waveform

$$EAS = \frac{1}{2} L \times (-I_{AS}^2) \times \frac{-BV_{DSS}}{-BV_{DSS} - (-V_{DD})}$$