

Dual P-channel MOSFET

ELM53993A-S

<http://www.elm-tech.com>

■General description

ELM53993A-S uses advanced trench technology to provide excellent $R_{ds(on)}$, low gate charge and low gate threshold voltage.

■Features

- $V_{ds}=-30V$
- $I_d=-3.6A$
- $R_{ds(on)}=150m\Omega$ ($V_{gs}=-10V$)
- $R_{ds(on)}=235m\Omega$ ($V_{gs}=-4.5V$)

■Maximum absolute ratings

$T_a=25^{\circ}C$. Unless otherwise noted.

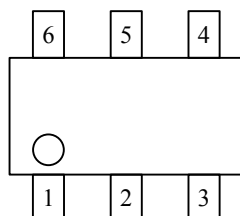
Parameter		Symbol	Limit	Unit
Drain-source voltage		V_{ds}	-30	V
Gate-source voltage		V_{gs}	± 20	V
Continuous drain current($T_j=150^{\circ}C$)	$T_a=25^{\circ}C$	I_d	-3.6	A
	$T_a=70^{\circ}C$		-3.0	
Pulsed drain current		I_{dm}	-15	A
Power dissipation	$T_c=25^{\circ}C$	P_d	2.0	W
	$T_c=70^{\circ}C$		1.3	
Operating junction temperature		T_j	150	$^{\circ}C$
Storage temperature range		T_{stg}	-55 to 150	$^{\circ}C$

■Thermal characteristics

Parameter	Symbol	Typ.	Max.	Unit
Thermal resistance junction-to-ambient	$R_{\theta ja}$		120	$^{\circ}C/W$

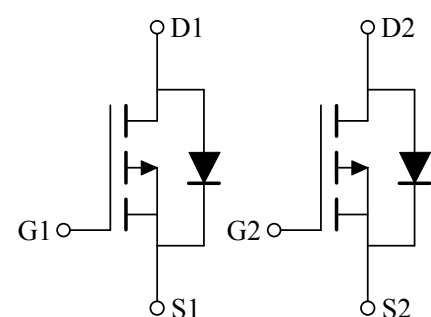
■Pin configuration

SOT-26(TOP VIEW)



Pin No.	Pin name
1	GATE1
2	SOURCE2
3	GATE2
4	DRAIN2
5	SOURCE1
6	DRAIN1

■Circuit



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■Electrical characteristics

Ta=25°C. Unless otherwise noted.

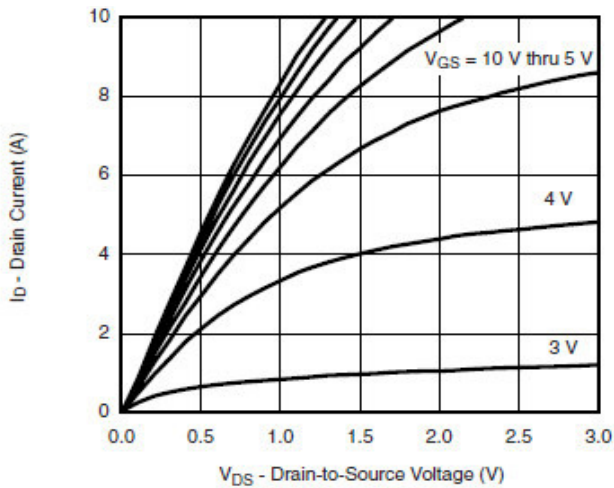
Parameter	Symbol	Condition		Min.	Typ.	Max.	Unit
STATIC PARAMETERS							
Drain-source breakdown voltage	BVdss	Id=-250μA, Vgs=0V		-30			V
Zero gate voltage drain current	Idss	Vds=-24V, Vgs=0V				-1	μA
			Ta=85°C			-30	
Gate-body leakage current	Igss	Vds=0V, Vgs=±20V				±100	nA
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=-250μA		-1.0		-2.6	V
On state drain current	Id(on)	Vgs=-10V, Vds≥-5V		-10			A
Static drain-source on-resistance	Rds(on)	Vgs=-10V, Id=-3.6A			135	150	mΩ
		Vgs=-4.5V, Id=-3.2A			220	235	
Forward transconductance	Gfs	Vds=-5V, Id=-4.0A			10		S
Diode forward voltage	Vsd	Is=-1.7A, Vgs=0V			-0.7	-1.3	V
Max. body-diode continuous current	Is					-1.5	A
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vgs=0V, Vds=-15V, f=1MHz			170		pF
Output capacitance	Coss				50		pF
Reverse transfer capacitance	Crss				30		pF
SWITCHING PARAMETERS							
Total gate charge	Qg	Vgs=-4.5V, Vds=-15V Id≐-2.5A			2.5		nC
Gate-source charge	Qgs				0.8		nC
Gate-drain charge	Qgd				1.0		nC
Turn-on delay time	td(on)	Vgs=-10V, Vds=-15V Id≐-2.0A, RL=7.5Ω Rgen=1Ω			5	10	ns
Turn-on rise time	tr				10	16	ns
Turn-off delay time	td(off)				10	16	ns
Turn-off fall time	tf				5	10	ns

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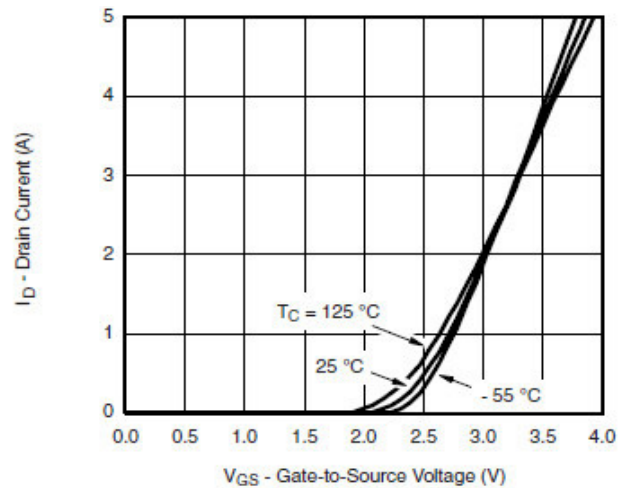
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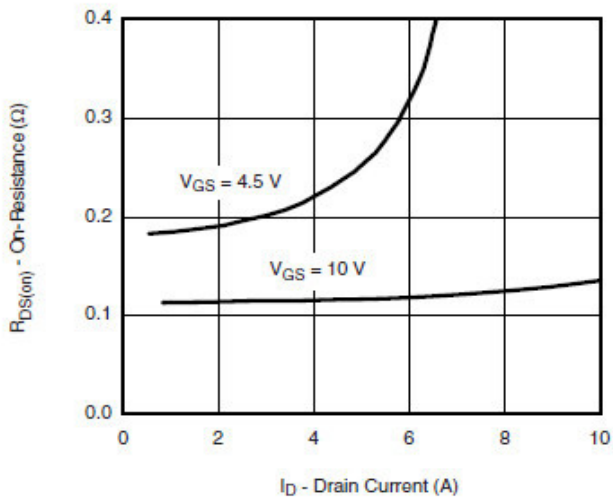
■ Typical electrical and thermal characteristics



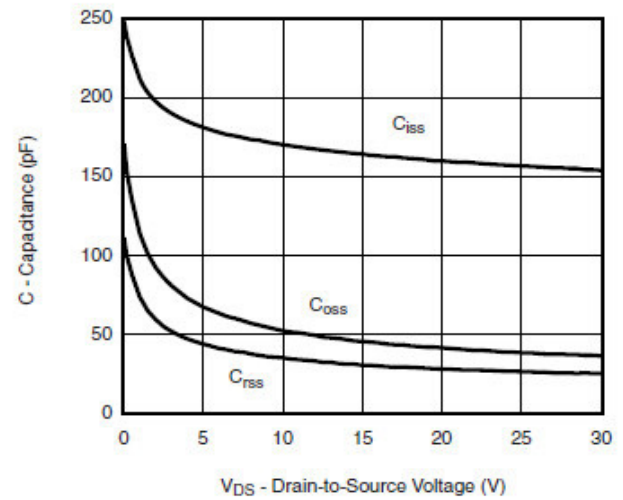
Output Characteristics



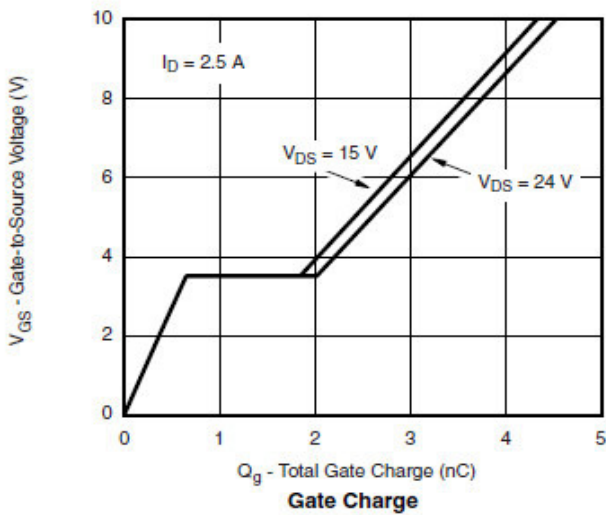
Transfer Characteristics



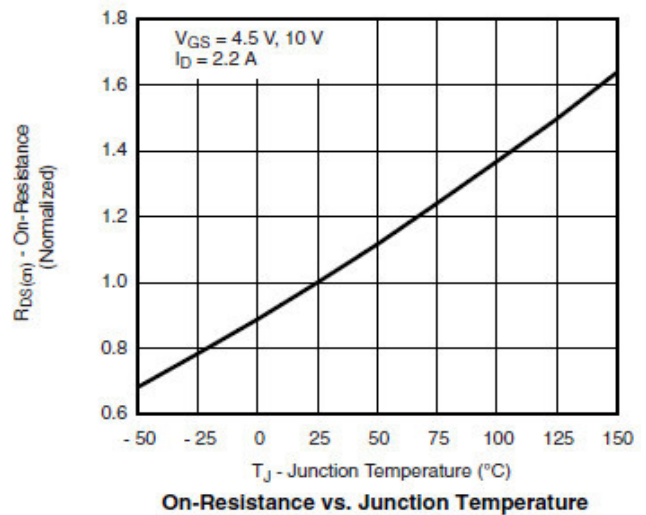
On-Resistance vs. Drain Current



Capacitance



Gate Charge

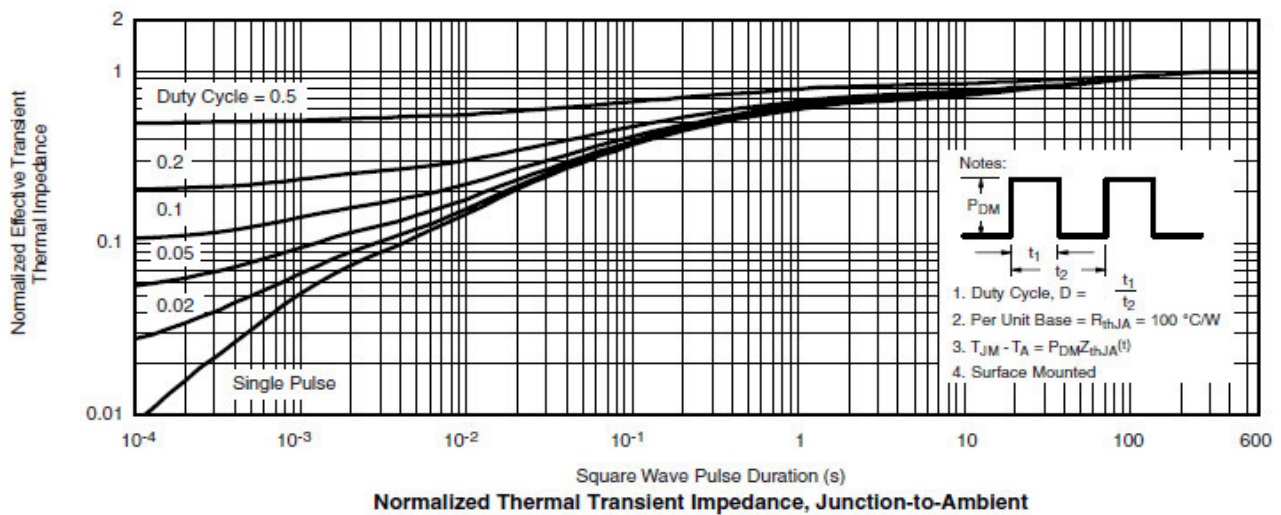
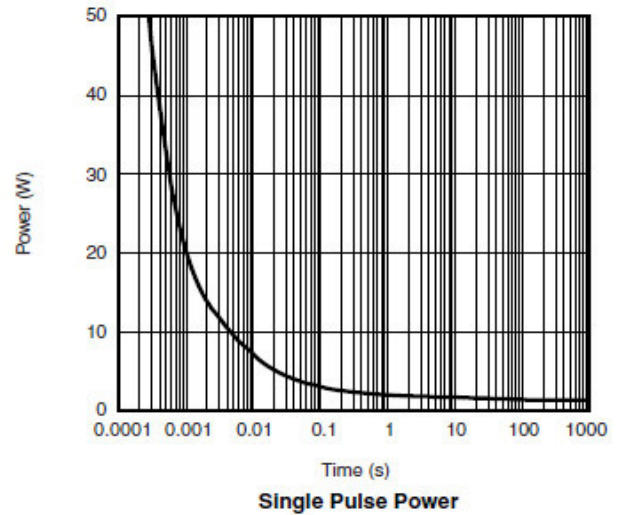
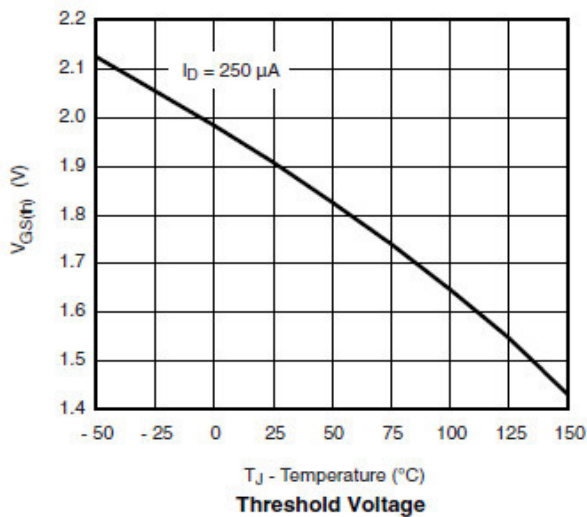
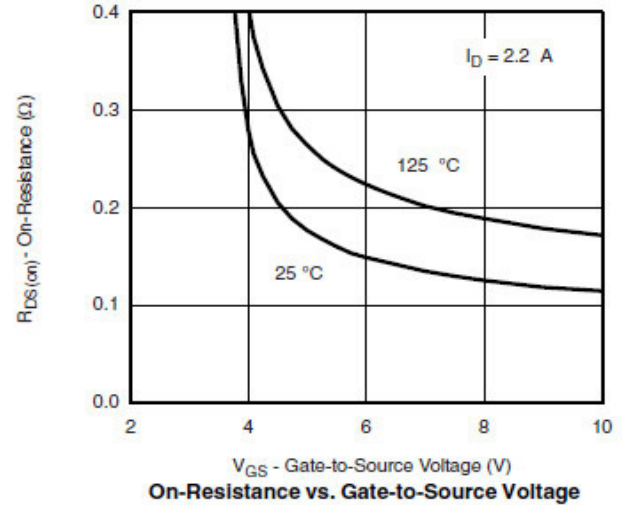
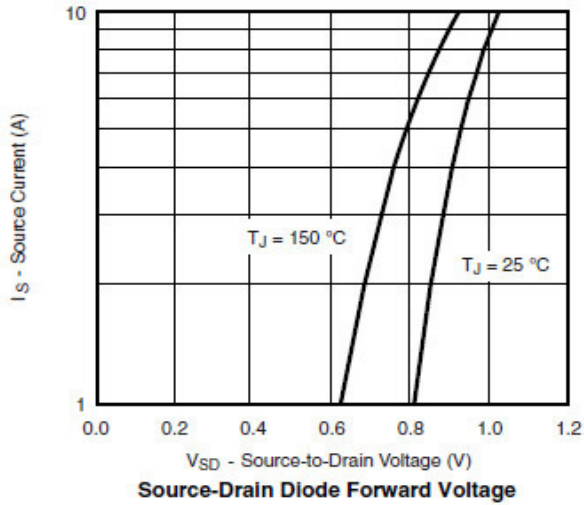


On-Resistance vs. Junction Temperature

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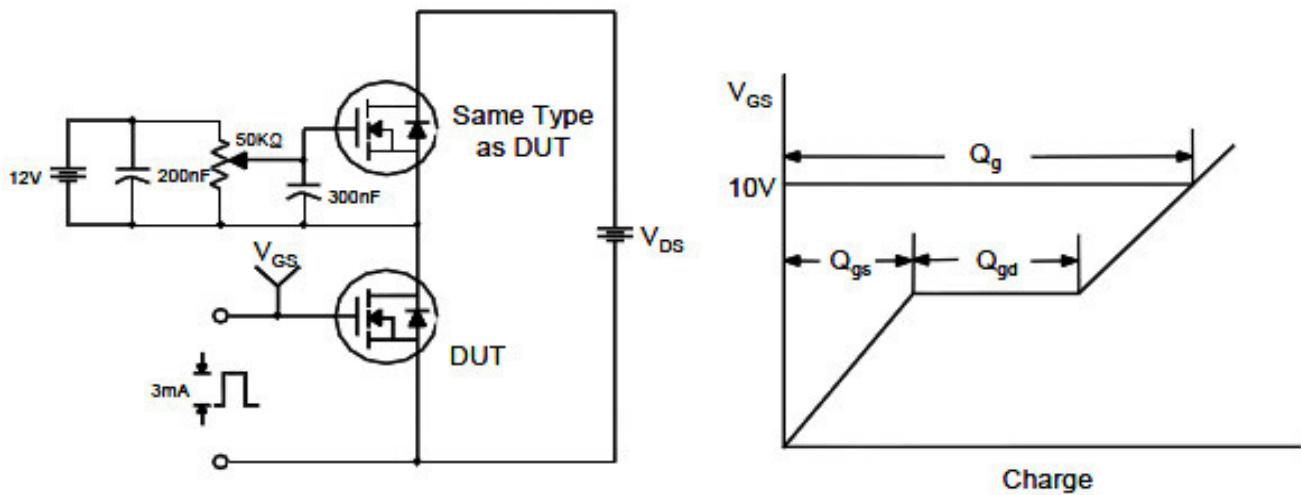
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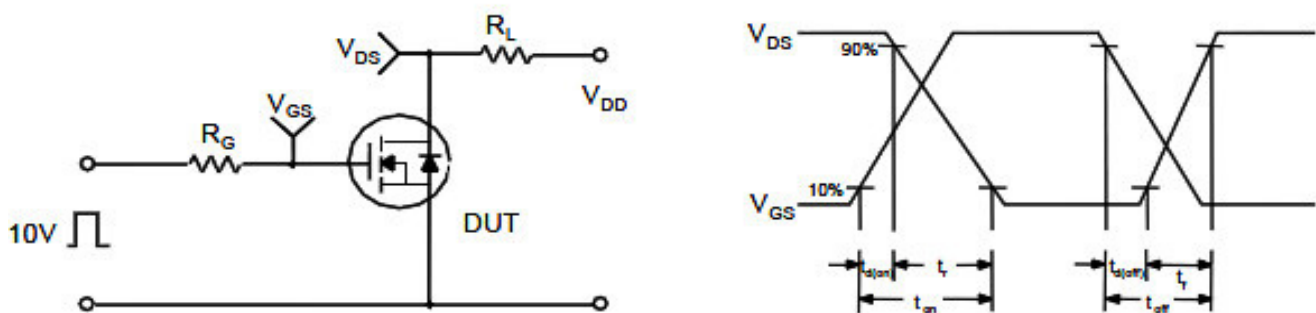
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■ Test circuit & waveform

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

