

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.

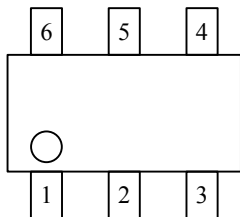
Parameter	Symbol	Limit	Unit
Drain-source voltage	V_{ds}	-30	V
Gate-source voltage	V_{gs}	± 20	V
Continuous drain current ($T_j = 150^\circ C$)	I_d	$T_a = 25^\circ C$	-3.6
		$T_a = 70^\circ C$	-3.0
Pulsed drain current	I_{dm}	-15	A
Power dissipation	P_d	$T_c = 25^\circ C$	2.0
		$T_c = 70^\circ C$	1.3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

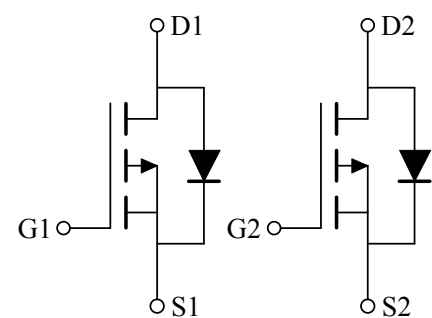
Pin configuration

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.

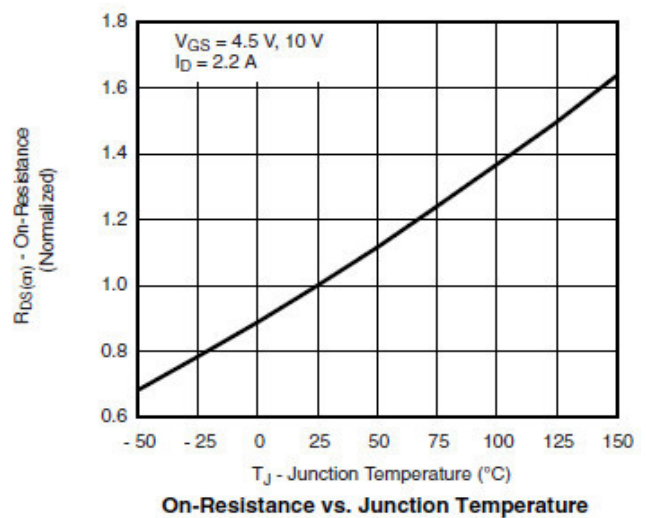
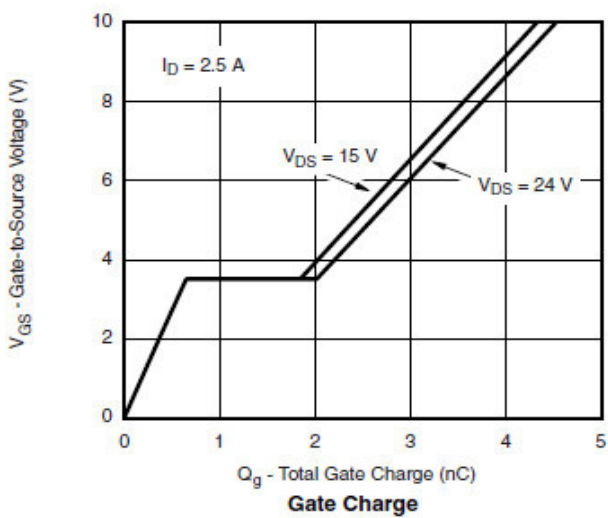
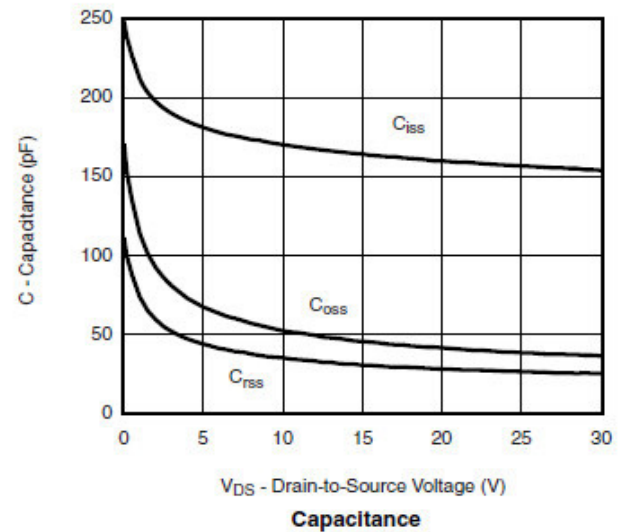
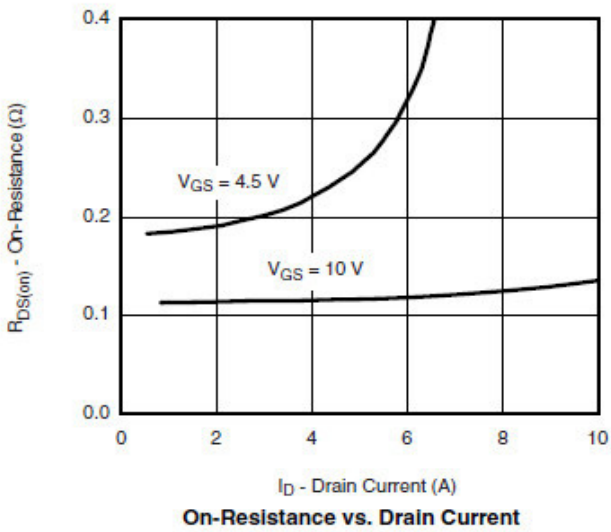
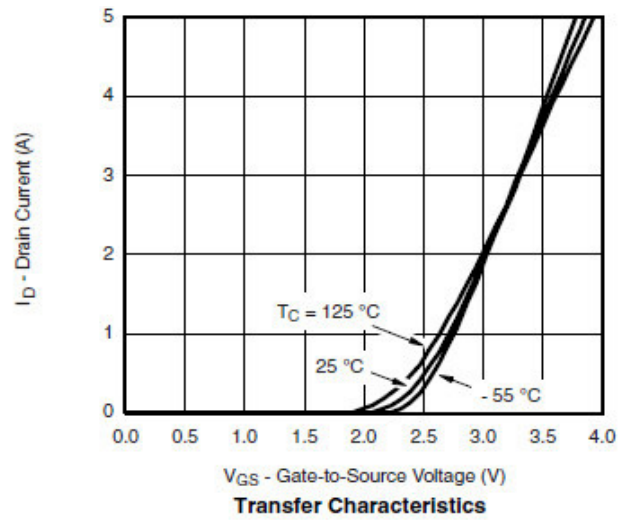
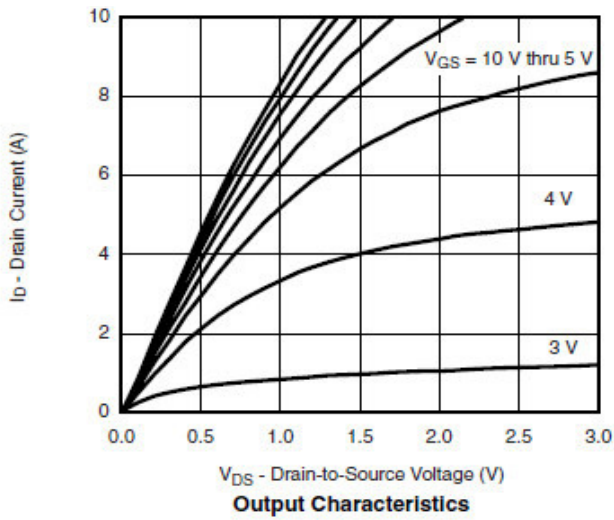
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
STATIC PARAMETERS						
Drain-source breakdown voltage	BVdss	Id=-250μA, Vgs=0V	-30			V
Zero gate voltage drain current	Idss	Vds=-24V, Vgs=0V			-1	μA
		Ta=85°C			-30	
Gate-body leakage current	Igss	Vds=0V, Vgs=±20V			±100	nA
Gate threshold voltage	Vgs(th)	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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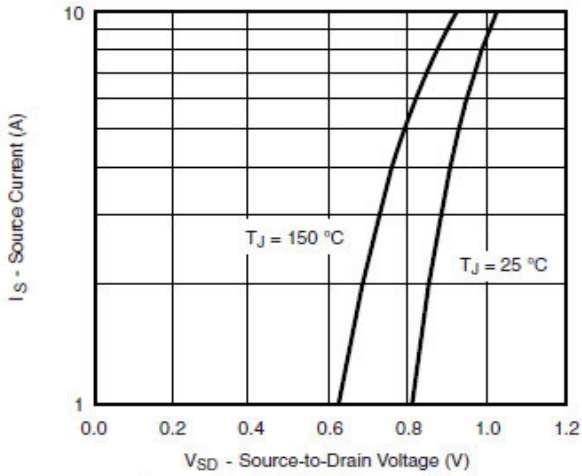
■ Typical electrical and thermal characteristics



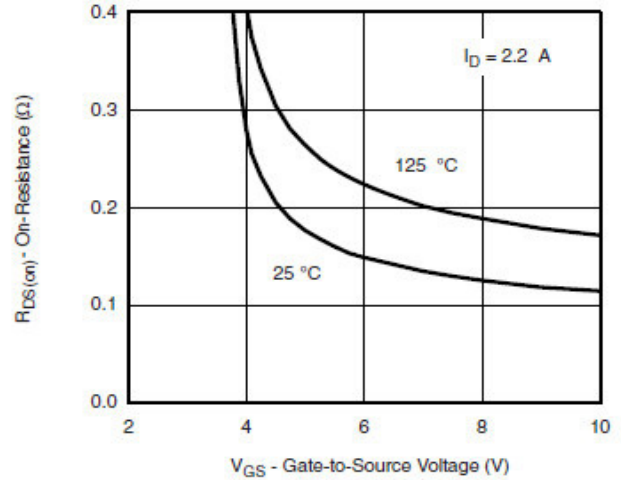
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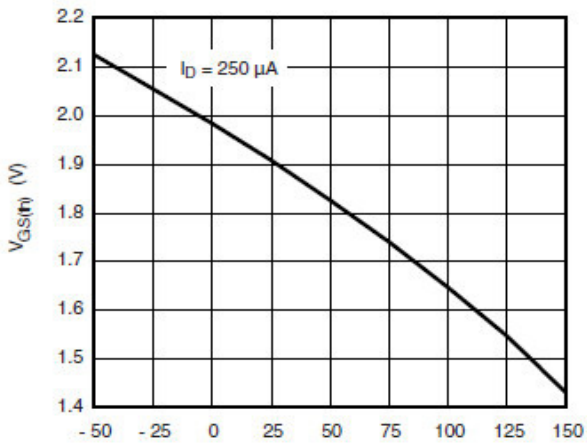
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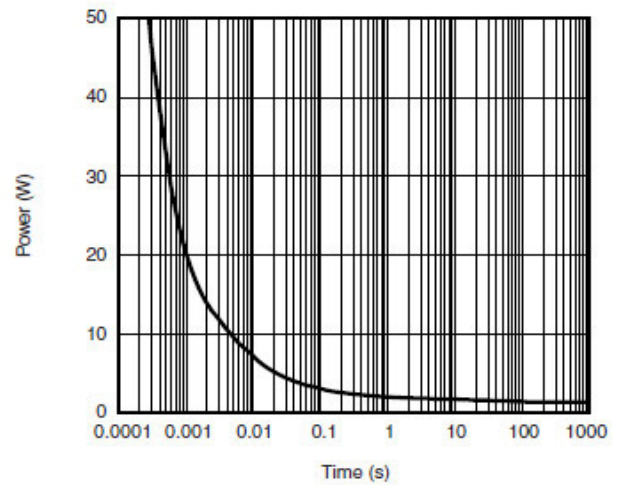
Source-Drain Diode Forward Voltage



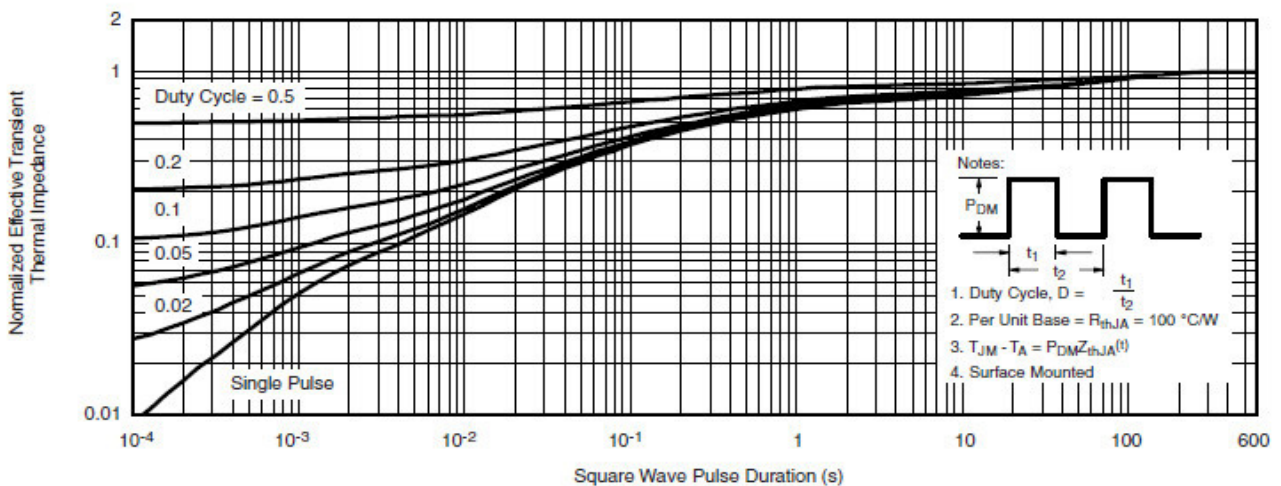
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Single Pulse Power



Normalized Thermal Transient Impedance, Junction-to-Ambient

- Notes:
-
- Duty Cycle, $D = \frac{t_1}{t_2}$
 - Per Unit Base = $R_{thJA} = 100\text{ }^{\circ}\text{C/W}$
 - $T_{JM} - T_A = P_{DM} Z_{thJA}^{(t)}$
 - Surface Mounted

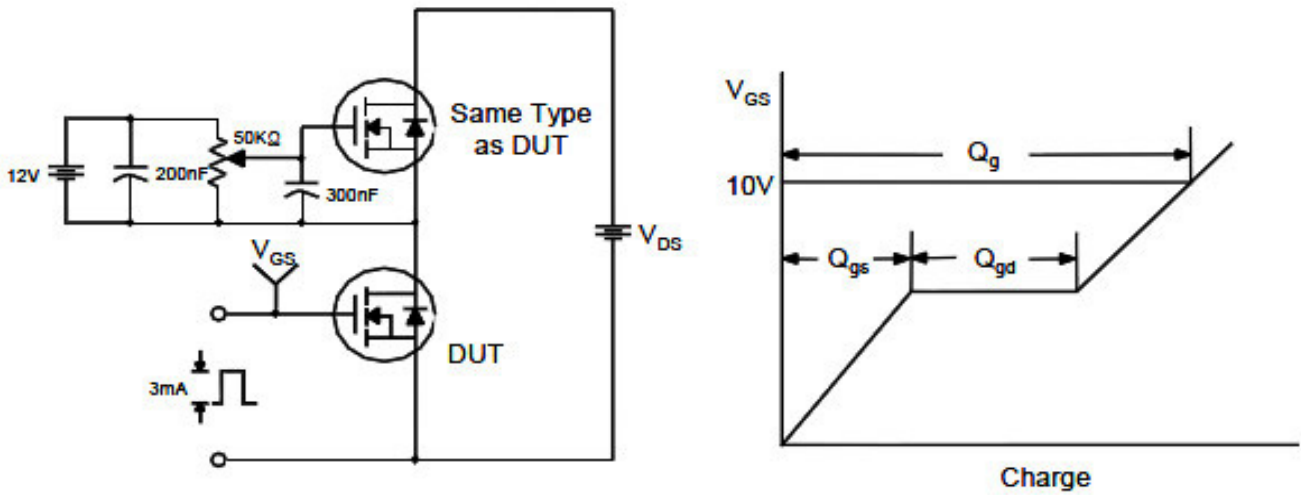
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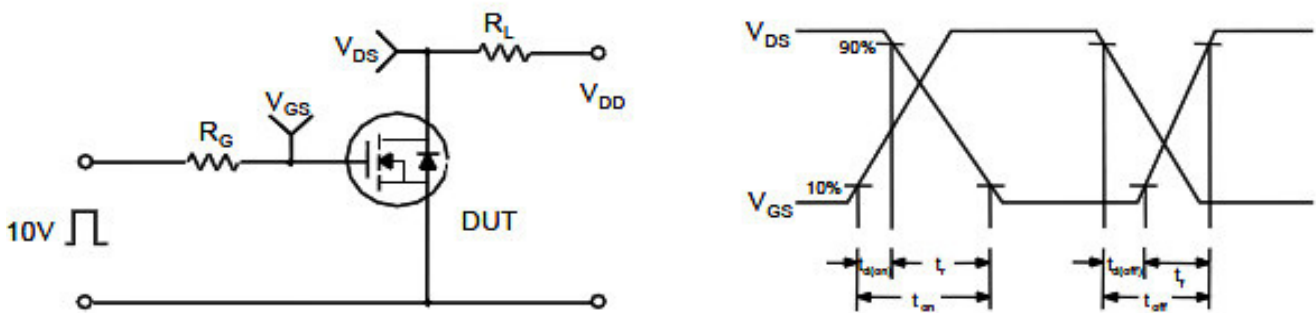
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■ Test circuit & waveform

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

