

Single P-channel MOSFET

ELM59575SA-S

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

■ General description

ELM59575SA-S uses advanced trench technology to provide excellent $R_{ds(on)}$, low gate charge and low gate threshold voltage.

■ Features

- $V_{ds} = -60V$
- $I_d = -18A$
- $R_{ds(on)} = 68m\Omega$ ($V_{gs} = -10V$)
- $R_{ds(on)} = 78m\Omega$ ($V_{gs} = -4.5V$)

■ Maximum absolute ratings

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

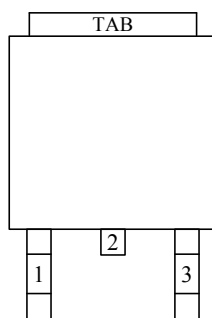
Parameter	Symbol	Limit	Unit
Drain-source voltage	V_{ds}	-60	V
Gate-source voltage	V_{gs}	± 20	V
Continuous drain current	I_d	$T_a = 25^\circ C$	-18
		$T_a = 70^\circ C$	-12
Pulsed drain current	I_{dm}	-50	A
Single pulse avalanche current	I_{as}	-12	A
Avalanche energy	E_{as}	23	mJ
Power dissipation	P_d	$T_c = 25^\circ C$	40
		$T_c = 70^\circ C$	15
Junction and storage temperature range	T_j, T_{stg}	-55 to 150	$^\circ C$

■ Thermal characteristics

Parameter	Symbol	Typ.	Max.	Unit
Thermal resistance junction-to-ambient	$R_{\theta ja}$		62.5	$^\circ C/W$

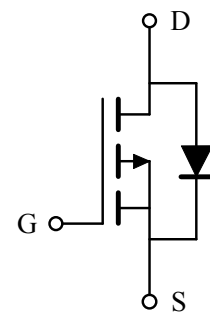
■ Pin configuration

TO-252-3(TOP VIEW)



Pin No.	Pin name
1	GATE
2	DRAIN
3	SOURCE

■ Circuit



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■ Electrical characteristics

Ta=25°C. Unless otherwise noted.

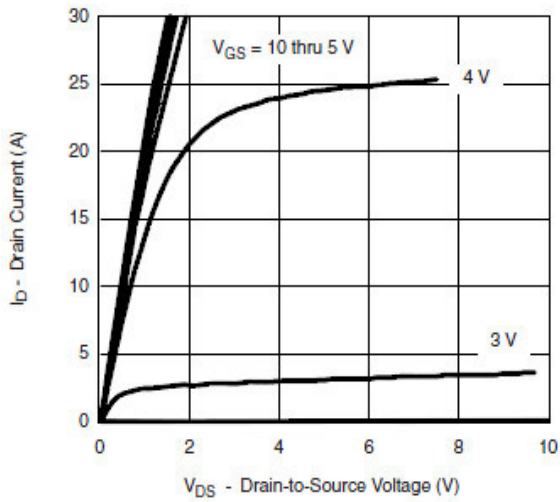
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
STATIC PARAMETERS						
Drain-source breakdown voltage	BVdss	Vgs=0V, Id=-250μA	-60			V
Zero gate voltage drain current	Idss	Vds=-48V, Vgs=0V			-1	μA
		Vds=-48V, Vgs=0V, Ta=85°C			-20	
Gate-body leakage current	Igss	Vds=0V, Vgs=±20V			±100	nA
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=-250μA	-1.0		-2.5	V
On state drain current	Id(on)	Vgs=-10V, Vds=-5V	-20			A
Static drain-source on-resistance	Rds(on)	Vgs=-10V, Id=-18A		55	68	mΩ
		Vgs=-4.5V, Id=-12A		65	78	
Forward transconductance	Gfs	Vds=-15V, Id=-3.2A		12		S
Diode forward voltage	Vsd	Is=-3A, Vgs=0V		-0.8	-1.3	V
Max. body-diode continuous current	Is				-10	A
DYNAMIC PARAMETERS						
Input capacitance	Ciss	Vgs=0V, Vds=-25V, f=1MHz		1200	2000	pF
Output capacitance	Coss			140		pF
Reverse transfer capacitance	Crss			90		pF
SWITCHING PARAMETERS						
Total gate charge	Qg	Vgs=-10V, Vds=-30V Id=-10A		25	40	nC
Gate-source charge	Qgs			5		nC
Gate-drain charge	Qgd			8		nC
Turn-on delay time	td(on)	Vgs=-10V, Vds=-30V RL=3Ω, Id=-18A Rgen=2.5Ω		10	20	ns
Turn-on rise time	tr			10	20	ns
Turn-off delay time	td(off)			45	80	ns
Turn-off fall time	tf			25	40	ns

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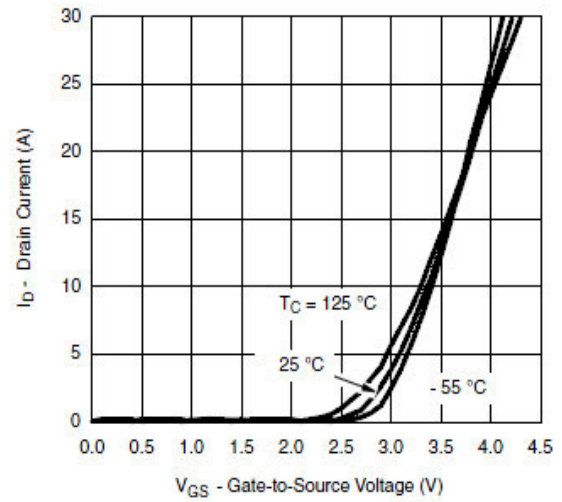
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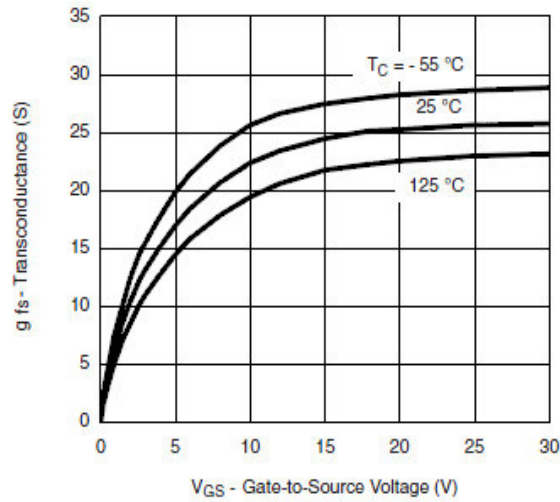
Typical electrical and thermal characteristics



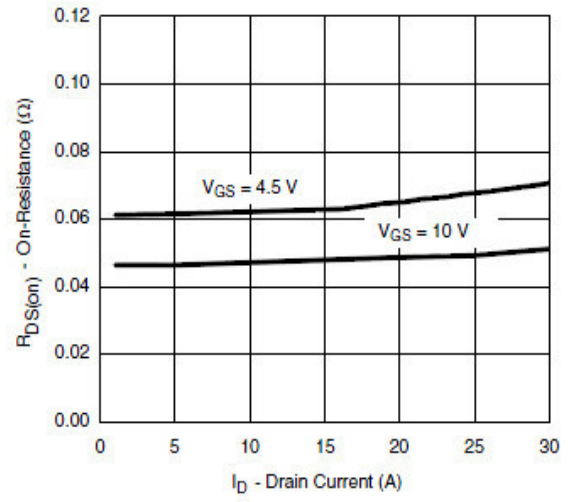
Output Characteristics



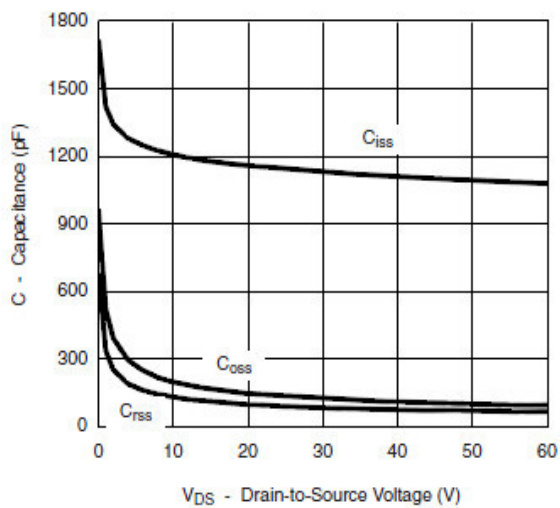
Transfer Characteristics



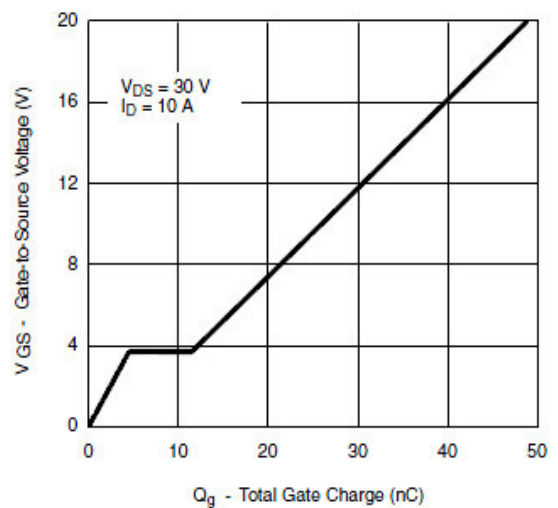
Transconductance



On-Resistance vs. Drain Current



Capacitance

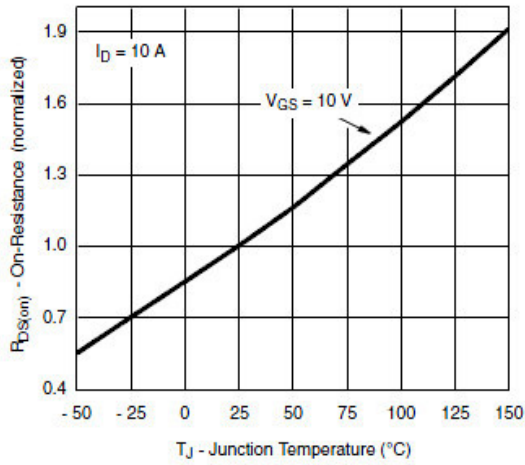


Gate Charge

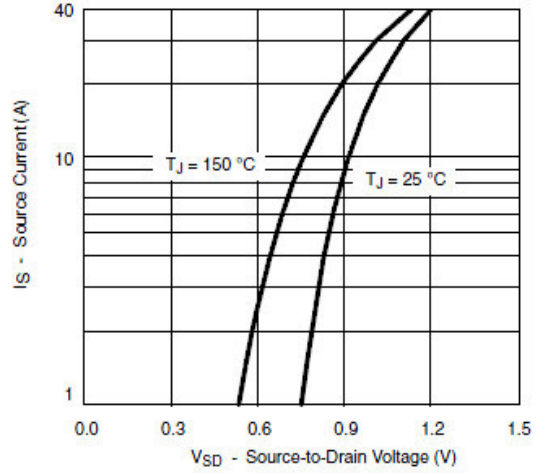
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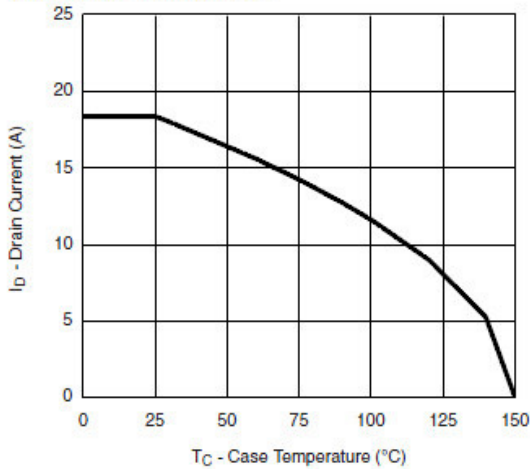


On-Resistance vs. Junction Temperature

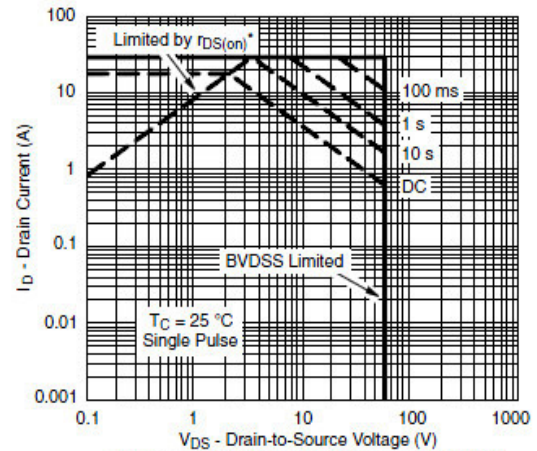


Source-Drain Diode Forward Voltage

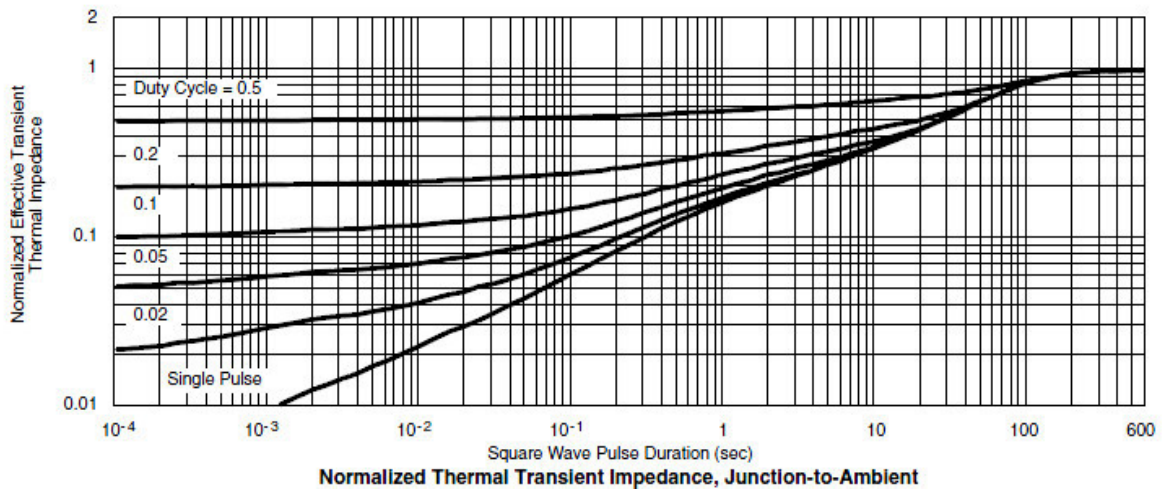
THERMAL RATINGS



Maximum Drain Current vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient

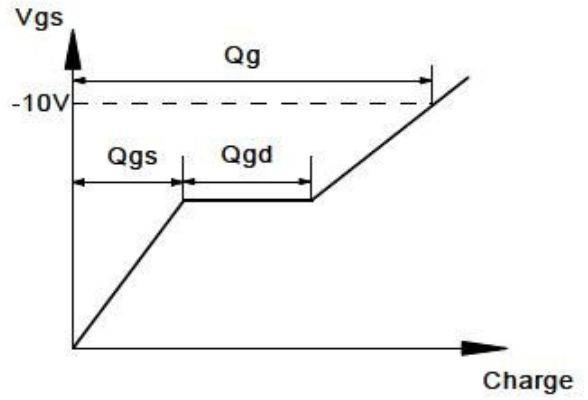
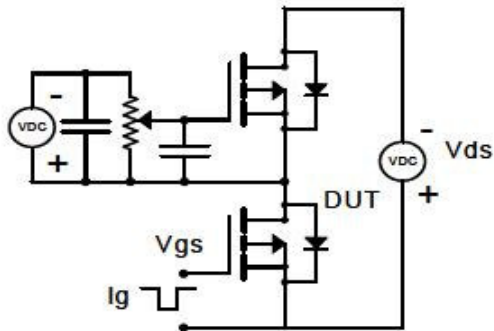
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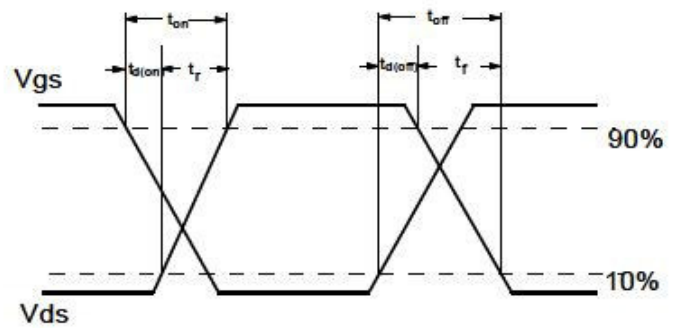
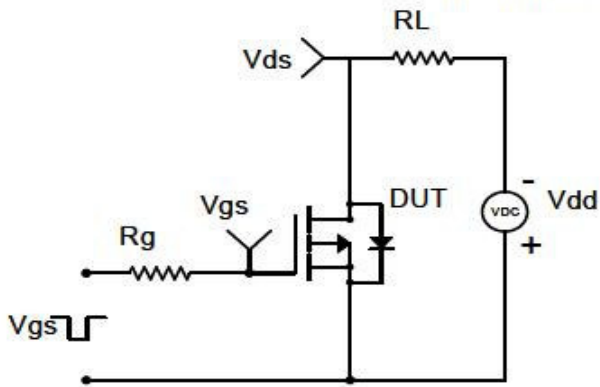
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■ Test circuit and waveform

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

