

# Single N-channel MOSFET

## ELM51230WSA-S

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

### ■ General description

ELM51230WSA-S uses advanced trench technology to provide excellent  $R_{ds(on)}$ , low gate charge and low gate threshold voltage. ESD protection is included.

### ■ Features

- $V_{ds}=100V$
- $I_d=0.17A$
- $R_{ds(on)} = 5.8\Omega$  ( $V_{gs}=10V$ )
- $R_{ds(on)} = 6.8\Omega$  ( $V_{gs}=4.5V$ )
- ESD Protected.

### ■ Maximum absolute ratings

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

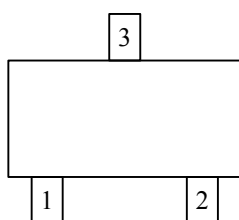
Parameter	Symbol	Limit	Unit
Drain-source voltage	$V_{ds}$	100	V
Gate-source voltage	$V_{gs}$	$\pm 20$	V
Continuous drain current( $T_j=150^\circ C$ )	Id	$T_a=25^\circ C$	0.17
		$T_a=70^\circ C$	0.17
Pulsed drain current	$I_{dm}$	0.68	A
Power dissipation	Pd	$T_c=25^\circ C$	0.35
		$T_c=70^\circ C$	0.22
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	$^\circ C/W$

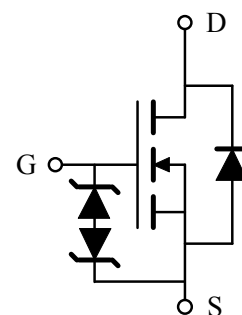
### ■ Pin configuration

SC-70(TOP VIEW)



Pin No.	Pin name
1	GATE
2	SOURCE
3	DRAIN

### ■ Circuit



# Single N-channel MOSFET

## ELM51230WSA-S

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

### ■ Electrical characteristics

Ta=25°C. Unless otherwise noted.

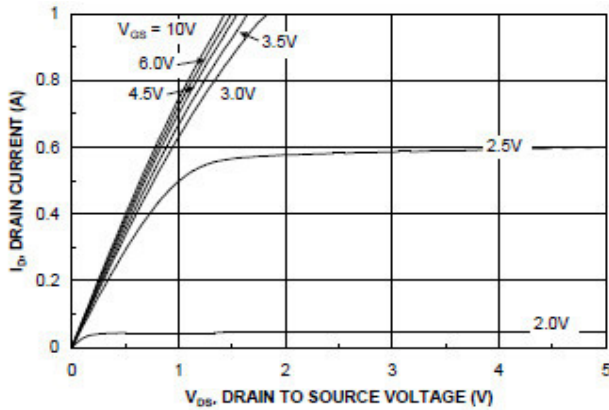
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	
<b>STATIC PARAMETERS</b>							
Drain-source breakdown voltage	BVdss	Id=250μA, Vgs=0V	100			V	
Zero gate voltage drain current	Idss	Vds=80V, Vgs=0V Ta=85°C			1	μA	
					10		
Gate-body leakage current	Igss	Vds=0V, Vgs=±20V			10	μA	
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=250μA	1.0		3.0	V	
Static drain-source on-resistance	Rds(on)	Vgs=10V, Id=0.17A		4.0	5.8	Ω	
		Vgs=4.5V, Id=0.17A		4.6	6.8		
Forward transconductance	Gfs	Vds=10V, Id=0.17A		0.8		S	
Diode forward voltage	Vsd	Is=0.17A, Vgs=0V		0.75	1.30	V	
Max. body-diode continuous current	Is				0.4	A	
<b>DYNAMIC PARAMETERS</b>							
Input capacitance	Ciss	Vgs=0V, Vds=25V, f=1MHz		70		pF	
Output capacitance	Coss				8		pF
Reverse transfer capacitance	Crss				5		pF
<b>SWITCHING PARAMETERS</b>							
Total gate charge	Qg	Vgs=10V, Vds=30V Id=0.22A		1.8	3.5	nC	
Gate-source charge	Qgs				0.2		nC
Gate-drain charge	Qgd				0.3		nC
Turn-on delay time	td(on)	Vgs=10V, Vds=30V Id=0.28A, Rgen=50.0Ω		5	10	ns	
Turn-on rise time	tr				5	10	ns
Turn-off delay time	td(off)				7	15	ns
Turn-off fall time	tf				10	20	ns

# Single N-channel MOSFET

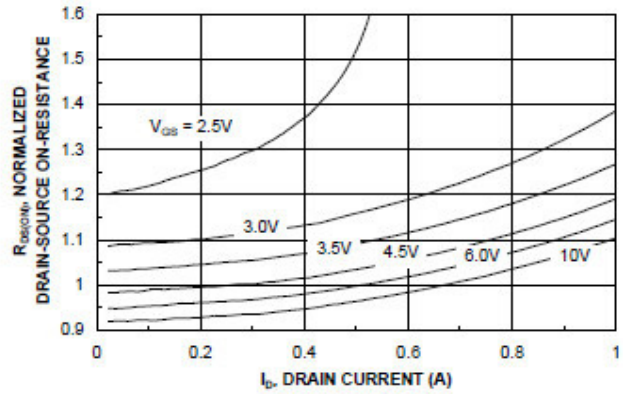
ELM51230WSA-S

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

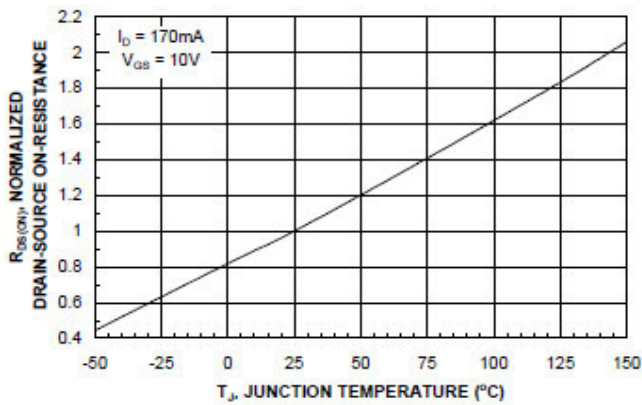
## ■ Typical electrical and thermal characteristics



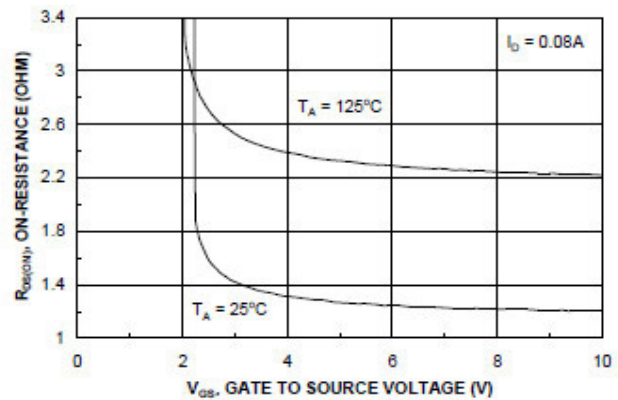
On-Region Characteristics



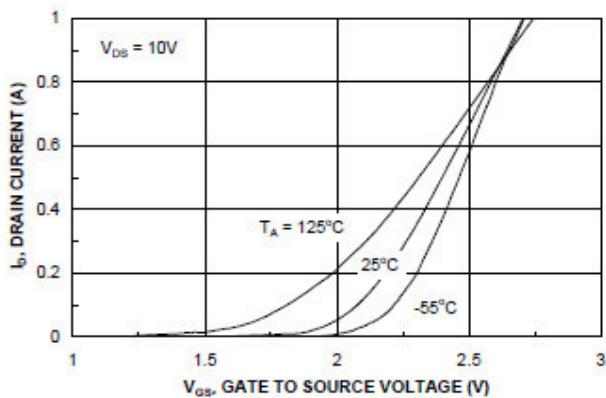
On-Resistance Variation with Drain Current and Gate Voltage



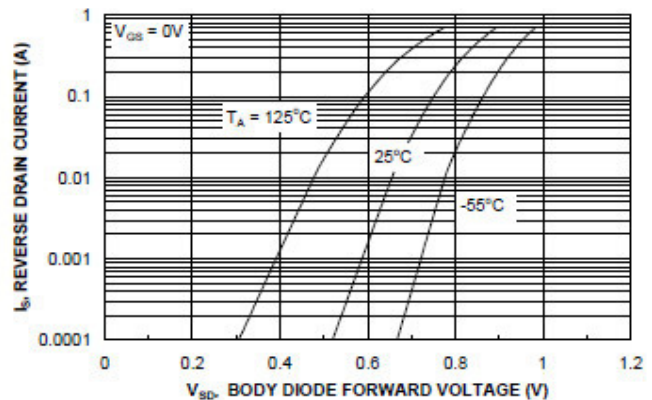
On-Resistance Variation with Temperature



On-Resistance Variation with Gate-to-Source Voltage



Transfer Characteristics

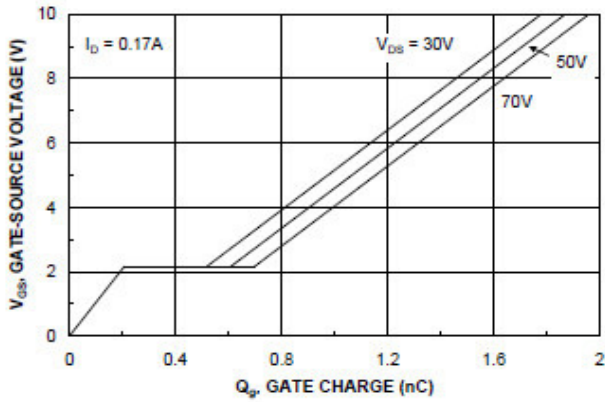


Body Diode Forward Voltage Variation with Source Current and Temperature

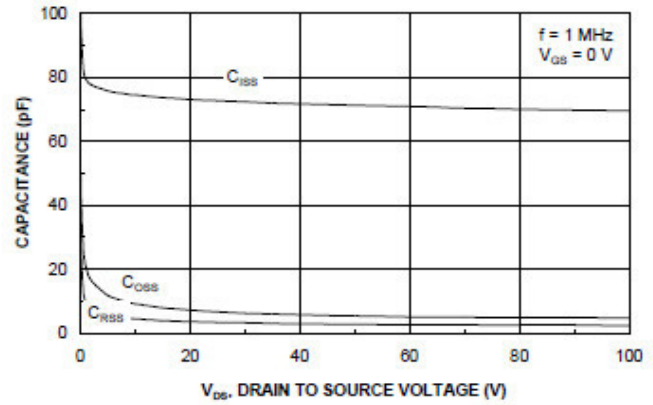
# Single N-channel MOSFET

## ELM51230WSA-S

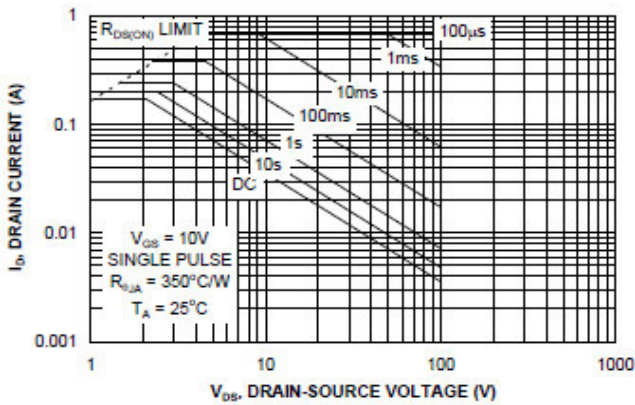
<http://www.elm-tech.com>



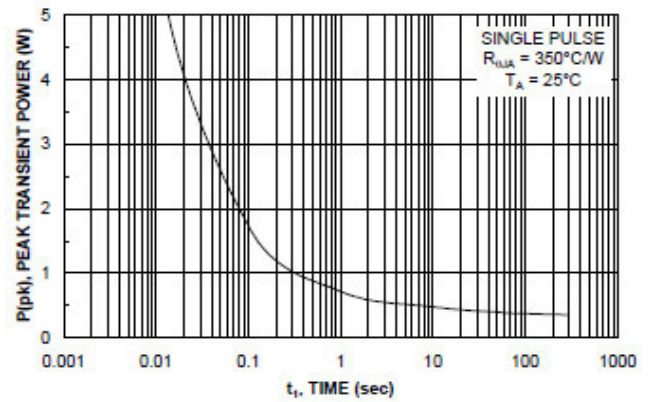
Gate Charge Characteristics



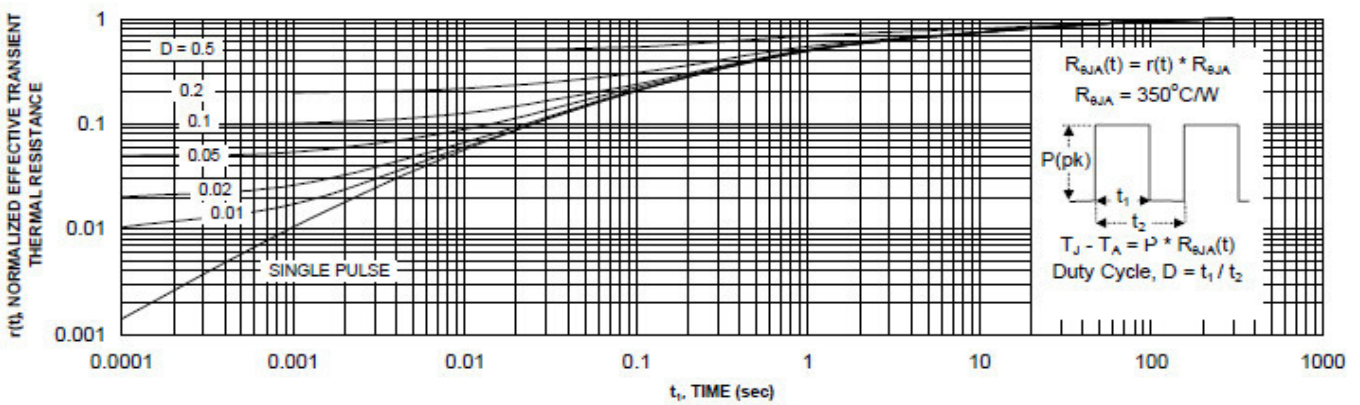
Capacitance Characteristics



Maximum Safe Operating Area



Single Pulse Maximum Power Dissipation



Transient Thermal Response Curve, Junction to Ambient

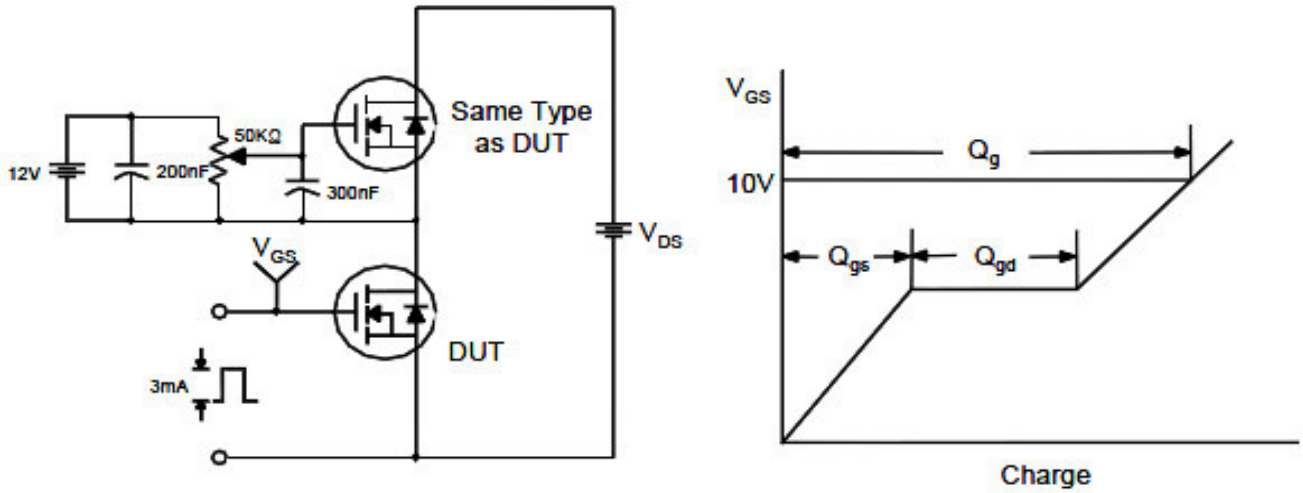
# Single N-channel MOSFET

ELM51230WSA-S

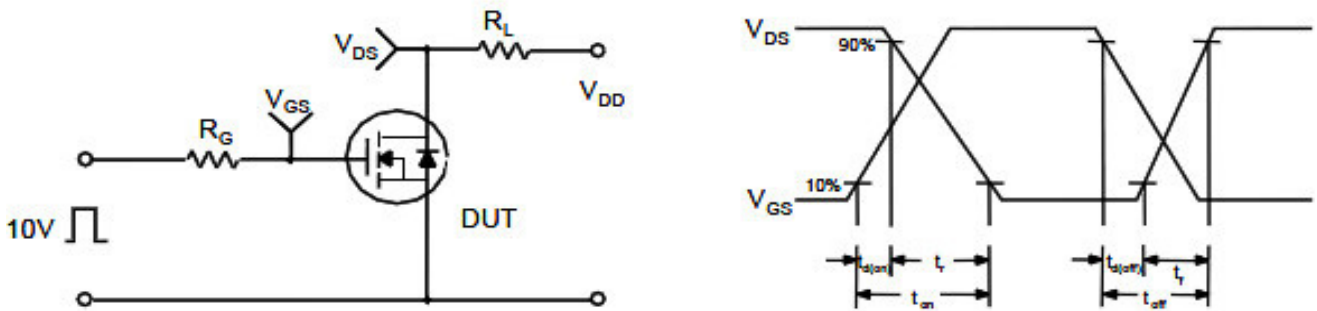
<http://www.elm-tech.com>

## ■ Test circuit and waveform

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

