

Single N-channel MOSFET

ELM51330KSA-S

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

■General description

ELM51330KSA-S uses advanced trench technology to provide excellent $R_{ds(on)}$, low gate charge and low gate threshold voltage. ESD protection is included.

■Features

- $V_{ds}=60V$
- $I_d=0.5A$
- $R_{ds(on)} = 2.4\Omega$ ($V_{gs}=10V$)
- $R_{ds(on)} = 3.0\Omega$ ($V_{gs}=4.5V$)
- ESD Rating : 2KV

■Maximum absolute ratings

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

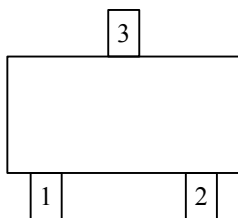
Parameter	Symbol	Limit	Unit
Drain-source voltage	V_{ds}	60	V
Gate-source voltage	V_{gs}	± 20	V
Continuous drain current($T_j=150^\circ C$)	I_d	0.5	A
		0.3	
Pulsed drain current	I_{dm}	1.0	A
Power dissipation	P_d	0.35	W
		0.22	
Operating junction temperature	T_j	150	$^\circ C$
Storage temperature range	T_{stg}	- 55 to 150	$^\circ C$

■Thermal characteristics

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

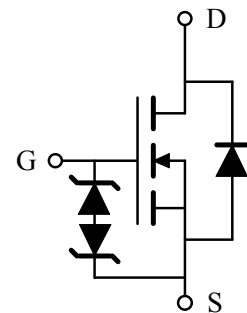
■Pin configuration

SC-70(TOP VIEW)



Pin No.	Pin name
1	GATE
2	SOURCE
3	DRAIN

■Circuit



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■Electrical characteristics

Ta=25°C. Unless otherwise noted.

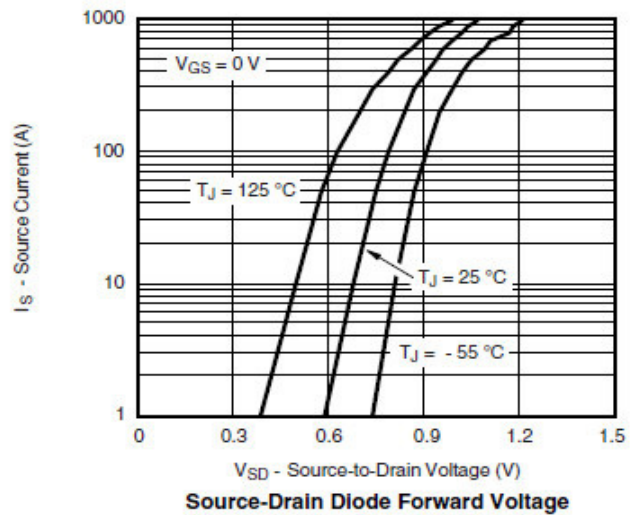
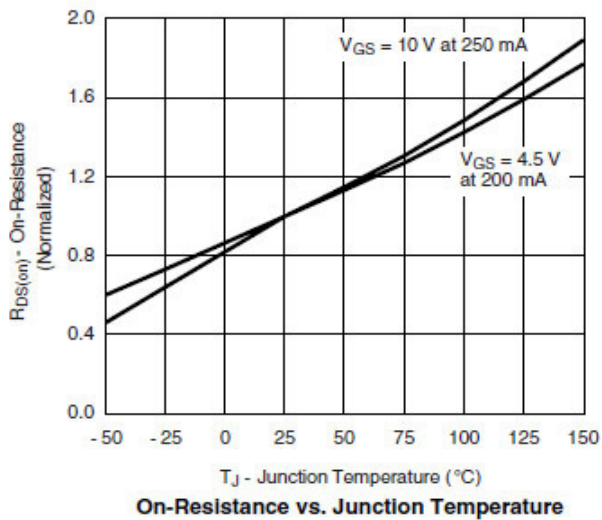
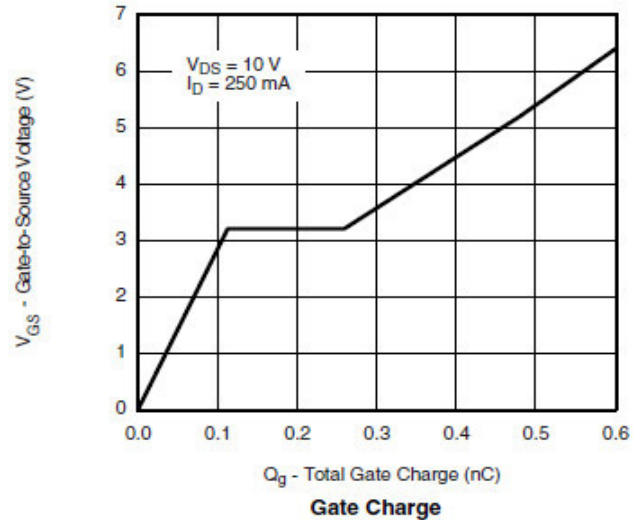
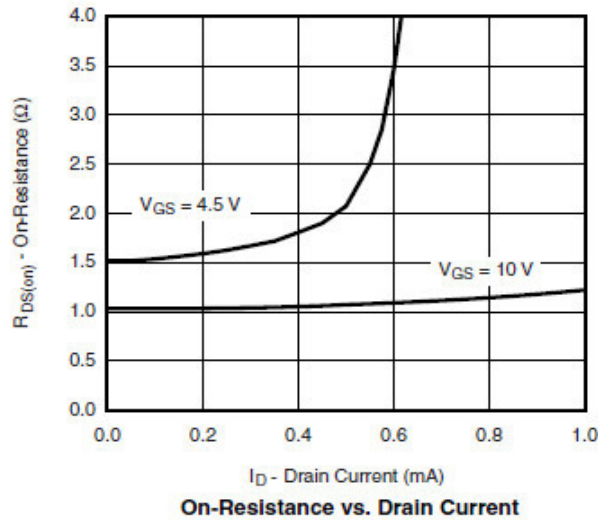
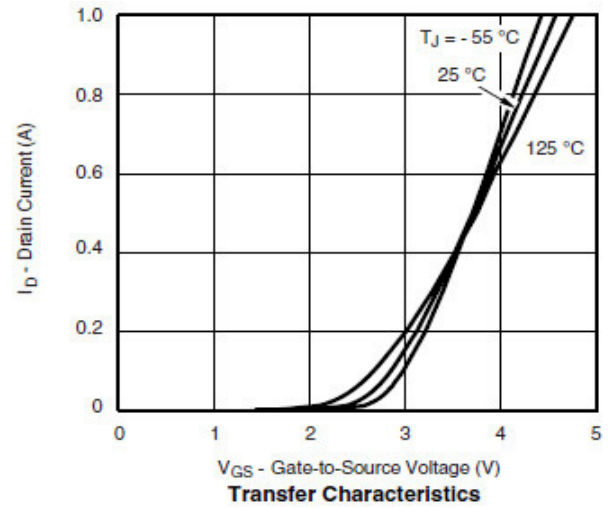
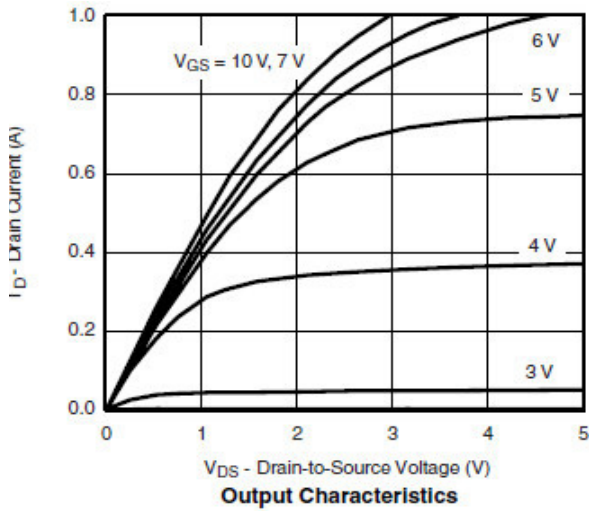
Parameter	Symbol	Condition		Min.	Typ.	Max.	Unit
STATIC PARAMETERS							
Drain-source breakdown voltage	BVdss	Id=250μA, Vgs=0V		60			V
Zero gate voltage drain current	Idss	Vds=60V, Vgs=0V				1	μA
			Ta=85°C			10	
Gate-body leakage current	Igss	Vds=0V, Vgs=±20V				3	μA
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=250μA		1.0		2.0	V
Static drain-source on-resistance	Rds(on)	Vgs=10V, Id=0.5A			1.2	2.4	Ω
		Vgs=4.5V, Id=0.3A			1.6	3.0	
Forward transconductance	Gfs	Vds=10V, Id=0.2A			0.2		S
Diode forward voltage	Vsd	Is=0.2A, Vgs=0V			0.75	1.40	V
Max. body-diode continuous current	Is					0.4	A
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vgs=0V, Vds=25V, f=1MHz			30		pF
Output capacitance	Coss				8		pF
Reverse transfer capacitance	Crss				5		pF
SWITCHING PARAMETERS							
Total gate charge	Qg	Vgs=4.5V, Vds=10V Id=0.25A			450		pC
Gate-source charge	Qgs				110		pC
Gate-drain charge	Qgd				150		pC
Turn-on delay time	td(on)	Vgs=10V, Vds=30V RL=150Ω, Id=0.2A Rgen=10Ω			4	10	ns
Turn-on rise time	tr				5	15	ns
Turn-off delay time	td(off)				12	20	ns
Turn-off fall time	tf				10	20	ns

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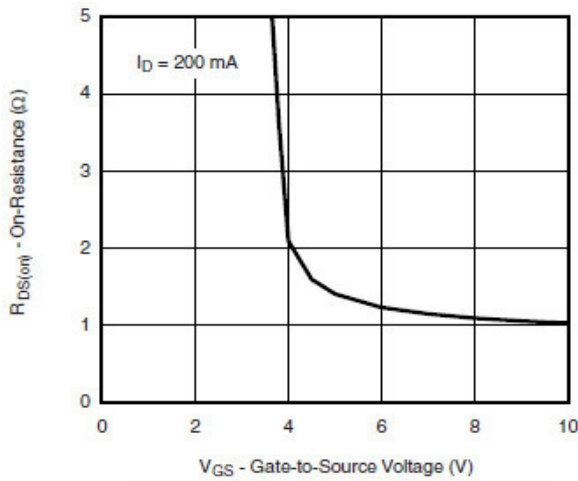
■ Typical electrical and thermal characteristics



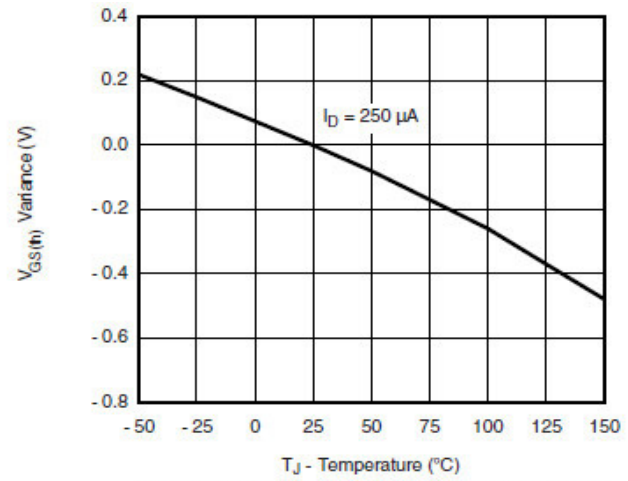
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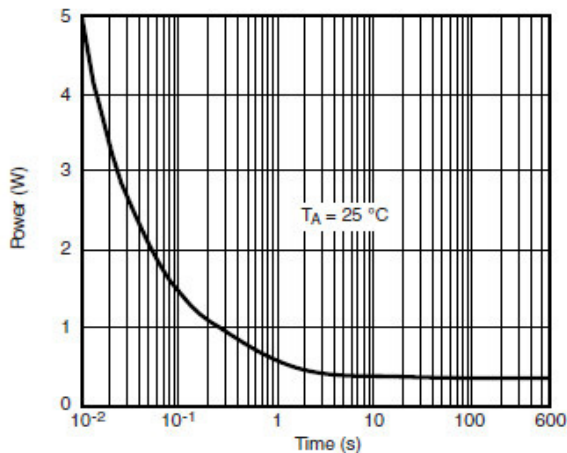
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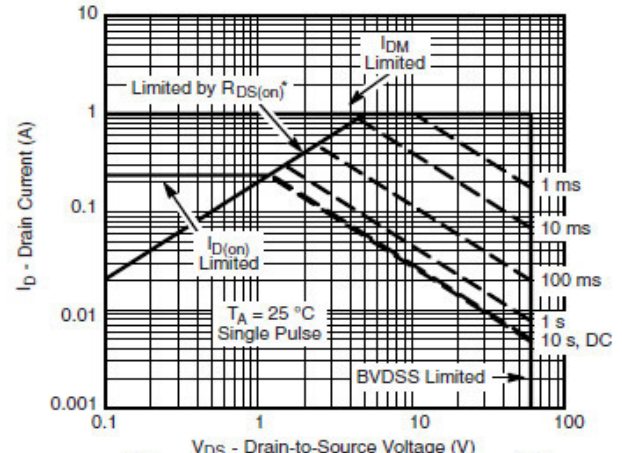
On-Resistance vs. Gate-Source Voltage



Threshold Voltage Variance over Temperature

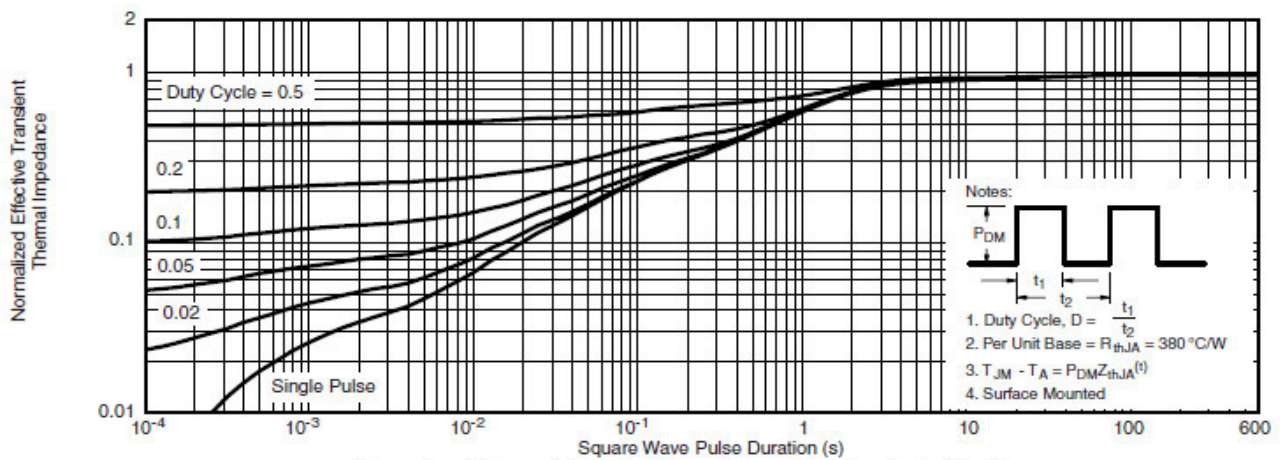


Single Pulse Power



* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient

- Notes:
1. Duty Cycle, $D = \frac{t_1}{t_1 + t_2}$
 2. Per Unit Base = $R_{thJA} = 380^{\circ}C/W$
 3. $T_{JM} - T_A = P_{DM} Z_{thJA}^{(t)}$
 4. Surface Mounted

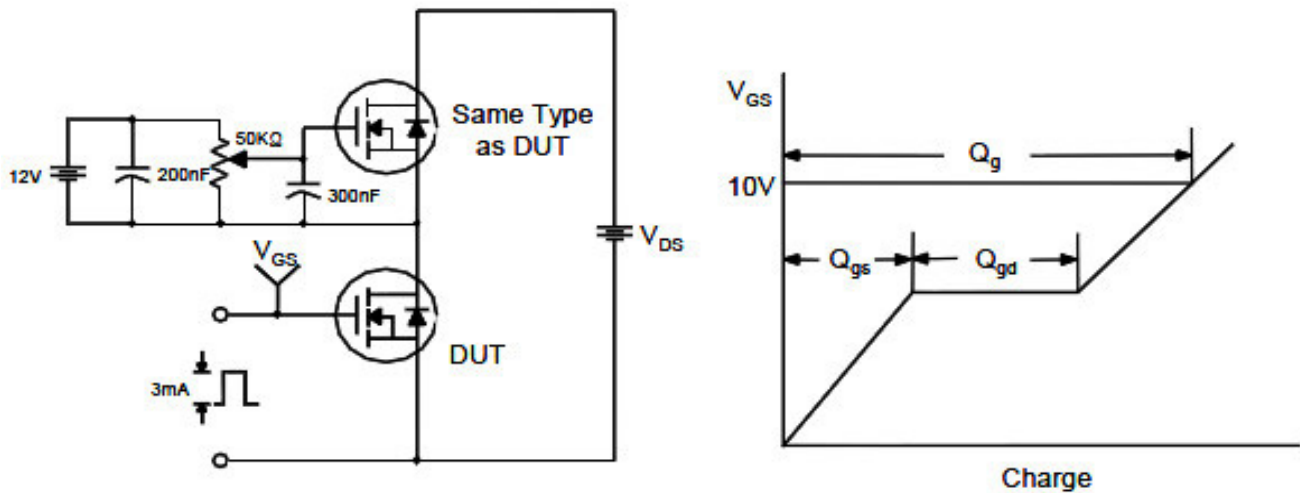
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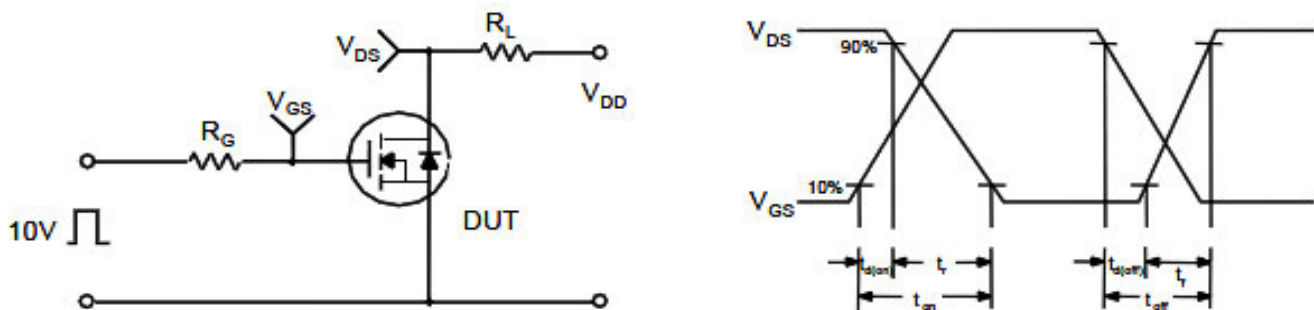
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■ Test circuit and waveform

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

