Single N-channel MOSFET

ELM51400FA-S

■General description

ELM51400FA-S uses advanced trench technology to provide excellent Rds(on), low gate charge and low gate resistance.

■Features

- Vds=30V
- Id=1.0A
- Rds(on) < 430mΩ (Vgs=4.5V)
- Rds(on) < 580mΩ (Vgs=2.5V)
- Rds(on) < 860mΩ (Vgs=1.8V)

■Maximum absolute ratings

Ta=25°C. Unless otherwise noted.

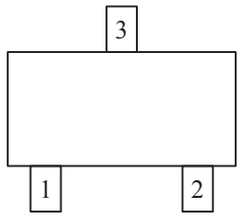
Parameter		Symbol	Limit	Unit
Drain-source voltage		Vds	30	V
Gate-source voltage		Vgs	±12	V
Continuous drain current(Tj=150°C)	Ta=25°C	Id	1.0	A
	Ta=70°C		0.6	
Pulsed drain current		Idm	6	A
Power dissipation	Tc=25°C	Pd	0.35	W
	Tc=70°C		0.22	
Junction and storage temperature range		Tj, Tstg	- 55 to 150	°C

■Thermal characteristics

Parameter	Symbol	Typ.	Max.	Unit
Maximum junction-to-ambient	Rθja		120	°C/W

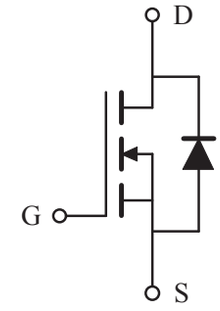
■Pin configuration

SC-70(TOP VIEW)



Pin No.	Pin name
1	GATE
2	SOURCE
3	DRAIN

■Circuit

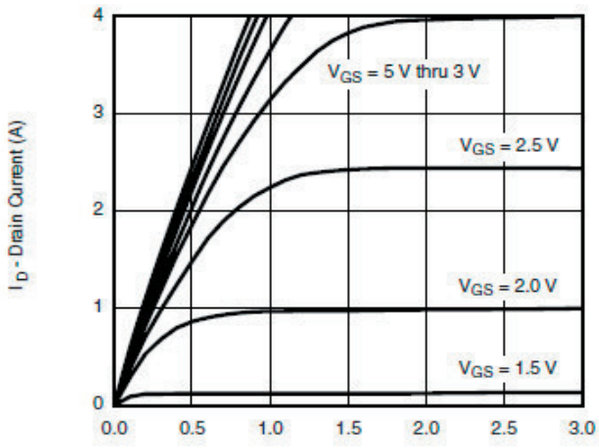


■Electrical characteristics

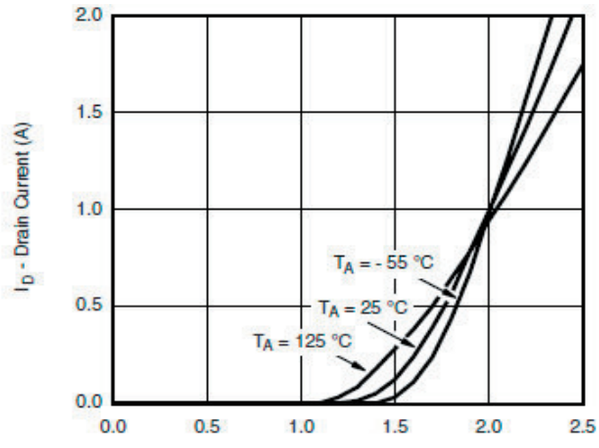
Ta=25°C. Unless otherwise noted.

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			5	
Gate-body leakage current	Igss	Vds=0V, Vgs=±12V				±100	nA
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=250μA		0.5		1.0	V
On state drain current	Id(on)	Vgs=4.5V, Vds=5V		1.8			A
Static drain-source on-resistance	Rds(on)	Vgs=4.5V, Id=1.5A			380	430	mΩ
		Vgs=2.5V, Id=1.2A			500	580	
		Vgs=1.8V, Id=0.6A			760	860	
Forward transconductance	Gfs	Vds=10V, Id=1.0A			1		S
Diode forward voltage	Vsd	Is=1.0A, Vgs=0V			0.65	1.20	V
Max. body-diode continuous current	Is					1.0	A
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vgs=0V, Vds=15V, f=1MHz			85		pF
Output capacitance	Coss				25		pF
Reverse transfer capacitance	Crss				15		pF
SWITCHING PARAMETERS							
Total gate charge	Qg	Vgs=4.5V, Vds=15V Id=1.2A			1.4	1.8	nC
Gate-source charge	Qgs				0.3		nC
Gate-drain charge	Qgd				0.6		nC
Turn-on delay time	td(on)	Vgs=4.5V, Vds=15V RL=20Ω, Id=1.2A Rgen=1Ω			15	25	ns
Turn-on rise time	tr				25	45	ns
Turn-off delay time	td(off)				15	25	ns
Turn-off fall time	tf				10	20	ns

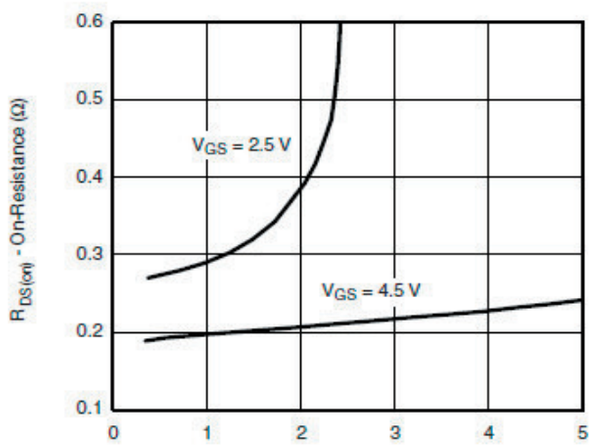
■Typical electrical and thermal characteristics



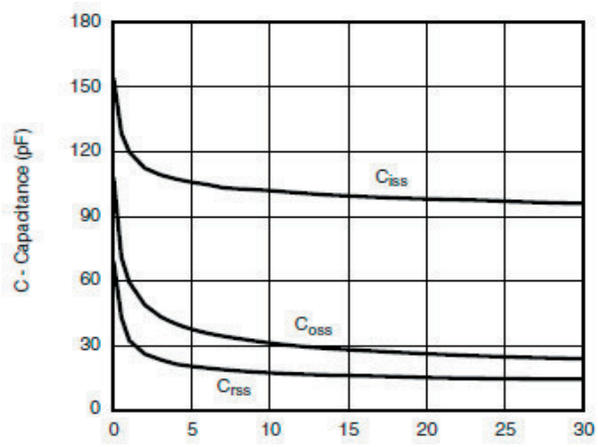
Output Characteristics



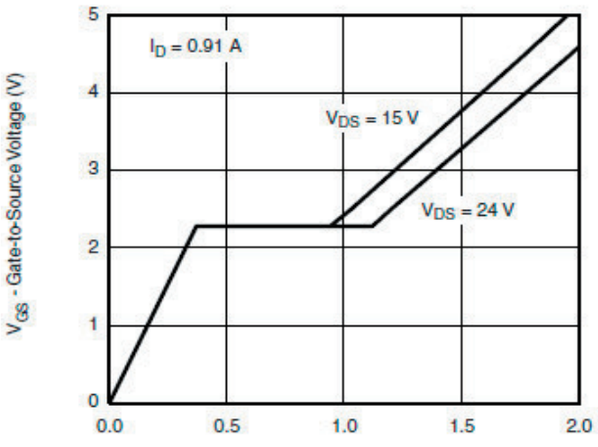
Transfer Characteristics Curves vs. Temperature



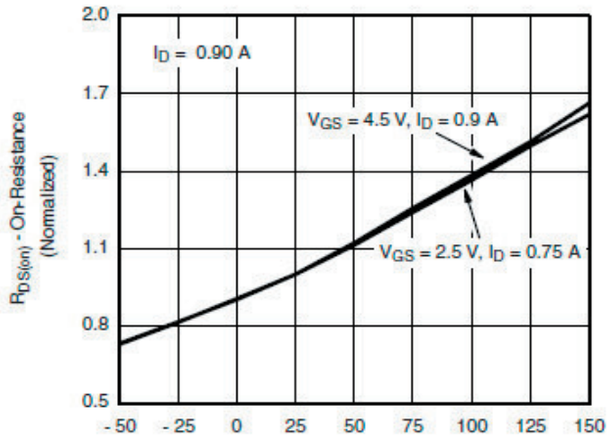
On-Resistance vs. Drain Current



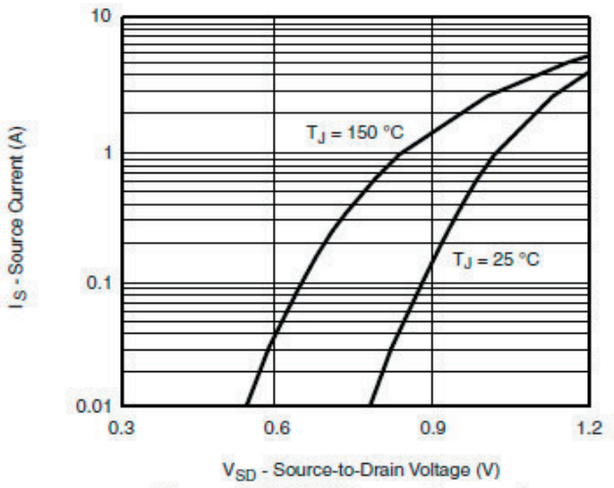
Capacitance



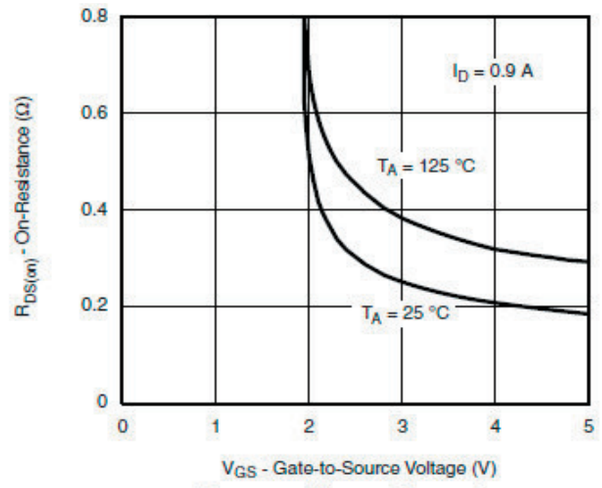
Gate Charge



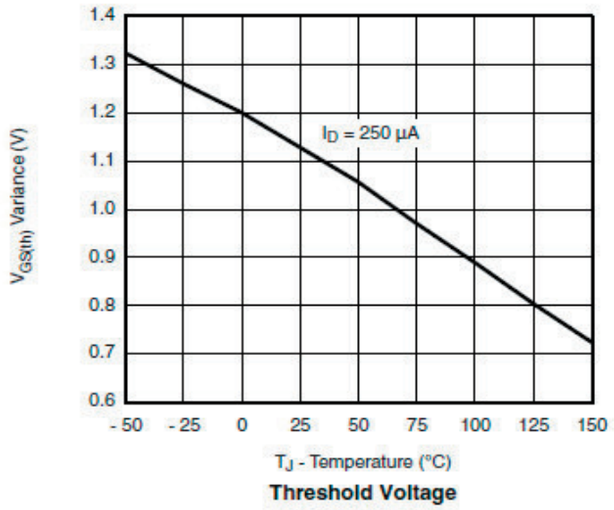
On-Resistance vs. Junction Temperature



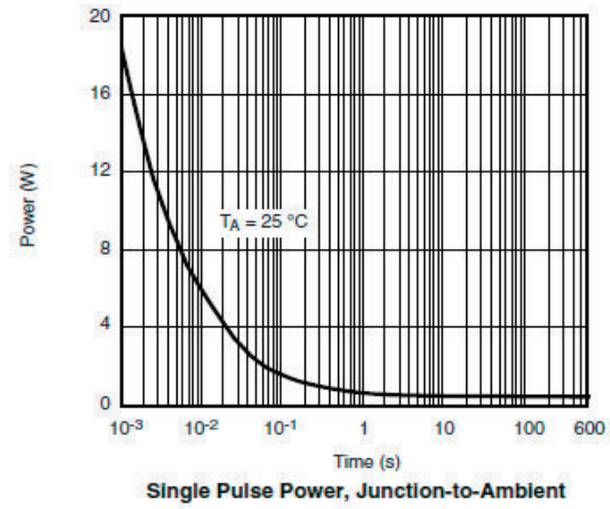
Forward Diode Voltage vs. Temperature



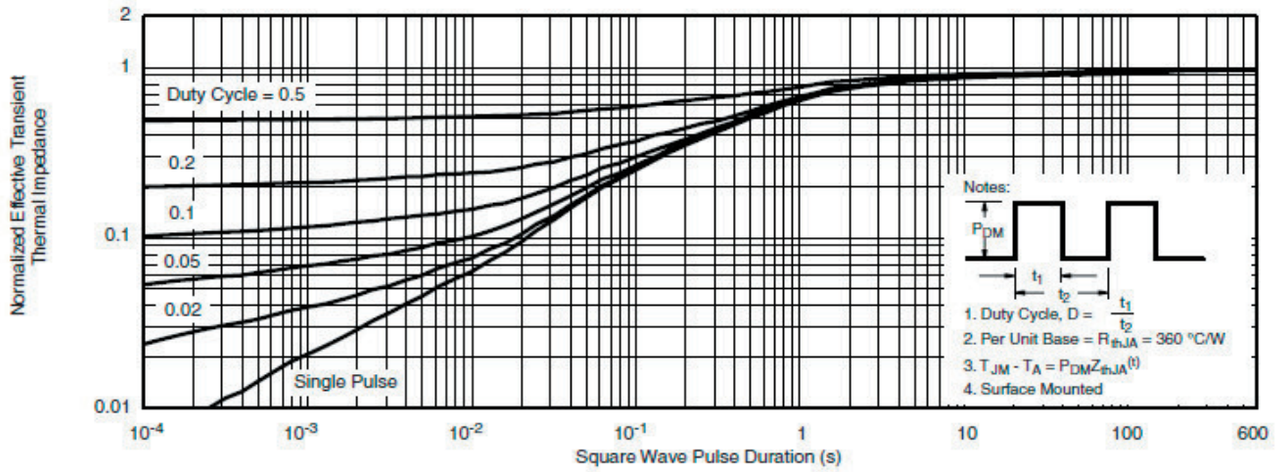
$R_{DS(on)}$ vs. V_{GS} vs. Temperature



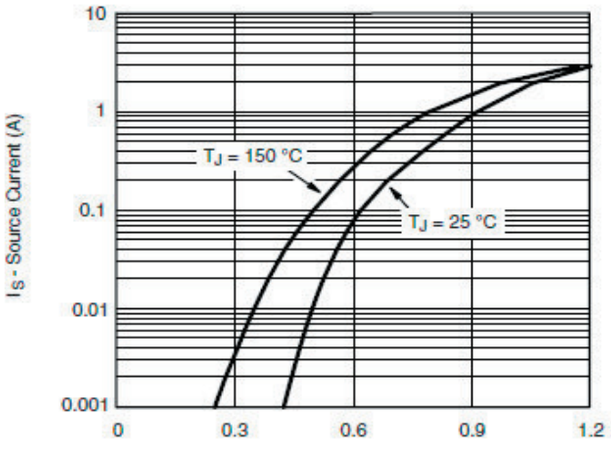
Threshold Voltage



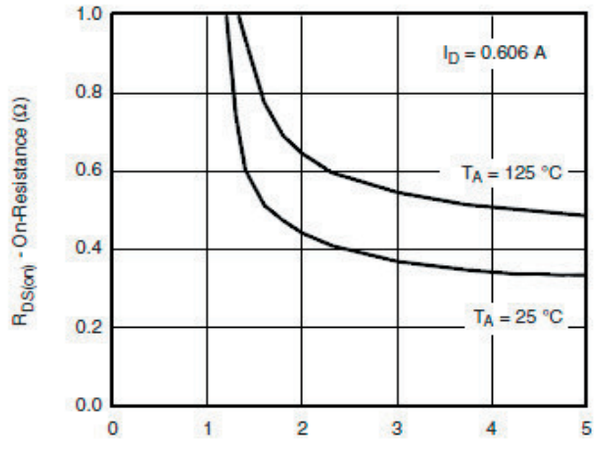
Single Pulse Power, Junction-to-Ambient



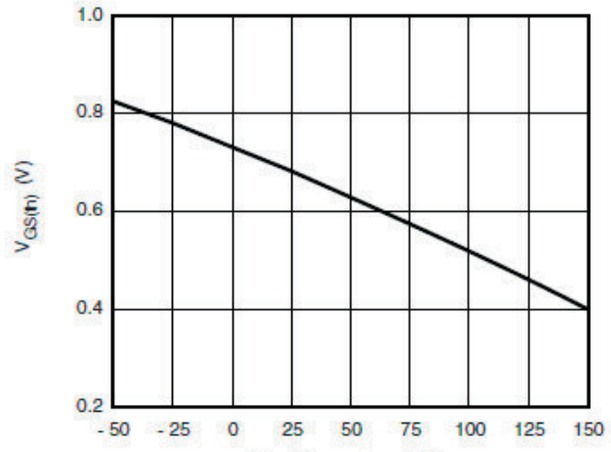
Normalized Thermal Transient Impedance, Junction-to-Ambient



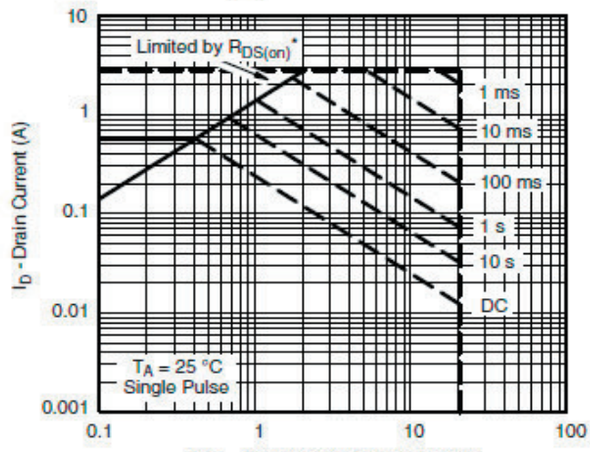
Source-Drain Diode Forward Voltage



$R_{DS(on)}$ vs. V_{GS} vs Temperature

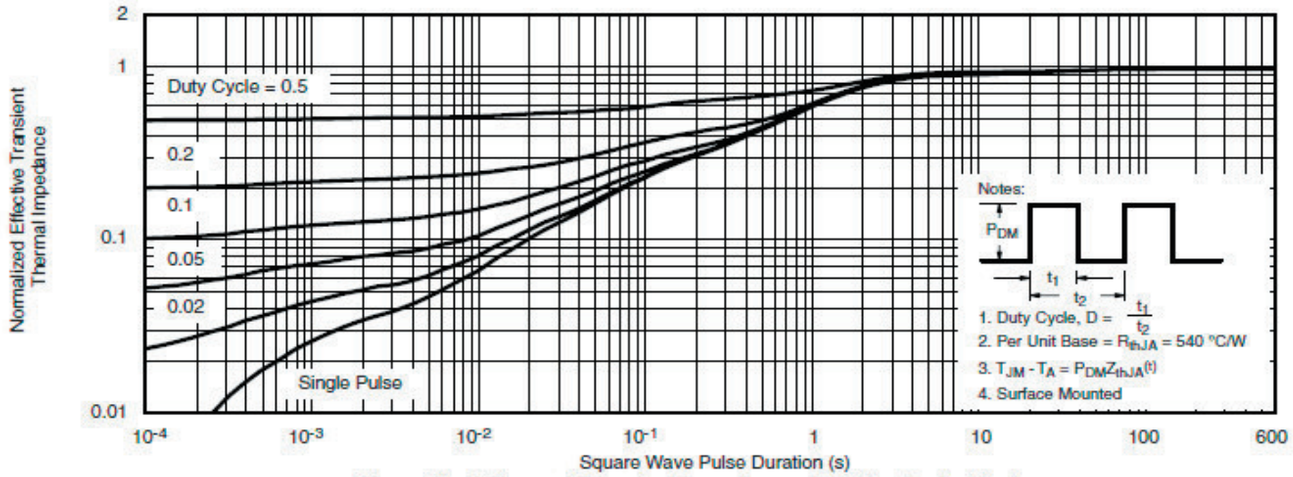


Threshold Voltage



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

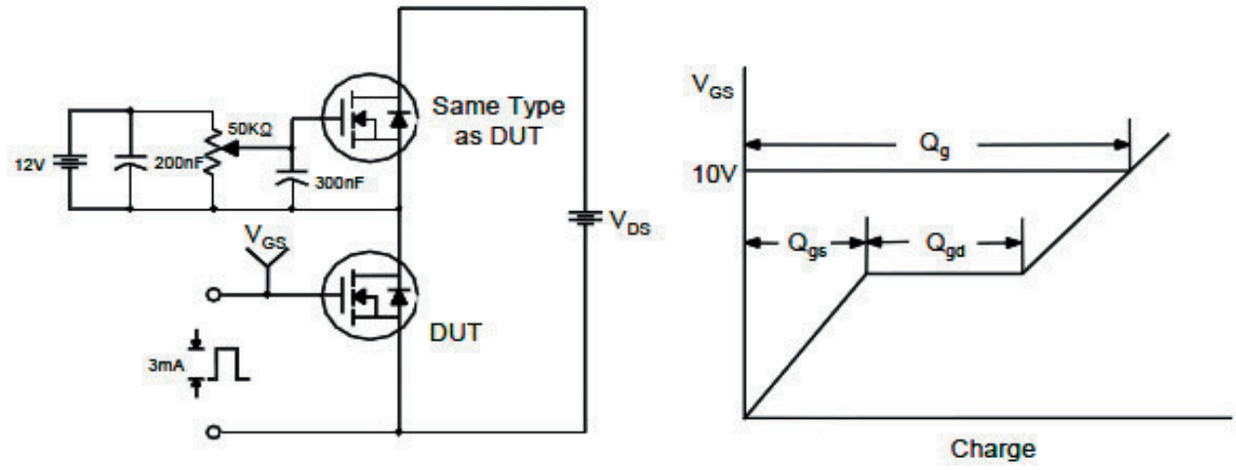
Safe Operating Area, Junction-to-Ambient



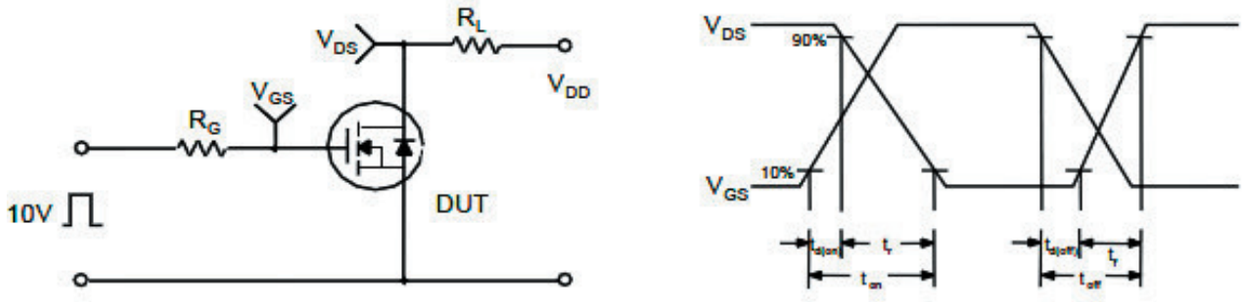
Normalized Thermal Transient Impedance, Junction-to-Ambient

■Test circuit and waveform

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms