Single N-channel MOSFET

ELM5E400PA-S

■General description

ELM5E400PA-S uses advanced trench technology to provide excellent Rds(on), low gate charge and low gate resistance.

■Features

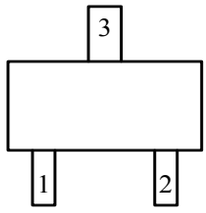
- Vds=20V
- Id=0.7A
- Rds(on) = 360mΩ (Vgs=4.5V)
- Rds(on) = 420mΩ (Vgs=2.5V)
- Rds(on) = 560mΩ (Vgs=1.8V)

■Maximum absolute ratings

Parameter		Symbol	Limit	Unit
Drain-source voltage		Vds	20	V
Gate-source voltage		Vgs	±12	V
Continuous drain current Tj=150°C	Ta=25°C	Id	0.7	A
	Ta=70°C		0.4	
Pulsed drain current		Idm	1.0	A
Power dissipation	Ta=25°C	Pd	0.27	W
	Ta=70°C		0.16	
Junction and storage temperature range		Tj, Tstg	-55 to 150	°C

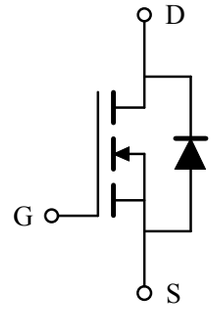
■Pin configuration

SOT-523(TOP VIEW)



Pin No.	Pin name
1	GATE
2	SOURCE
3	DRAIN

■Circuit

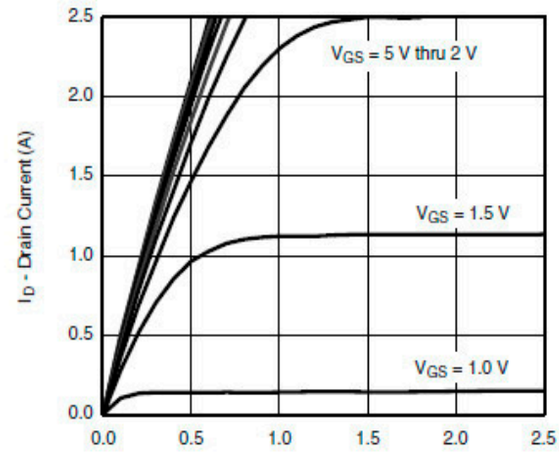


■Electrical characteristics

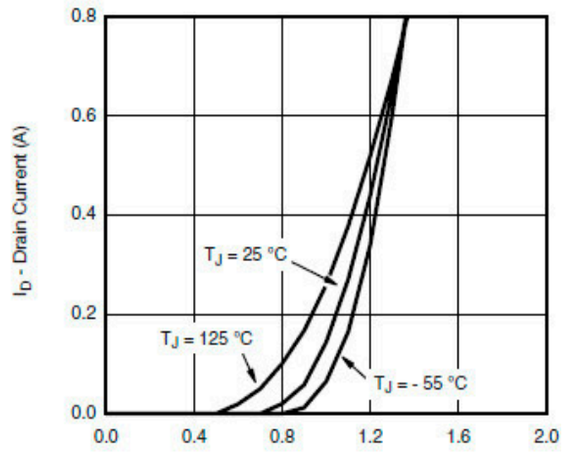
Ta=25°C

Parameter	Symbol	Condition		Min.	Typ.	Max.	Unit
STATIC PARAMETERS							
Drain-source breakdown voltage	BVdss	Id=250μA, Vgs=0V		20			V
Zero gate voltage drain current	Idss	Vds=20V, Vgs=0V				1	μA
			Tj=85°C			5	
Gate-body leakage current	Igss	Vds=0V, Vgs=±12V				±100	nA
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=250μA		0.4		1.0	V
On state drain current	Id(on)	Vgs=4.5V, Vds=5V		0.7			A
Static drain-source on-resistance	Rds(on)	Vgs=4.5V, Id=0.6A			240	360	mΩ
		Vgs=2.5V, Id=0.5A			300	420	
		Vgs=1.8V, Id=0.4A			420	560	
Forward transconductance	Gfs	Vds=10V, Id=0.4A			1		S
Diode forward voltage	Vsd	Is=0.15A, Vgs=0V			0.65	1.20	V
Max. body-diode continuous current	Is					0.3	A
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vgs=0V, Vds=10V, f=1MHz			70		pF
Output capacitance	Coss				20		pF
Reverse transfer capacitance	Crss				8		pF
SWITCHING PARAMETERS							
Total gate charge	Qg	Vgs=4.5V, Vds=10V, Id=0.6A			1.06	1.38	nC
Gate-source charge	Qgs				0.18		nC
Gate-drain charge	Qgd				0.32		nC
Turn-on delay time	td(on)	Vgs=4.5V, Vds=10V Rl=20Ω, Id=0.5A, Rgen=1Ω			18	26	ns
Turn-on rise time	tr				20	28	ns
Turn-off delay time	td(off)				70	110	ns
Turn-off fall time	tf				25	40	ns

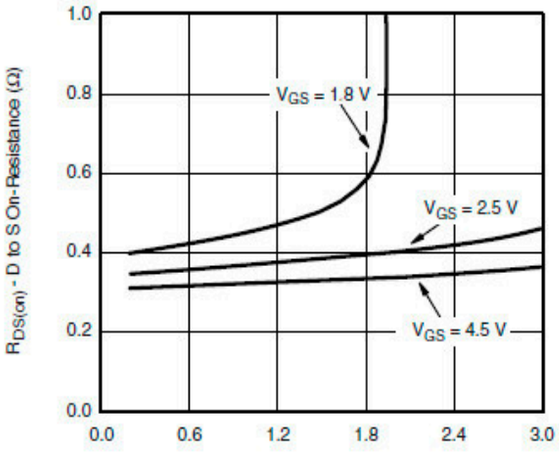
■Typical electrical and thermal characteristics



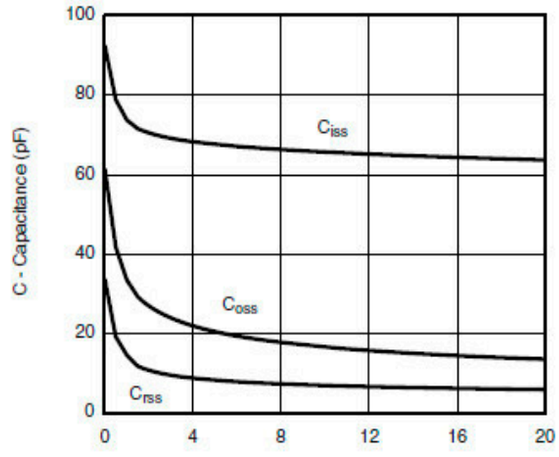
Output Characteristics



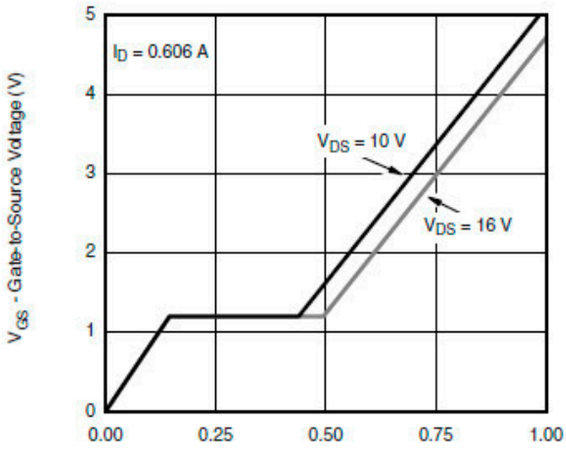
Transfer Characteristics



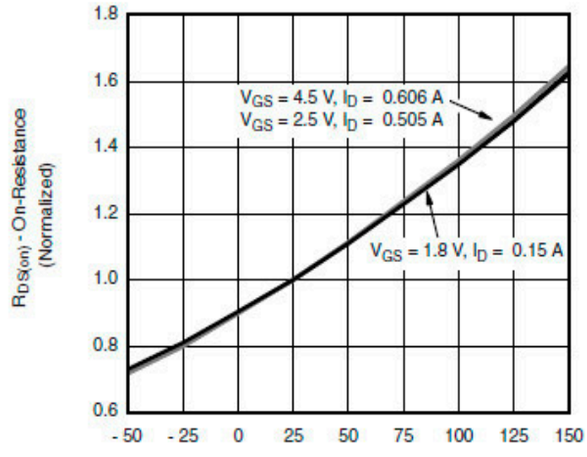
On-Resistance vs. Drain Current



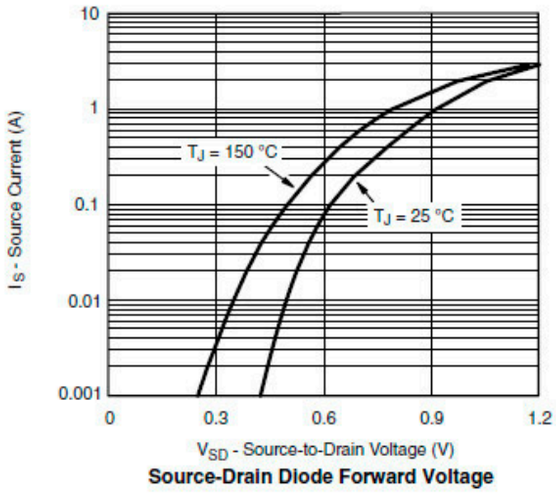
Capacitance



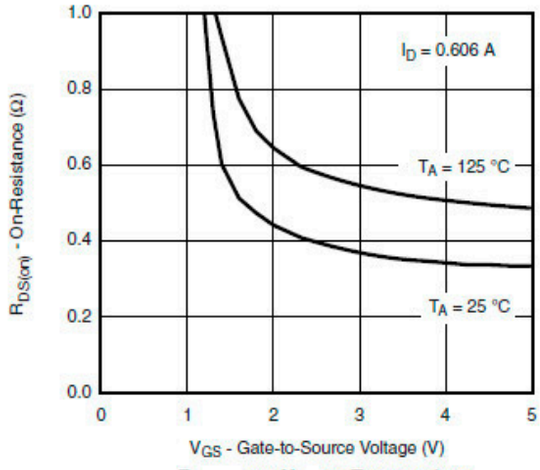
Gate Charge



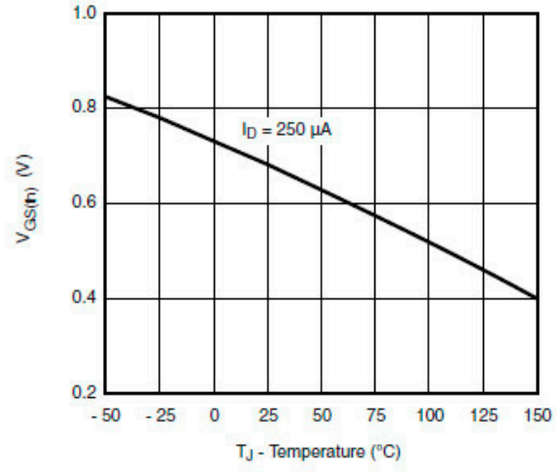
On-Resistance vs. Junction Temperature



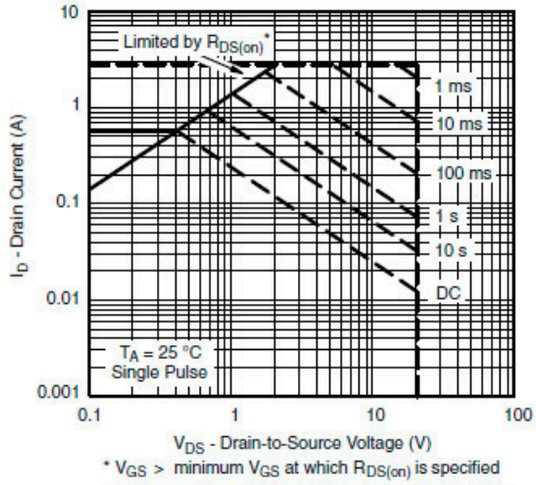
Source-Drain Diode Forward Voltage



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

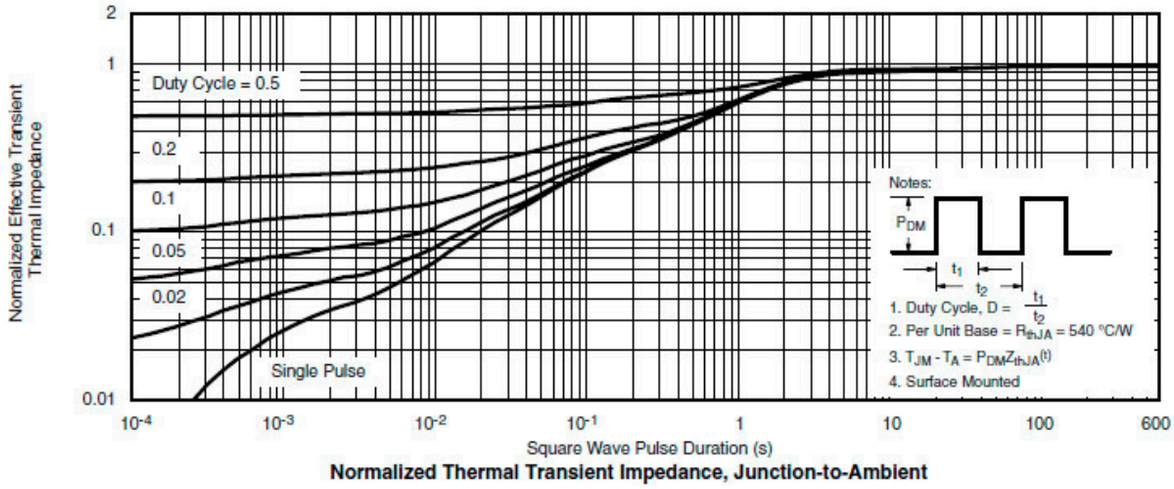


Threshold Voltage



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

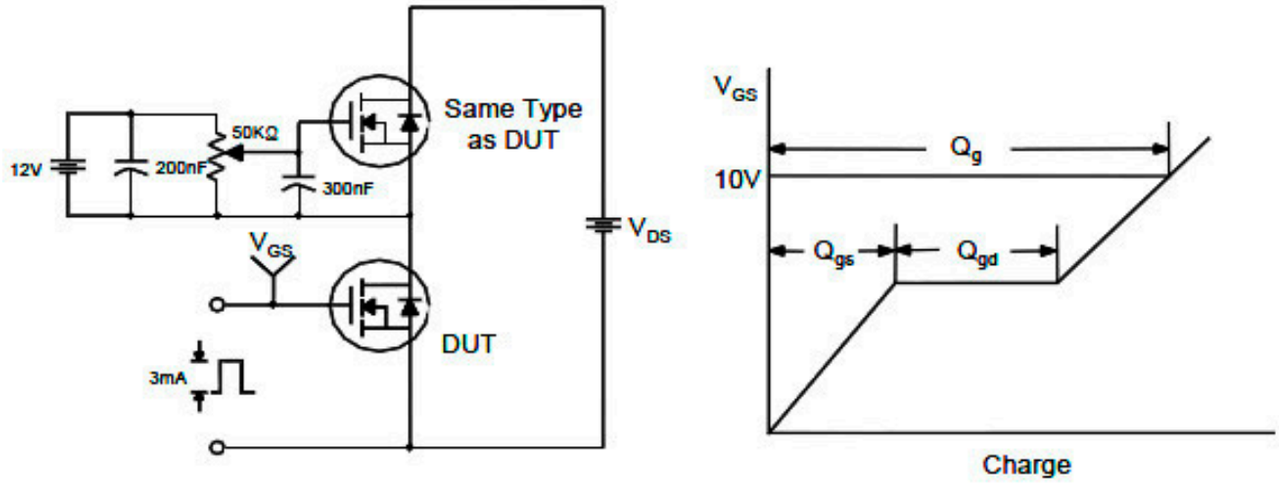
Safe Operating Area, Junction-to-Ambient



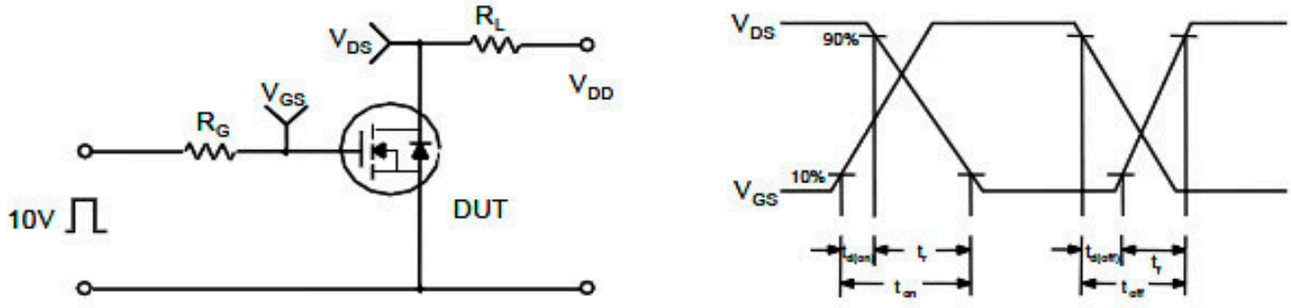
Normalized Thermal Transient Impedance, Junction-to-Ambient

■Test circuit and waveform

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms