Single P-channel MOSFET

ELM6PB010FAA-N

■General description

ELM6PB010FAA-N uses advanced trench technology to provide excellent Rds(on), low gate charge and low gate threshold voltage.

■Features

- Vds=-40V
- Id=-22A (Vgs=-10V)
- Rds(on) = 10mΩ (Vgs=-10V)
- Rds(on) = 13mΩ (Vgs=-4.5V)

■Maximum absolute ratings

Ta=25°C. Unless otherwise noted.

Parameter		Symbol	Limit	Unit	Note
Drain-source voltage		Vds	-40	V	
Gate-source voltage		Vgs	±20	V	
Continuous drain current	Tc=25°C	Id	-22.0	A	1
	Tc=100°C		-14.0		
Continuous drain current	Ta=25°C		-9.7	A	2
	Ta=70°C		-7.8		
Pulsed drain current		Idm	-88	A	3
Max. body-diode continuous current (Tc=25°C)		Is	-10	A	1
Avalanche current (L=0.1mH)		Ias	-30	A	
Avalanche energy (L=0.5mH)		Eas	81	mJ	
Power dissipation	Tc=25°C	Pd	12.0	W	1
	Tc=100°C		4.6		
Power dissipation	Ta=25°C		2.3	W	2
	Ta=70°C		1.5		
Junction and storage temperature range		Tj, Tstg	-55 to +150	°C	

■Thermal characteristics

Parameter	Symbol	Typ.	Max.	Unit	Note
Thermal resistance, junction-to-ambient	Rθja		55	°C/W	2
Thermal resistance, junction-to-case	Rθjc		11		

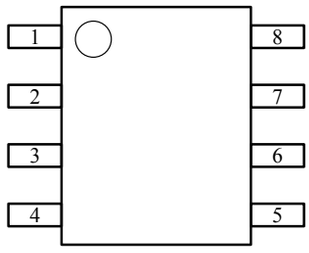
NOTE : 1. The power dissipation Pd is based on Tj(max)=150°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

2. The value of Rθja is measured with the device mounted on 1 in² FR-4 board with 2 oz. copper, in a still air environment with Ta=25°C. The power dissipation Pdsm is based on Rθja and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.

3. Pulse width limited by junction temperature Tj(max)=150°C. Ratings are based on low frequency and low duty cycles to keep initial Tj=25°C.

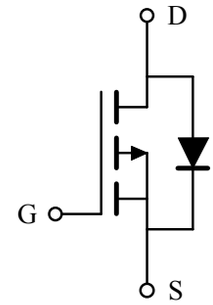
■Pin configuration

SOP-8(TOP VIEW)



Pin No.	Pin name
1	SOURCE
2	SOURCE
3	SOURCE
4	GATE
5	DRAIN
6	DRAIN
7	DRAIN
8	DRAIN

■Circuit



■Electrical characteristics

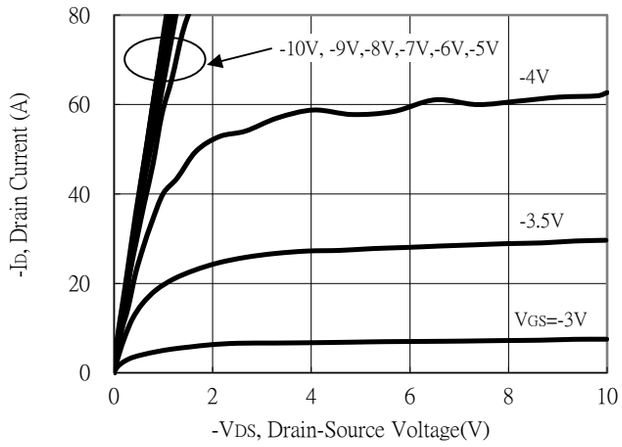
Ta=25°C. Unless otherwise noted.

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
STATIC PARAMETERS							
Drain-source breakdown voltage	BVdss	Id=-250μA, Vgs=0V	-40	-	-	V	
Zero gate voltage drain current	Idss	Vds=-32V, Vgs=0V	-	-	-10	μA	
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	
Static drain-source on-resistance	Rds(on)	Vgs=-10V, Id=-10A	-	10.0	13.0	mΩ	
		Vgs=-4.5V, Id=-8A	-	13.0	18.5		
Forward transconductance	Gfs	Vds=-10V, Id=-10A	-	24	-	S	
Diode forward voltage	Vsd	Is=-10A, Vgs=0V	-	-0.82	-1.20	V	1
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vgs=0V, Vds=-20V, f=1MHz	-	3400	-	pF	
Output capacitance	Coss		-	280	-	pF	
Reverse transfer capacitance	Crss		-	200	-	pF	
Gate resistance	Rg	f=1MHz	-	5.3	-	Ω	
SWITCHING PARAMETERS							
Total gate charge	Qg	Vgs=-10V, Vds=-20V Id=-10A	-	68.0	-	nC	1, 2
Gate-source charge	Qgs		-	10.5	-	nC	1, 2
Gate-drain charge	Qgd		-	14.5	-	nC	1, 2
Turn-on delay time	td(on)	Vgs=-10V, Vds=-20V Id=-10A, Rgen=1Ω	-	17	-	ns	1, 2
Turn-on rise time	tr		-	21	-	ns	1, 2
Turn-off delay time	td(off)		-	97	-	ns	1, 2
Turn-off fall time	tf		-	17	-	ns	1, 2
Body diode reverse recovery time	trr	If=-10A, dIf/dt=100A/μs	-	16	-	ns	
Body diode reverse recovery charge	Qrr		-	11	-	nC	

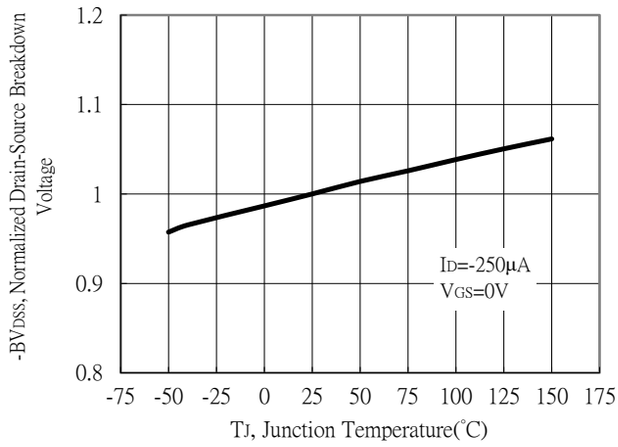
* 1. Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%.
  2. Independent of operating temperature.

■Typical electrical and thermal characteristics

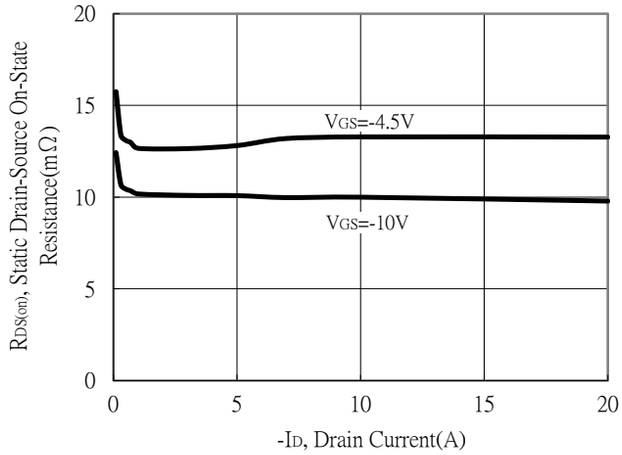
Typical Output Characteristics



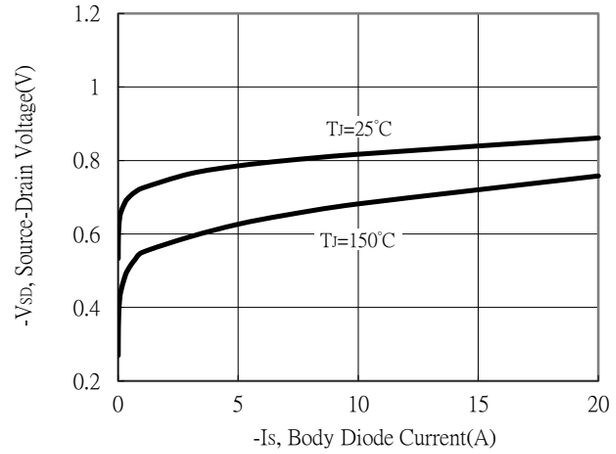
Breakdown Voltage vs Ambient Temperature



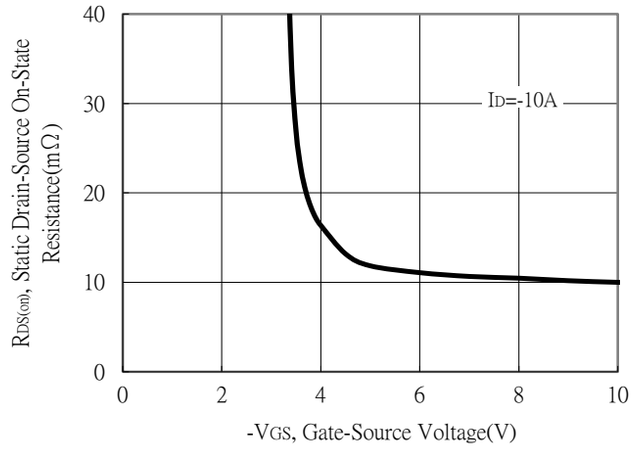
Static Drain-Source On-State resistance vs Drain Current



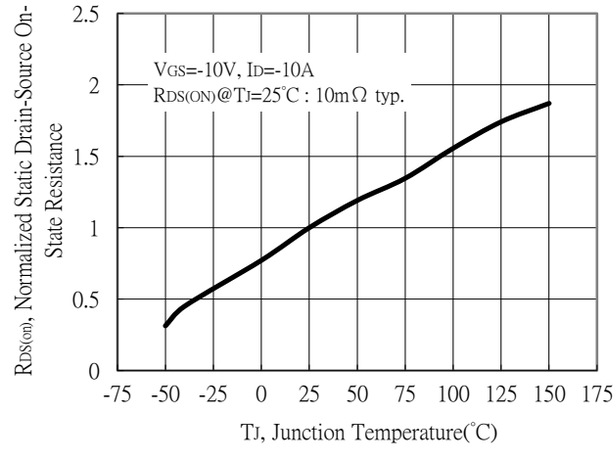
Body Diode Currentvs Source-Drain Voltage



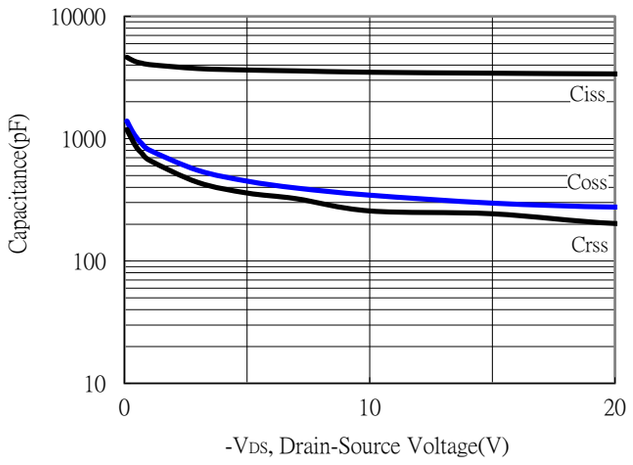
Static Drain-Source On-State Resistance vs Gate-Source Voltage



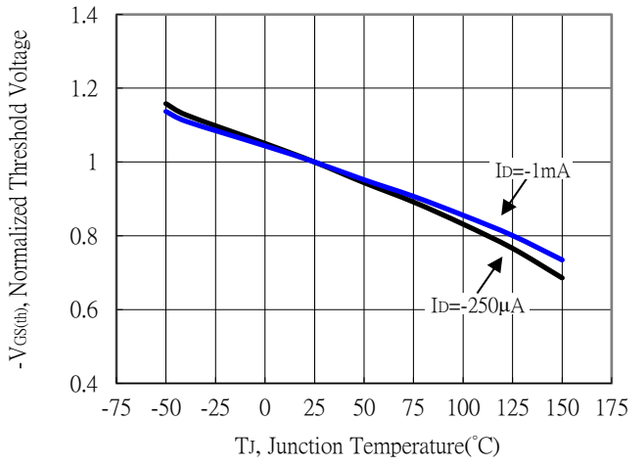
Drain-Source On-State Resistance vs Junction Temperature



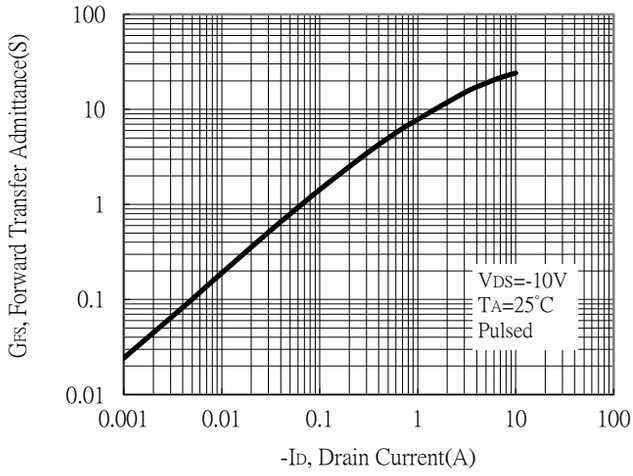
Capacitance vs Drain-to-Source Voltage



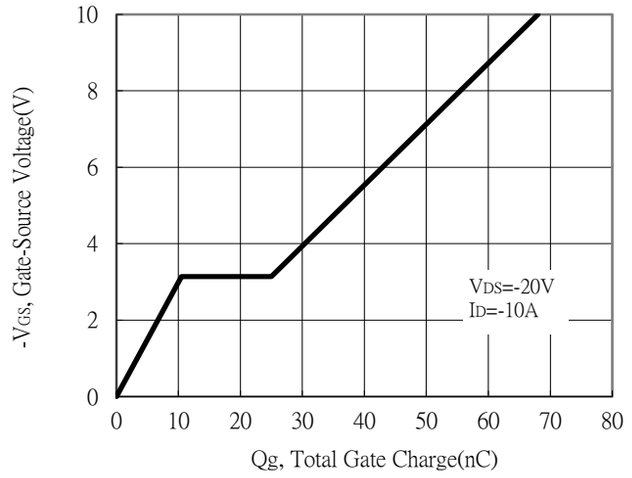
Threshold Voltage vs Junction Temperature



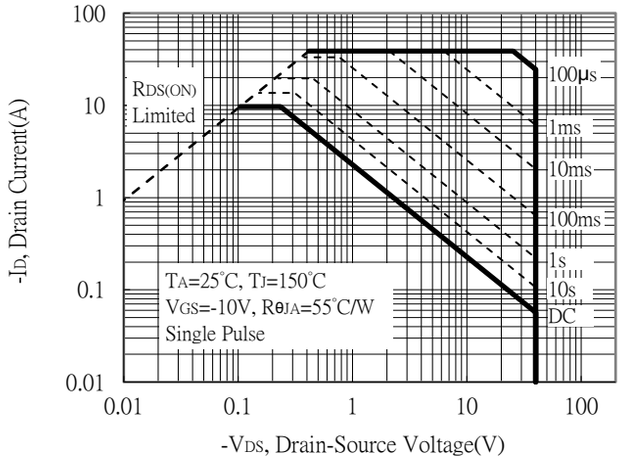
Forward Transfer Admittance vs Drain Current



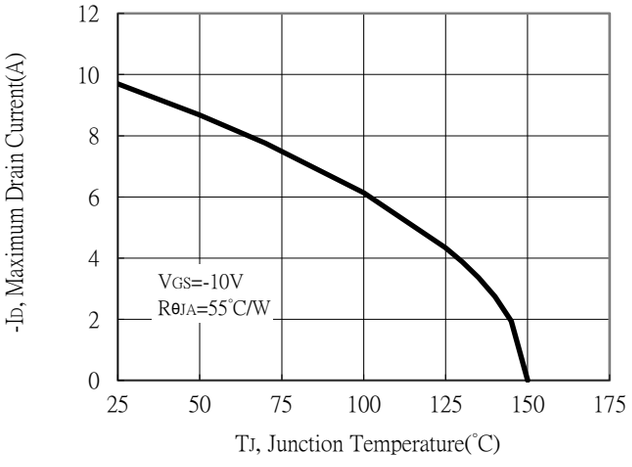
Gate Charge Characteristics



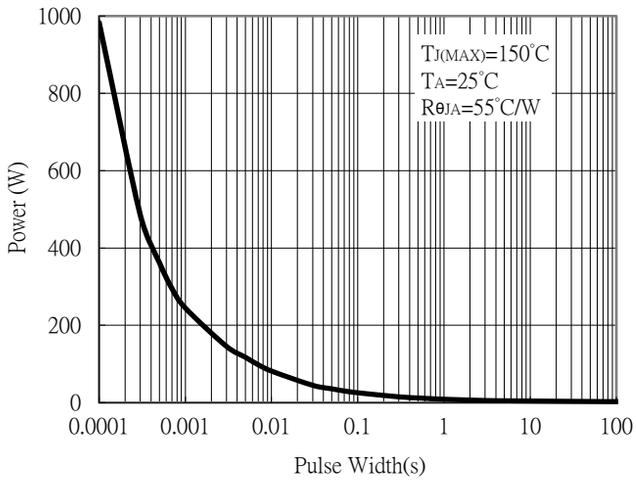
Maximum Safe Operating Area



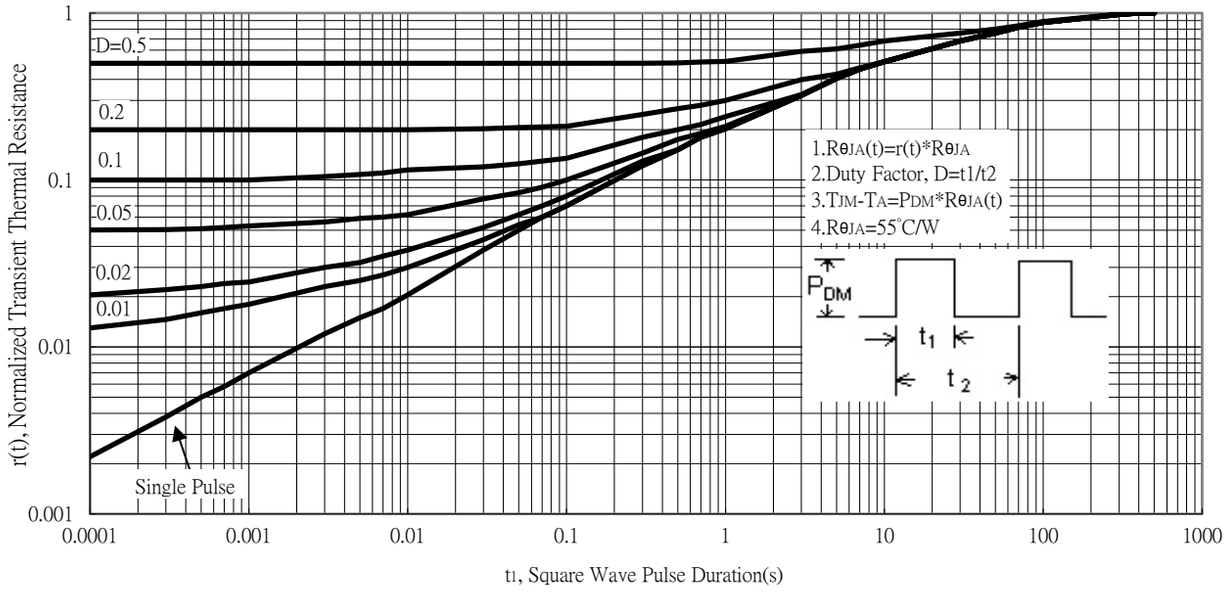
Maximum Drain Current vs Junction Temperature



Single Pulse Power Rating, Junction to Ambient



Transient Thermal Response Curves



■Recmmended soldering footpeint