SuperMOS – SOT23-6L -20V BV_{DSS}, 82mΩ $R_{DS(on)}$, P-channel MOSFET

1. Description

The FDC6310P-ES is P-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. Device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product FDC6310P-ES is Pb-free.

2. Features

- -20V, $R_{DS(ON)}$=82mΩ(TYP.) @V_{GS}=-4.5V
  $R_{DS(ON)}$=118mΩ(TYP.) @V_{GS}=-2.5V
  $R_{DS(ON)}$=180mΩ(TYP.) @V_{GS}=-1.8V
- Fast Switching
- High density cell design for low $R_{DS(on)}$
- Material: Halogen free
- Reliable and rugged
- Avalanche Rated
- Low leakage current

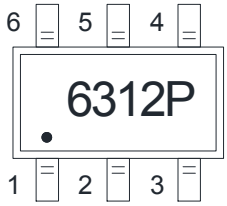
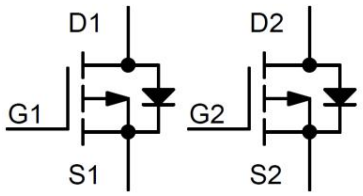
3. Applications

- PWM applications
- Load switch
- Power management in portable/desktop PCs
- DC/DC conversion

4. Ordering Information

Part Number	Package	Marking	Material	Packing	Quantity per reel	Flammability Rating	Reel Size
FDC6310P-ES	SOT23-6L	.6312P	Halogen free	Tape & Reel	3,000 PCS	UL 94V-0	7 inches

5. Pin Configuration and Functions

Pin	Function	Outline	Circuit Diagram
1	Gate1		
5	Source1		
6	Drain1		
3	Gate2		
2	Source2		
4	Drain2		

6. Specification

Absolute Maximum Rating & Thermal Characteristics

Ratings at 25 ℃ ambient temperature unless otherwise specified.

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		BV_{DSS}	-20	V
Gate-Source Voltage		V_{GS}	±12	V
Continuous Drain Current	T_A=25°C	I_D	-2	A
	T_A=100°C		-1.3	
Maximum Power Dissipation	T_A=25°C	P_D	0.8	W
Pulsed Drain Current		I_{DM}	-8	A
Operating Junction Temperature		T_J	150	°C
Storage Temperature Range		T_{stg}	-55 to +150	°C

Thermal resistance ratings

Single Operation				
Parameter	Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance (t ≤ 10s)	$R_{\theta JA}$		156	°C/W

Electrical Characteristics

At TA = 25℃ unless otherwise specified

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=-250uA	-20			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-20V, V_{GS}=0V			-1	uA
Gate-to-source Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±12V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS}=V_{DS}, I_D=-250uA	-0.4	-0.62	-1.0	V
Drain-to-source On-resistance	$R_{DS(on)}$	V_{GS}=-4.5V, I_D=-2A		82	95	mΩ
		V_{GS}=-2.5A, I_D=-1.5A		118	138	
		V_{GS}=-1.8V, I_D=-1A		180	210	
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C_{ISS}	V_{GS}=0V, V_{DS} =-10V f=1MHz		185		pF
Output Capacitance	C_{OSS}			35		
Reverse Transfer Capacitance	C_{RSS}			25		
Total Gate Charge	Q_G	V_{GS}=-4.5V, V_{DS}=-10V I_D =-2A		2.2		nC
Gate-to-Source Charge	Q_{GS}			0.5		
Gate-to-Drain Charge	Q_{GD}			0.5		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$t_{d(ON)}$	V_{GS}=-4.5V, V_{DS}=-10V R_L=5Ω, R_G=3Ω		10		ns
Rise Time	t_r			30		
Turn-Off Delay Time	$t_{d(OFF)}$			62		
Fall Time	t_f			50		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	V_{GS}=0V, I_S=-2A			-1.5	V

7. Typical Characteristics

Figure 1: Output Characteristics

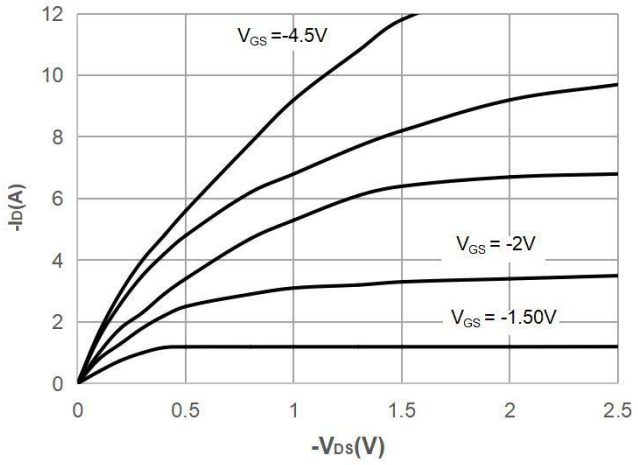


Figure 2: Typical Transfer Characteristics

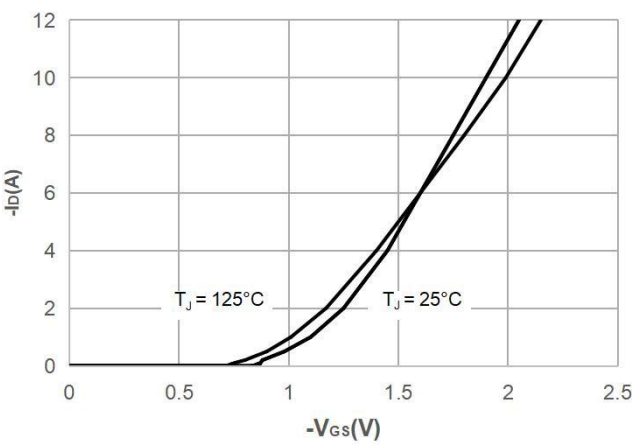


Figure 3: On-resistance vs. Drain Current

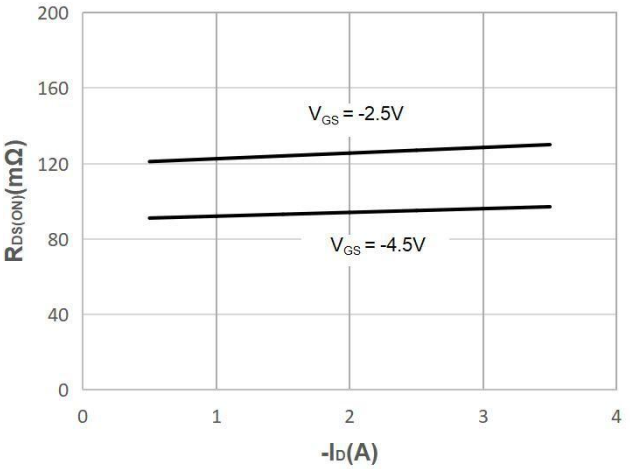


Figure 4: Body Diode Characteristics

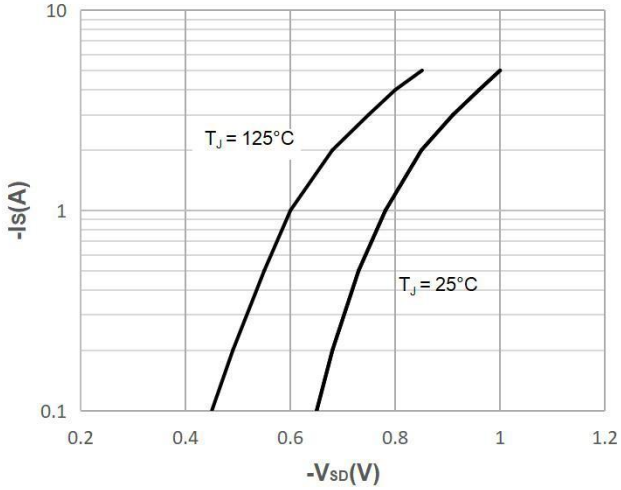


Figure 5: Gate Charge Characteristics

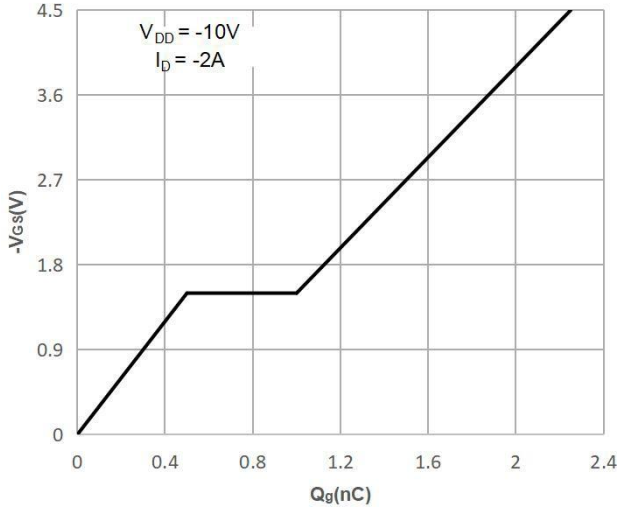


Figure 6: Capacitance Characteristics

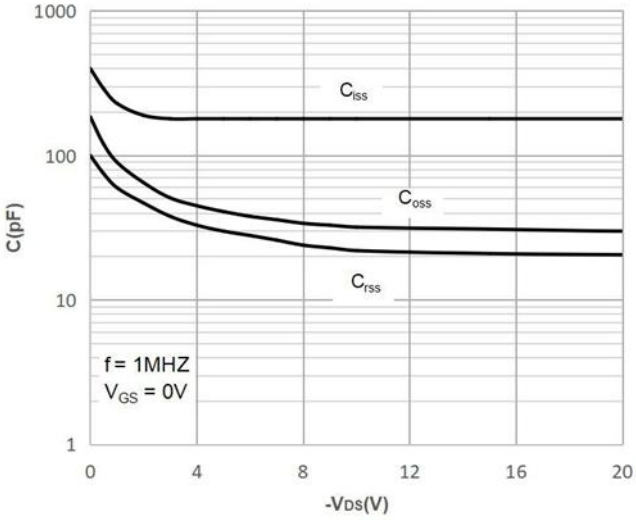


Figure 7: Normalized Breakdown voltage vs. Junction Temperature

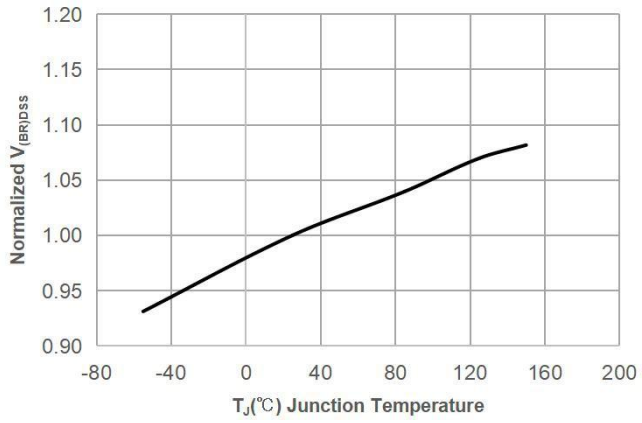


Figure 8: Normalized on Resistance vs. Junction Temperature

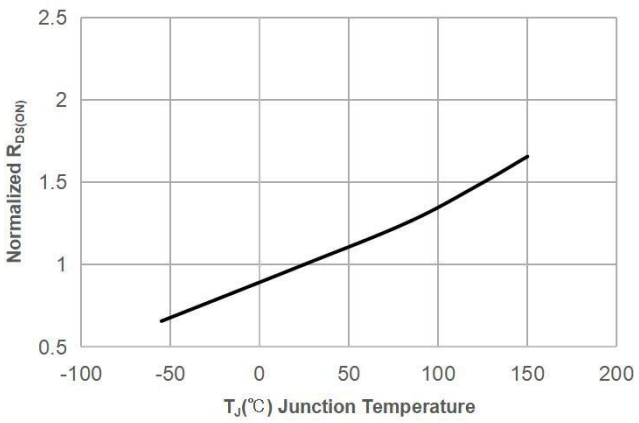


Figure 9: Maximum Safe Operating Area

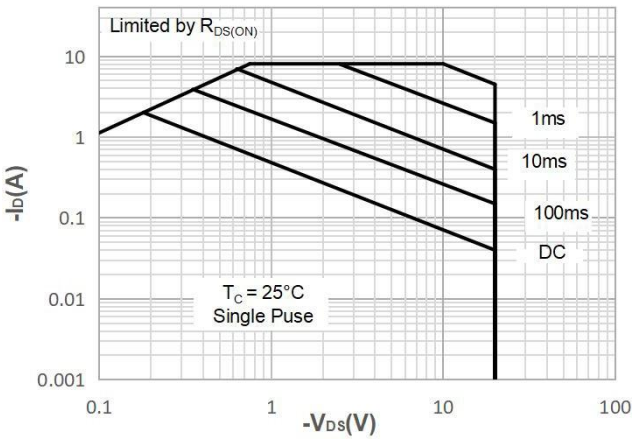


Figure 10: Maximum Continuous Drian Current vs. Case Temperature

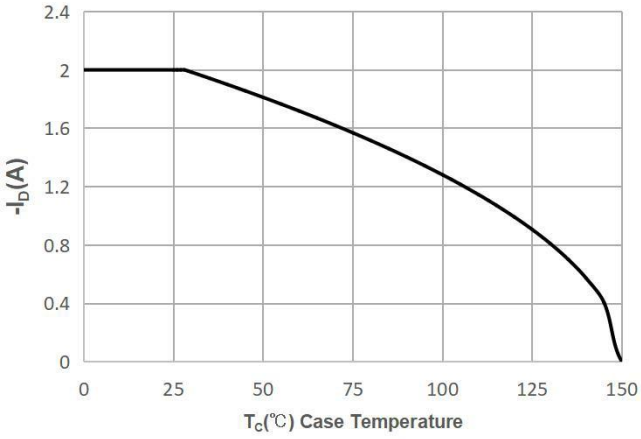


Figure 11: Normalized Maximum Transient Thermal Impedance

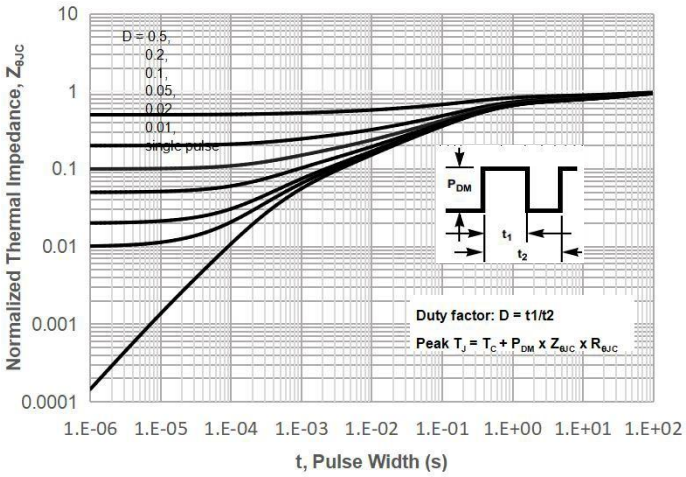
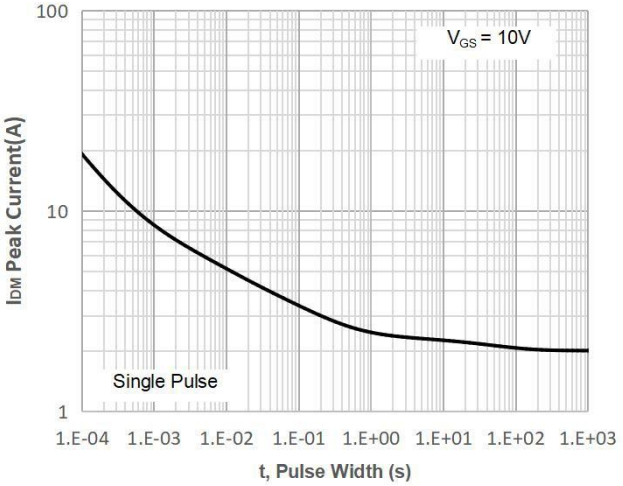
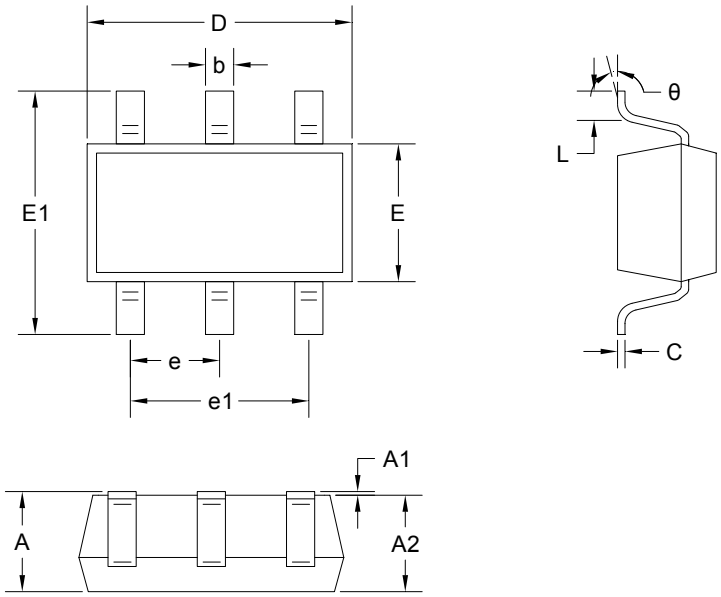


Figure 12: Peak Current Capacity



8. Dimension (SOT23-6L)



Unit: mm

Symbol		A	A1	A2	b	c	D
Spec	Min	1.050	0.000	1.050	0.300	0.100	2.820
	Max	1.250	0.100	1.150	0.500	0.200	3.020
Symbol		E	E1	e	e1	L	θ
Spec	Min	1.500	2.650	0.950BSC	1.800	0.300	0°
	Max	1.700	2.950		2.000	0.600	8°

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