

F1010EZS-VB Datasheet

N-Channel 60 V (D-S) MOSFET

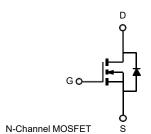
PRODUCT SUMMARY				
V _{DS}	60	V		
R _{DS(on)} V _{GS} = 10 V	4	mΩ		
ID	150	Α		
Configuration	Single			

FEATURES

- Trench power MOSFET
- Package with low thermal resistance
- 100 % R_g and UIS tested







ABSOLUTE MAXIMUM RATINGS (T _C = 25 °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 _C = 25 °C a	_	150	
Continuous Diam Current	T _C = 125 °C	I _D	65	
Continuous Source Current (Diode Conduction) ^a	Is	120	A	
Pulsed Drain Current ^b		I _{DM}	350	
Single Pulse Avalanche Current	L = 0.1 mH	I _{AS}	65	
Single Pulse Avalanche Energy	L = 0.111111	E _{AS}	211	mJ
Maximum Power Dissipation ^b	T _C = 25 °C	Pp	220	W
waxiinani i owei Dissipation -	T _C = 125 °C	1.D	70	V V
Operating Junction and Storage Temperature Range	T_J , T_{stg}	-55 to +175	°C	

THERMAL RESISTANCE RATINGS					
PARAMETER		SYMBOL	LIMIT	UNIT	
Junction-to-Ambient	PCB Mount c	R _{thJA}	40	°C/W	
Junction-to-Case (Drain)		R _{thJC}	0.65	C/VV	

Notes

- a. Package limited.
- b. Pulse test; pulse width \leq 300 µs, duty cycle \leq 2 %.
- c. When mounted on 1" square PCB (FR4 material).

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SPECIFICATIONS (T _C = 25 °C	, unless other	wise noted)					
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Static				•	•		
Drain-Source Breakdown Voltage	V _{DS}	V _{GS}	= 0, I _D = 250 μA	60	-	-	V
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} =	V _{GS} , I _D = 250 μA	2.0		4.0]
Gate-Source Leakage	I _{GSS}	V _{DS} =	0 V, V _{GS} = ± 20 V	-	-	± 100	nA
		V _{GS} = 0 V	V _{DS} = 60 V	-	-	1	
Zero Gate Voltage Drain Current	I _{DSS}	V _{GS} = 0 V	V _{DS} = 60 V, T _J = 125 °C	-	-	50	μA
		V _{GS} = 0 V	V _{DS} = 60 V, T _J = 175 °C	-	-	250	1 ' !
On-State Drain Current ^a	I _{D(on)}	V _{GS} = 10 V	$V_{DS} \ge 5 \ V$	120	-	-	Α
		V _{GS} = 10 V	I _D = 30 A	-	4	-	mΩ
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V	I _D = 30 A, T _J = 125 °C	-	12	-	
		V _{GS} = 10 V	I _D = 30 A, T _J = 175 °C	-	15	-	
Forward Transconductance b	9fs	V _{DS} = 15 V, I _D = 30 A		-	94	-	S
Dynamic ^b	•						
Input Capacitance	C _{iss}			-	-	7000	
Output Capacitance	C _{oss}	V _{GS} = 0 V	V _{DS} = 25 V, f = 1 MHz	-	-	715	pF
Reverse Transfer Capacitance	C _{rss}			-	-	360	
Total Gate Charge ^c	Qg			-	96	145	
Gate-Source Charge	Q _{gs}	V _{GS} = 10 V V _{DS} = 30 V, I _D = 75 A -	24	-	nC		
Gate-Drain Charge ^c	Q _{gd}			-	27	-	
Gate Resistance	Rg		f = 1 MHz		1	1.7	Ω
Turn-On Delay Time ^c	t _{d(on)}			-	16	24	
Rise Time ^c	t _r	$V_{DD} = 30 \text{ V}, \text{ R}_L = 0.4 \Omega$ $I_D \cong 75 \text{ A}, \text{ V}_{GEN} = 10 \text{ V}, \text{ R}_g = 1 \Omega$		-	14	21	ns
Turn-Off Delay Time ^c	t _{d(off)}			-	34	51	
Fall Time ^c	t _f			-	9	14	
Source-Drain Diode Ratings and Characteristics b							
Pulsed Current ^a	I _{SM}			_	-	450	Α
Forward Voltage	V _{SD}	I _F = 75 A, V _{GS} = 0		-	0.9	1.5	V

Notes

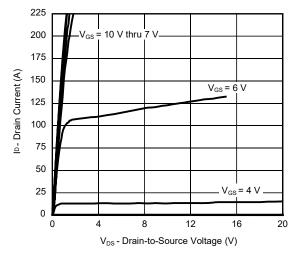
- a. Pulse test; pulse width $\leq 300~\mu s,$ duty cycle $\leq 2~\%.$ b. Guaranteed by design, not subject to production testing.
- c. Independent of operating temperature.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

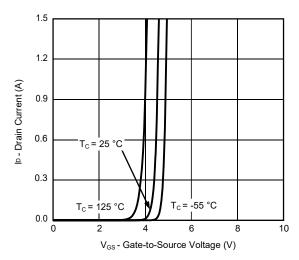
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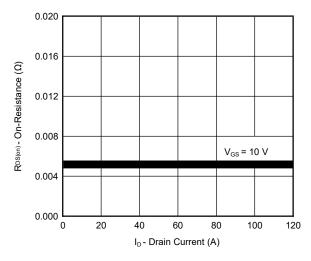
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



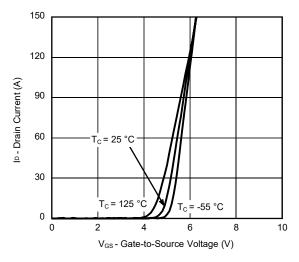




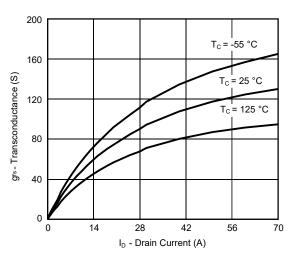
Transfer Characteristics



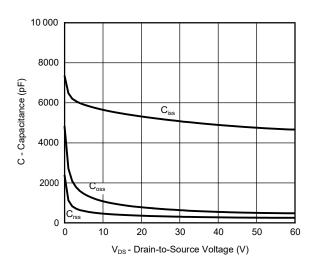
On-Resistance vs. Drain Current



Transfer Characteristics



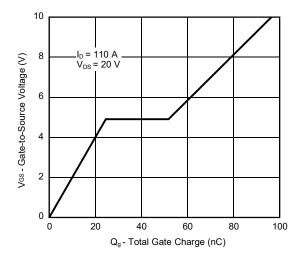
Transconductance



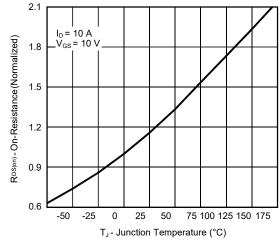
Capacitance



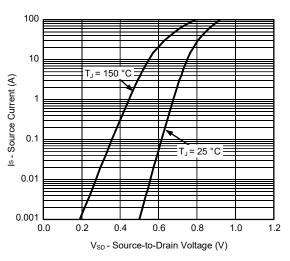
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



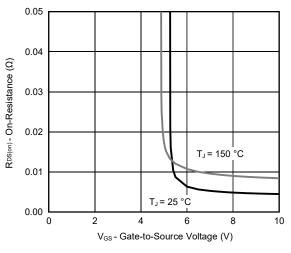
Gate Charge



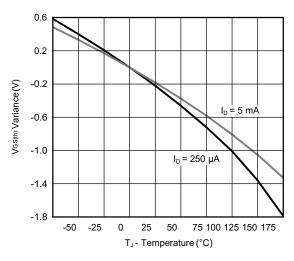
On-Resistance vs. Junction Temperature



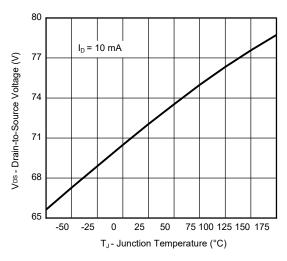
Source Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage



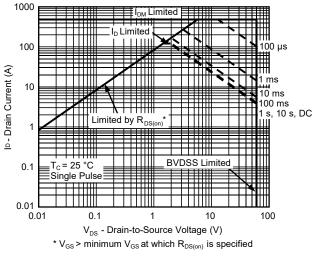
Threshold Voltage



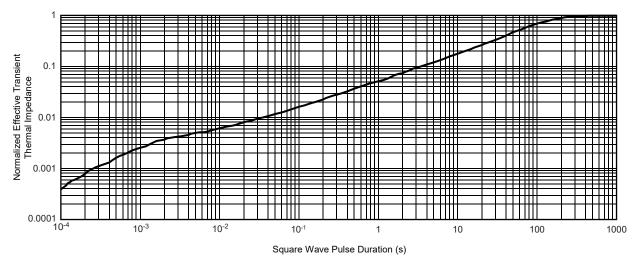
Drain Source Breakdown vs. Junction Temperature



THERMAL RATINGS (T_A = 25 °C, unless otherwise noted)



Safe Operating Area

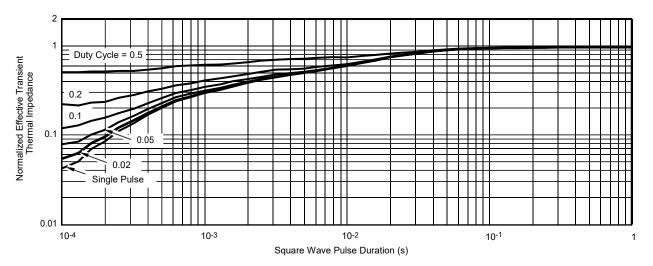


Normalized Thermal Transient Impedance, Junction-to-Ambient

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THERMAL RATINGS (T_A = 25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Case

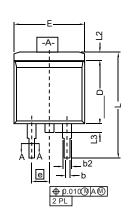
Note

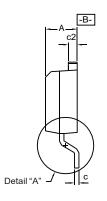
- The characteristics shown in the two graphs
 - Normalized Transient Thermal Impedance Junction-to-Ambient (25 °C)
- Normalized Transient Thermal Impedance Junction-to-Case (25 °C) are given for general guidelines only to enable the user to get a "ball park" indication of part capabilities. The data are extracted from single pulse transient thermal impedance characteristics which are developed from empirical measurements. The latter is valid for the part mounted on printed circuit board FR4, size 1" x 1" x 0.062", double sided with 2 oz. copper, 100 % on both sides. The part capabilities can widely vary depending on actual application parameters and operating conditions.

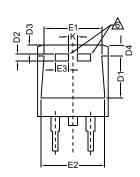
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TO-263 (D²PAK): 3-LEAD

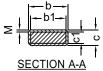








DETAIL A (ROTATED 90°)



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- 1. Plane B includes maximum features of heat sink tab and plastic.
- 2. No more than 25 % of L1 can fall above seating plane by max.
- 3. Pin-to-pin coplanarity max. 4 mils.

4. *: Thin lead is for SUB, SYB.	
Thick lead is for SUM, SYM, SQM.	
Use inches as the primary measurement.	
6 This feature is for thick lead.	

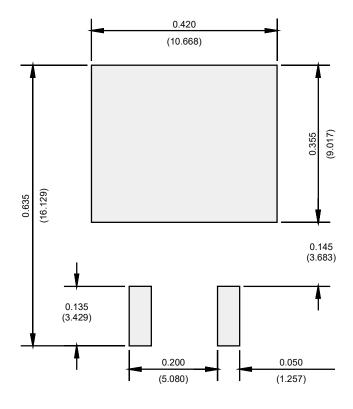
		INC	HES	MILLIMETERS		
DIM.		MIN.	MAX.	MIN.	MAX.	
Α		0.160	0.190	4.064	4.826	
	b	0.020	0.039	0.508	0.990	
	b1	0.020	0.035	0.508	0.889	
	b2	0.045	0.055	1.143	1.397	
c*	Thin lead	0.013	0.018	0.330	0.457	
	Thick lead	0.023	0.028	0.584	0.711	
с1	Thin lead	0.013	0.017	0.330	0.431	
61	Thick lead	0.023	0.027	0.584	0.685	
	c2	0.045	0.055	1.143	1.397	
	D	0.340	0.380	8.636	9.652	
	D1	0.220	0.240	5.588	6.096	
	D2	0.038	0.042	0.965	1.067	
	D3	0.045	0.055	1.143	1.397	
	D4	0.044	0.052	1.118	1.321	
	E	0.380	0.410	9.652	10.414	
	E1	0.245	-	6.223	-	
	E2 0.355		0.375	9.017	9.525	
	E3	0.072	0.078	1.829	1.981	
	е	0.100	0.100 BSC		2.54 BSC	
	K	0.045	0.055	1.143	1.397	
	L	0.575	0.625	14.605	15.875	
L1		0.090	0.110	2.286	2.794	
	L2 0.040		0.055	1.016	1.397	
	L3	0.050	0.070	1.270	1.778	
	L4	0.010	BSC	BSC 0.254 BSC		
	М	-	0.002	-	0.050	
ECN: T13-0707-Rev. K. 30-Sep-13						

ECN: T13-0707-Rev. K, 30-Sep-13

DWG: 5843



RECOMMENDED MINIMUM PADS FOR D²PAK: 3-Lead



Recommended Minimum Pads Dimensions in Inches/(mm)



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