

IRF510-VB Datasheet N-Channel 100-V (D-S) MOSFET

PRODUCT SUMMARY				
V _{(BR)DSS} (V)	R _{DS(on)} (Ω)	I _D (A)		
100	0.127at V _{GS} = 10 V	18		

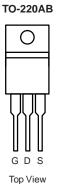
FEATURES

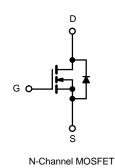
- TrenchFET[®] Power MOSFET
- 175 °C Junction Temperature
- Low Thermal Resistance Package
- 100 % R_g Tested

APPLICATIONS

• Isolated DC/DC Converters







ABSOLUTE MAXIMUM RATINGS $T_C = 25 \text{ °C}$, unless otherwise noted					
Parameter		Symbol	Limit	Unit	
Drain-Source Voltage		V _{DS}	100	V	
Gate-Source Voltage		V _{GS}	± 20	v	
Continuous Drain Current ($T_1 = 175 \text{ °C}$)	T _C = 25 °C	1-	18		
Continuous Drain Current $(1) = 175$ C)	T _C = 125 °C	I _D	15	A	
Pulsed Drain Current		I _{DM}	68	A	
Avalanche Current	L = 0.1 mH	I _{AS}	18		
Single Pulse Avalanche Energy ^b	L = 0.11111	E _{AS}	200	mJ	
Maria Diasia di sh	T _C = 25 °C	Р	105	14/	
Maximum Power Dissipation ^b	T _A = 25 °C ^d	- P _D -	3.75	W	
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 (TO-263) ^d	R _{thJA}	40	°C/W	
Junction-to-Case (Drain)		R _{thJC}	0.4	C/W	

Notes:

- a. Package limited.
- b. Duty cycle \leq 1 %.
- c. See SOA curve for voltage derating.

d. When Mounted on 1" square PCB (FR-4 material).

SPECIFICATIONS $T_J = 25^{\circ}$	C, unless o	therwise noted				
Parameter	Symbol	Test Conditions	Min.	Тур.	Max.	Unit
Static		-				
Drain-Source Breakdown Voltage	V _{(BR)DSS}	$V_{DS} = 0 V, I_{D} = 250 \mu A$	100			V
Gate-Threshold Voltage	V _{GS(th)}	$V_{DS} = V_{GS}$, $I_D = 250 \ \mu A$	2		4	v
Gate-Body Leakage	I _{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V			± 100	nA
		$V_{DS} = 100 \text{ V}, \text{ V}_{GS} = 0 \text{ V}$			1	
Zero Gate Voltage Drain Current	I _{DSS}	$V_{DS} = 100 \text{ V}, V_{GS} = 0 \text{ V}, T_{J} = 125 \text{ °C}$			50	μA
		$V_{DS} = 100 \text{ V}, \text{ V}_{GS} = 0 \text{ V}, \text{ T}_{J} = 175 ^{\circ}\text{C}$			250	
On-State Drain Current ^a	I _{D(on)}	$V_{DS} \ge 5 V$, $V_{GS} = 10 V$	120			А
		V _{GS} = 10 V, I _D = 20 A		0.127		
Drain-Source On-State Resistance ^a	r _{DS(on)}	V _{GS} = 10 V, I _D = 20 A, T _J = 125 °C		0.130		Ω
		V _{GS} = 10 V, I _D = 20 A, T _J = 175 °C		0.170		
Forward Transconductance ^a	9 _{fs}	V _{DS} = 15 V, I _D = 20 A	25			S
Dynamic ^b	•			•		
Input Capacitance	C _{iss}			1300		
Output Capacitance	C _{oss}	V _{GS} = 0 V, V _{DS} = 25 V, f = 1 MHz	260		pF	
Reverse Transfer Capacitance	C _{rss}			110		P.
Total Gate Charge ^c	Qg				28	
Gate-Source Charge ^c	Q _{gs}	V_{DS} = 100 V, V_{GS} = 10 V, I_{D} = 65 A			4.8	nC
Gate-Drain Charge ^c	Q _{gd}				15	
Gate Resistance	R _g		0.5	1.7	3.3	Ω
Turn-On Delay Time ^c	t _{d(on)}			8		
Rise Time ^c	t _r	V_{DD} = 100 V, R _L = 1.5 Ω		120		
Turn-Off Delay Time ^c	t _{d(off)}	$\text{I}_\text{D}\cong$ 65 A, V_GEN = 10 V, R_g = 2.5 Ω		25		ns
Fall Time ^c	t _f			50		
Source-Drain Diode Ratings and Ch	aracteristics 7	r _c = 25 °C ^b	•			
Continuous Current	ا _S			18		A
Pulsed Current	I _{SM}			68		
Forward Voltage ^a	V _{SD}	I _F = 65 A, V _{GS} = 0 V		1.0	1.5	V
Reverse Recovery Time	t _{rr}			130	200	ns
Peak Reverse Recovery Current	I _{RM(REC)}	I _F = 50 A, di/dt = 100 A/μs		8	12	A
Reverse Recovery Charge	Q _{rr}			0.52	1.2	μC

Notes:

a. Pulse test; pulse width \leq 300 µs, duty cycle \leq 2 %.

b. Guaranteed by design, not subject to production testing.

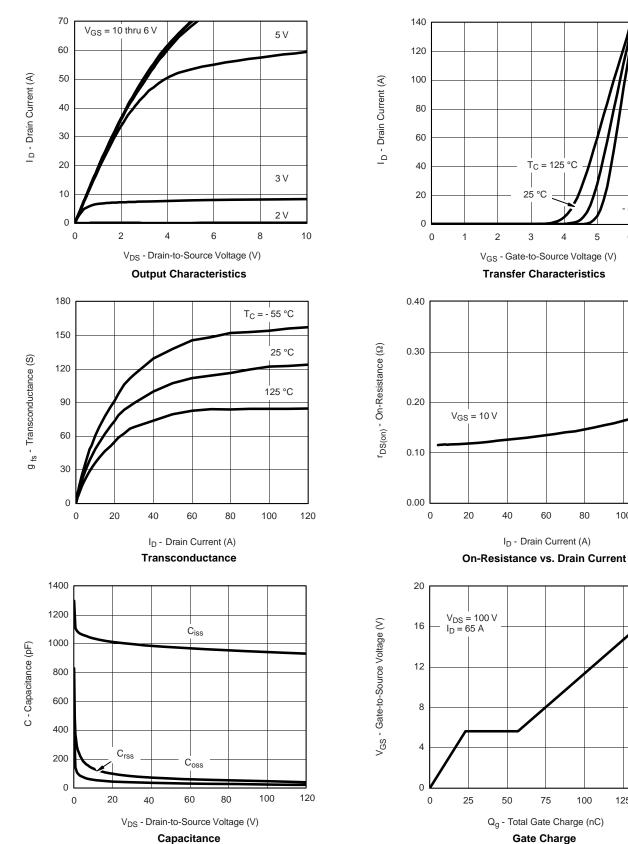
c. Independent of operating temperature.

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.

Bsemi



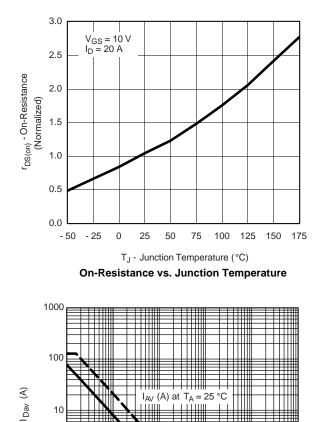
- 55 °C

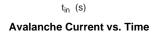


TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



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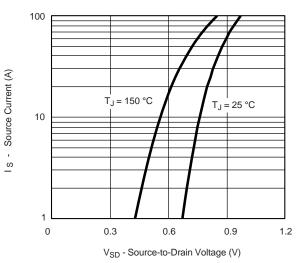
0.01

0.1

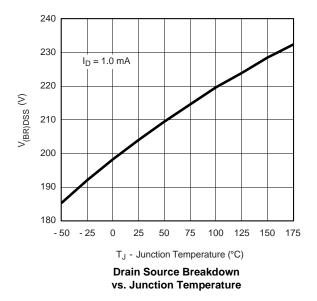
1

I_{AV} (A) at T_A = 25

°C Ħ



Source-Drain Diode Forward Voltage



10

1

0.1

0.00001

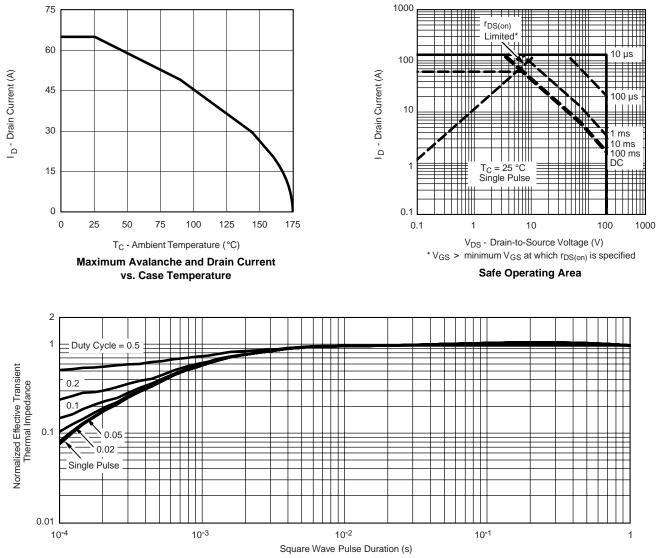
 I_{AV} (A) at $T_A = 150$ °C

0.0001

0.001



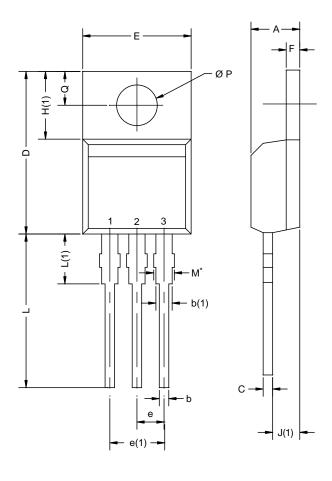
THERMAL RATINGS



Normalized Thermal Transient Impedance, Junction-to-Case



TO-220AB



	MILLIN	IETERS	INC	HES
DIM.	MIN.	MAX.	MIN.	MAX.
А	4.25	4.65	0.167	0.183
b	0.69	1.01	0.027	0.040
b(1)	1.20	1.73	0.047	0.068
С	0.36	0.61	0.014	0.024
D	14.85	15.49	0.585	0.610
Е	10.04	10.51	0.395	0.414
е	2.41	2.67	0.095	0.105
e(1)	4.88	5.28	0.192	0.208
F	1.14	1.40	0.045	0.055
H(1)	6.09	6.48	0.240	0.255
J(1)	2.41	2.92	0.095	0.115
L	13.35	14.02	0.526	0.552
L(1)	3.32	3.82	0.131	0.150
ØΡ	3.54	3.94	0.139	0.155
Q	2.60	3.00	0.102	0.118
ECN: X12- DWG: 547	0208-Rev. N, 1	08-Oct-12		

Notes

* M = 1.32 mm to 1.62 mm (dimension including protrusion) Heatsink hole for HVM



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