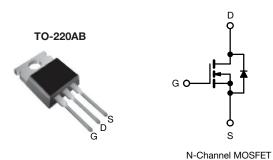
HALOGEN FREE



Power MOSFET



PRODUCT SUMMARY					
V _{DS} (V)	100				
$R_{DS(on)}(\Omega)$	V _{GS} = 10 V	0.16			
Q _g max. (nC)	26				
Q _{gs} (nC)	5.5				
Q _{gd} (nC)	11				
Configuration	Single				

FEATURES

- Dynamic dV/dt rating
- Repetitive avalanche rated
- 175 °C operating temperature
- · Fast switching
- · Ease of paralleling
- Simple drive requirements
- Material categorization: for definitions of compliance please see <u>www.vishay.com/doc?99912</u>

Note

* This datasheet provides information about parts that are RoHS-compliant and / or parts that are non RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS-compliant. Please see the information / tables in this datasheet for details

DESCRIPTION

Third generation power MOSFETs from Vishay provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

The TO-220AB package is universally preferred for all commercial-industrial applications at power dissipation levels to approximately 50 W. The low thermal resistance and low package cost of the TO-220AB contribute to its wide acceptance throughout the industry.

ORDERING INFORMATION				
Package	TO-220AB			
Lead (Pb)-free	IRF530PbF			
Lead (Pb)-free and halogen-free	IRF530PbF-BE3			

ABSOLUTE MAXIMUM RATINGS (T _C = 25 °C, unless otherwise PARAMETER			SYMBOL	LIMIT	UNIT	
Drain-source voltage			V _{DS}	100	V	
Gate-source voltage			V _{GS}	± 20		
Outline and distance and		T _C = 25 °C		14		
Continuous drain current	V _{GS} at 10 V	$T_C = 25 ^{\circ}C$ $T_C = 100 ^{\circ}C$	I _D	10	А	
Pulsed drain current a			I _{DM}	56		
Linear derating factor				0.59	W/°C	
Single pulse avalanche energy b			E _{AS}	69	mJ	
Repetitive avalanche current a			I _{AR}	14	А	
Repetitive avalanche energy ^a			E _{AR}	8.8	mJ	
Maximum power dissipation $T_C = 25 ^{\circ}C$			P _D	88	W	
Peak diode recovery dV/dt ^c			dV/dt	5.5	V/ns	
Operating junction and storage temperature range			T _J , T _{stg}	-55 to +175		
Soldering recommendations (peak temperature) ^d	For	10 s		300	°C	
Mounting toward	6.20.0**	C 00 M0		10	lbf ⋅ in	
Mounting torque	6-32 or M3 screw			1.1	N · m	

Notes

- a. Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11)
- b. V_{DD} = 25 V, starting T_J = 25 °C, L = 528 μ H, R_g = 25 Ω , I_{AS} = 14 A (see fig. 12)
- c. $I_{SD} \le 14 \text{ A}$, $dI/dt \le 140 \text{ A/}\mu\text{s}$, $V_{DD} \le V_{DS}$, $T_J \le 175 \text{ °C}$
- d. 1.6 mm from case



Vishay Siliconix

THERMAL RESISTANCE RATINGS					
PARAMETER	SYMBOL	TYP.	MAX.	UNIT	
Maximum junction-to-ambient	R _{thJA}	-	62		
Case-to-sink, flat, greased surface	R _{thCS}	0.50	-	°C/W	
Maximum junction-to-case (drain)	R _{thJC}	-	1.7		

PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Static						•	,
Drain-source breakdown voltage	V _{DS}	$V_{GS} = 0 \text{ V}, I_D = 250 \mu\text{A}$		100	-	-	V
V _{DS} temperature coefficient	$\Delta V_{DS}/T_{J}$	Reference t	to 25 °C, I _D = 1 mA	-	0.12	-	V/°C
Gate-source threshold voltage	V _{GS(th)}	$V_{DS} = V_{C}$	_{GS} , I _D = 250 μA	2.0	-	4.0	V
Gate-source leakage	I _{GSS}	V _G	_S = ± 20 V	-	-	± 100	nA
Zoro gata valtaga drain aurrent	,	V _{DS} = 10	V _{DS} = 100 V, V _{GS} = 0 V		-	25	,
Zero gate voltage drain current	I _{DSS}	V _{DS} = 80 V, V ₀	_{GS} = 0 V, T _J = 150 °C	-	-	250	μA
Drain-source on-state resistance	R _{DS(on)}	V _{GS} = 10 V	I _D = 8.4 A ^b	-	-	0.16	Ω
Forward transconductance	9 _{fs}	V _{DS} = 50	O V, I _D = 8.4 A ^b	5.1	-	-	S
Dynamic							
Input capacitance	C _{iss}	V	$\begin{aligned} V_{GS} &= 0 \text{ V}, \\ V_{DS} &= 25 \text{ V}, \end{aligned}$		670	-	pF
Output capacitance	C _{oss}	V _E			250	-	
Reverse transfer capacitance	C_{rss}	f = 1.0 I	MHz, see fig. 5	-	60	-	
Total gate charge	Q_g		I _D = 14 A, V _{DS} = 80 V, see fig. 6 and 13 ^b	-	-	26	nC
Gate-source charge	Q_{gs}	V _{GS} = 10 V		-	-	5.5	
Gate-drain charge	Q_{gd}			-	-	11	
Turn-on delay time	t _{d(on)}			-	10	-	
Rise time	t _r	V_{DD} = 50 V, I_{D} = 14 A R_{g} = 12 Ω , R_{D} = 3.6 Ω , see fig. 10 ^b		-	34	-	ns
Turn-off delay time	t _{d(off)}			-	23	-	
Fall time	t _f			-	24	-	
Gate input resistance	R_g	f = 1 MHz, open drain		1.0	-	4.7	Ω
Internal drain inductance	L _D	6 mm (0.25") f	Between lead, 6 mm (0.25") from		4.5	-	الم
Internal source inductance	L _S	package and center of die contact		-	7.5	-	- nH
Drain-Source Body Diode Characteristic	cs						
Continuous source-drain diode current	I _S	MOSFET symbol showing the integral reverse p - n junction diode		-	-	14	Α
Pulsed diode forward current ^a	I _{SM}			-	-	56	
Body diode voltage	V_{SD}	$T_J = 25 ^{\circ}\text{C}, I_S = 14 \text{A}, V_{GS} = 0 \text{V}^{ \text{b}}$		-	-	2.5	V
Body diode reverse recovery time	t _{rr}	T _ 2F °C	14 A dI/d+ = 100 A/c h	-	150	280	ns
Body diode reverse recovery charge	Q _{rr}	$T_J = 25 ^{\circ}\text{C}$, $I_F = 14 \text{A}$, $dI/dt = 100 \text{A/}\mu\text{s}^{\text{b}}$		-	0.85	1.7	μC
Forward turn-on time	t _{on}	Intrinsic turn	rn-on is dominated by L _S and L _D)			L _D)	

Notes

- a. Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11)
- b. Pulse width \leq 300 μ s; duty cycle \leq 2 %



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

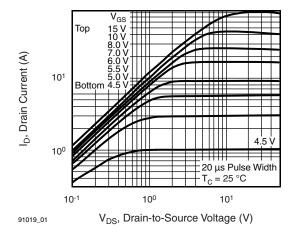


Fig. 1 - Typical Output Characteristics, T_C = 25 °C

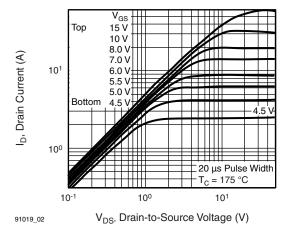


Fig. 2 - Typical Output Characteristics, $T_C = 175$ °C

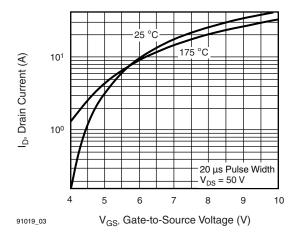


Fig. 3 - Typical Transfer Characteristics

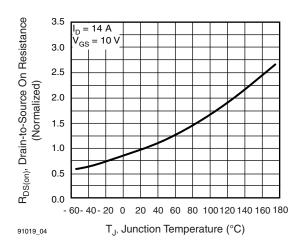


Fig. 4 - Normalized On-Resistance vs. Temperature

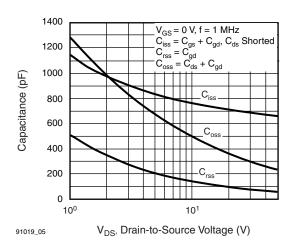


Fig. 5 - Typical Capacitance vs. Drain-to-Source Voltage

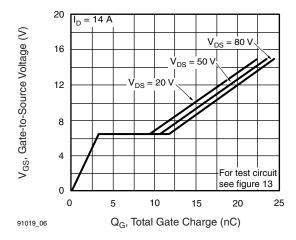


Fig. 6 - Typical Gate Charge vs. Gate-to-Source Voltage



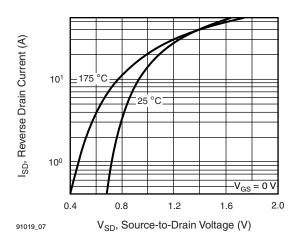


Fig. 7 - Typical Source-Drain Diode Forward Voltage

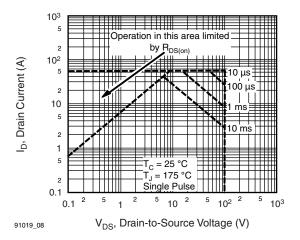


Fig. 8 - Maximum Safe Operating Area

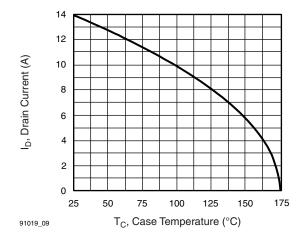


Fig. 9 - Maximum Drain Current vs. Case Temperature

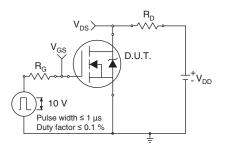


Fig. 10a - Switching Time Test Circuit

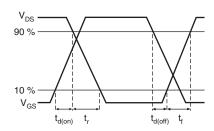


Fig. 10b - Switching Time Waveforms



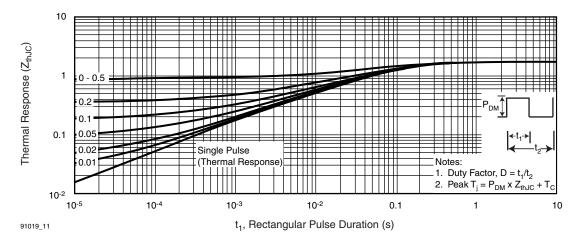


Fig. 11 - Maximum Effective Transient Thermal Impedance, Junction-to-Case

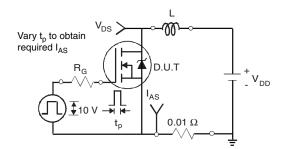


Fig. 12a - Unclamped Inductive Test Circuit

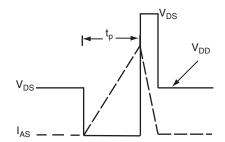


Fig. 12b - Unclamped Inductive Waveforms

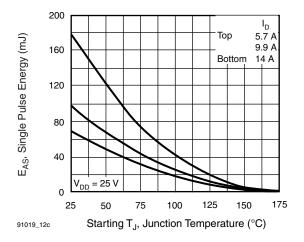


Fig. 12c - Maximum Avalanche Energy vs. Drain Current



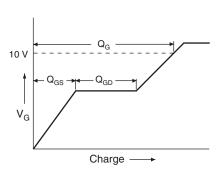


Fig. 13a - Basic Gate Charge Waveform

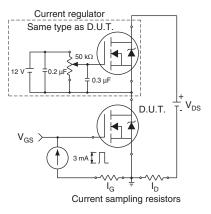
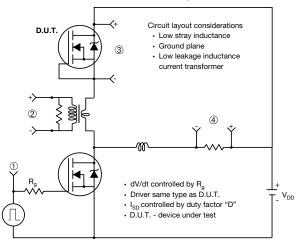


Fig. 13b - Gate Charge Test Circuit

Peak Diode Recovery dV/dt Test Circuit



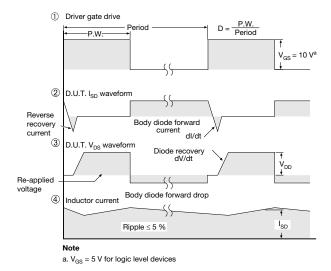
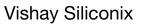


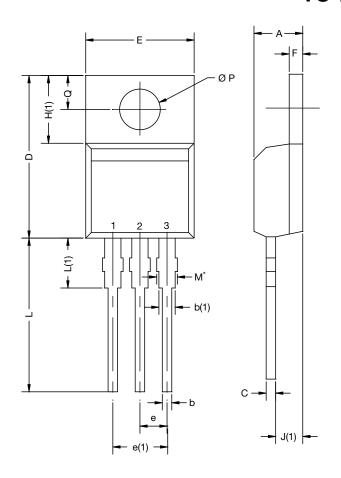
Fig. 14 - For N-Channel

Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package/tape drawings, part marking, and reliability data, see www.vishay.com/ppg291019.





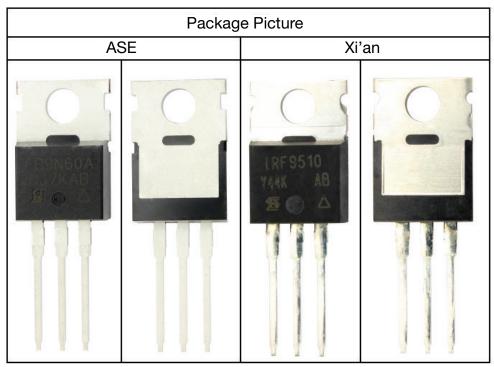
TO-220-1



DIM.	MILLIM	IETERS	INCHES		
	MIN.	MAX.	MIN.	MAX.	
Α	4.24	4.65	0.167	0.183	
b	0.69	1.02	0.027	0.040	
b(1)	1.14	1.78	0.045	0.070	
С	0.36	0.61	0.014	0.024	
D	14.33	15.85	0.564	0.624	
E	9.96	10.52	0.392	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)	6.10	6.71	0.240	0.264	
J(1)	2.41	2.92	0.095	0.115	
L	13.36	14.40	0.526	0.567	
L(1)	3.33	4.04	0.131	0.159	
ØΡ	3.53	3.94	0.139	0.155	
Q	2.54	3.00	0.100	0.118	
ECN: X15-0364-Rev. C, 14-Dec-15 DWG: 6031					

Note

 \bullet $M^{\star}=0.052$ inches to 0.064 inches (dimension including protrusion), heatsink hole for HVM



Revison: 14-Dec-15 1 Document Number: 66542



Legal Disclaimer Notice

Vishay

Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.