

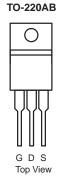
# N-Channel 200 V (D-S) MOSFET

PRODUCT SUMMARY				
V <sub>DS</sub> (V)	$V_{DS}(V)$ $R_{DS(on)}(\Omega)$			
200	0.270 at V <sub>GS</sub> = 10 V	10		

### **FEATURES**

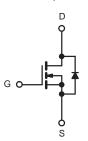
- DT-Trench Power MOSFET
- 175 °C Junction Temperature
- PWM Optimized
- 100 % R<sub>g</sub> Tested
- Compliant to RoHS Directive 2002/95/EC





#### **APPLICATIONS**

Primary Side Switch



N-Channel MOSFET

<b>ABSOLUTE MAXIMUM RATINGS</b> (T <sub>A</sub> = 25 °C, unless otherwise noted)						
Parameter		Symbol	Limit	Unit		
Drain-Source Voltage		V <sub>DS</sub>	200	1/		
Gate-Source Voltage		V <sub>GS</sub>	± 20	V		
Continuous Drain Current (T <sub>.I</sub> = 175 °C) <sup>b</sup>	T <sub>C</sub> = 25 °C	- I <sub>D</sub>	10			
Continuous Drain Current (1 <sub>J</sub> = 175 °C) <sup>2</sup>	T <sub>C</sub> = 125 °C		6			
Pulsed Drain Current		I <sub>DM</sub>	38	А		
Continuous Source Current (Diode Conduction)		I <sub>S</sub>	12			
Avalanche Current		I <sub>AS</sub>	10			
Single Pulse Avalanche Energy	L = 0.1 mH	E <sub>AS</sub>	18	mJ		
Maximum Dower Dissipation	T <sub>C</sub> = 25 °C	- P <sub>D</sub>	121 <sup>b</sup>	- W		
Maximum Power Dissipation	T <sub>A</sub> = 25 °C		2 <sup>a</sup>			
Operating Junction and Storage Temperature Range		T <sub>J</sub> , T <sub>stg</sub>	- 55 to 175	°C		

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Junction-to-Ambient <sup>a</sup>	t ≤ 10 s	R <sub>thJA</sub>	15	18	°C/W
Junction-to-Ambient*	Steady State	™thJA	40	50	
Junction-to-Case (Drain)		R <sub>thJC</sub>	0.85	1.1	

#### Notes

- a. Surface mounted on 1" x 1" FR4 board.
- b. See SOA curve for voltage derating.

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Parameter	Symbol	Test Conditions	Min.	Typ. <sup>a</sup>	Max.	Unit	
Static							
Drain-Source Breakdown Voltage	V <sub>DS</sub>	$V_{GS} = 0 \text{ V}, I_D = 250 \mu\text{A}$	200			V	
Gate Threshold Voltage	V <sub>GS(th)</sub>	$V_{DS} = V_{GS}, I_{D} = 250 \mu A$	2		4	V	
Gate-Body Leakage	I <sub>GSS</sub>	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 20 \text{ V}$			± 100	nA	
		V <sub>DS</sub> = 200 V, V <sub>GS</sub> = 0 V			1		
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 200 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 125 °C			50	μА	
		V <sub>DS</sub> = 200 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 175 °C			250		
On-State Drain Current <sup>b</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> = 5 V, V <sub>GS</sub> = 10 V	40			Α	
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 5 A		0.270			
Duti Ou ou Ou Out Duti un h	D .	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 5 A, T <sub>J</sub> = 125 °C		0.320			
Drain-Source On-State Resistance <sup>b</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 5 A, T <sub>J</sub> = 175 °C		0.410		Ω	
		$V_{GS} = 4.5 \text{ V}, I_{D} = 5 \text{ A}$		0.310			
Forward Transconductance <sup>b</sup>	9 <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 19 A		35		S	
Dynamic <sup>a</sup>							
Input Capacitance	C <sub>iss</sub>			800		pF	
Output Capacitance	C <sub>oss</sub>	$V_{GS} = 0 \text{ V}, V_{DS} = 25 \text{ V}, F = 1 \text{ MHz}$		110			
Reverse Transfer Capacitance	C <sub>rss</sub>			80			
Total Gate Charge <sup>c</sup>	$Q_g$			30			
Gate-Source Charge <sup>c</sup>	Q <sub>gs</sub>	$V_{DS} = 100 \text{ V}, V_{GS} = 10 \text{ V}, I_{D} = 19 \text{ A}$		8		nC	
Gate-Drain Charge <sup>c</sup>	$Q_{gd}$			12			
Gate Resistance	$R_g$		0.5		2.9	Ω	
Turn-On Delay Time <sup>c</sup>	t <sub>d(on)</sub>			15	25		
Rise Time <sup>c</sup>	t <sub>r</sub>	$V_{DD} = 100 \text{ V}, R_{L} = 5.2 \Omega$		50	75	nc	
Turn-Off Delay Time <sup>c</sup>	t <sub>d(off)</sub>	$I_D \cong 19 \text{ A}, V_{GEN} = 10 \text{ V}, R_g = 2.5 \Omega$		30	45	ns	
Fall Time <sup>c</sup>	t <sub>f</sub>			60	90		
Source-Drain Diode Ratings and Char	acteristics (7	<sub>C</sub> = 25 °C)					
Pulsed Current	I <sub>SM</sub>				40	Α	
Diode Forward Voltage <sup>b</sup>	$V_{SD}$	I <sub>F</sub> = 19 A, V <sub>GS</sub> = 0 V		0.9	1.5	V	
Source-Drain Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 19 A, dI/dt = 100 A/μs		180	250	ns	

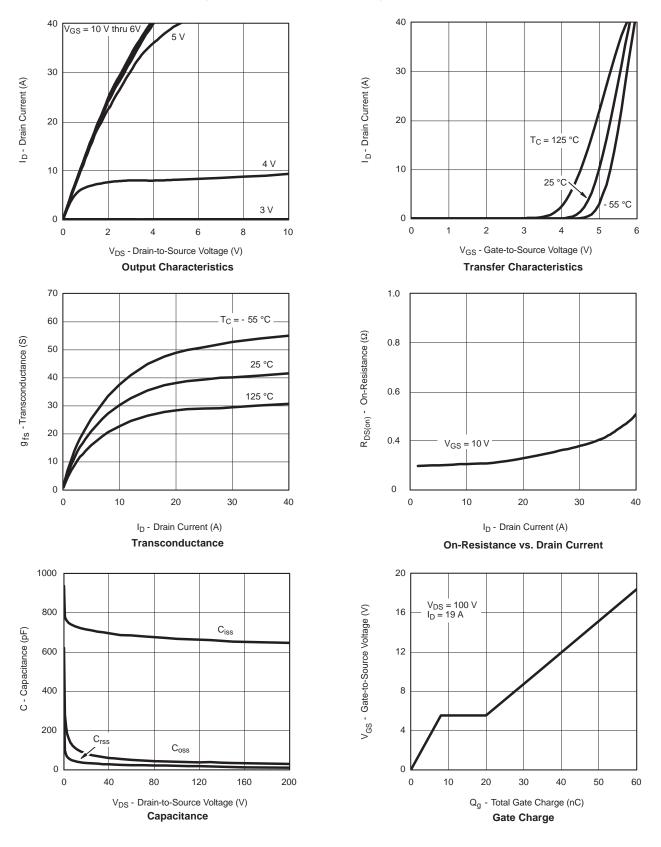
- a. Guaranteed by design, not subject to production testing. b. Pulse test; pulse width  $\leq$  300 µs, duty cycle  $\leq$  2 %. c. Independent of operating temperature.

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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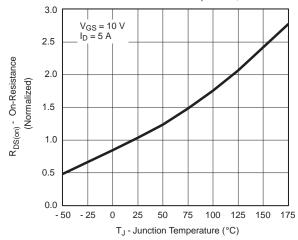
### TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

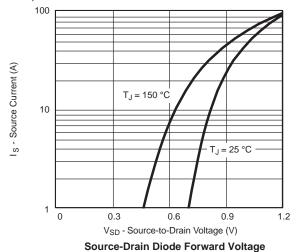


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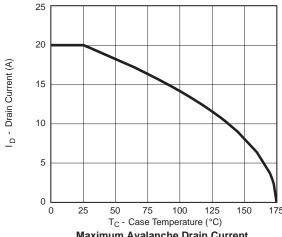
### TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)





On-Resistance vs. Junction Temperature

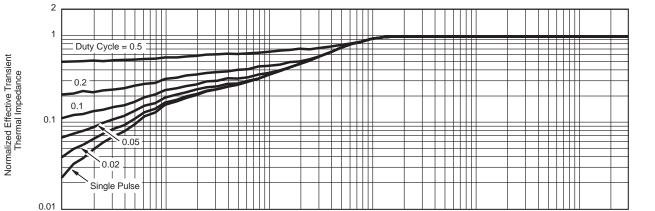
THERMAL RATINGS



Safe Operating Area

Maximum Avalanche Drain Current vs. Case Temperature

10-3



Square Wave Pulse Duration (s)
Normalized Thermal Transient Impedance, Junction-to-Case

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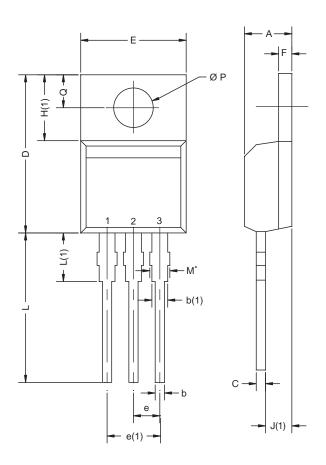
10-4

30

10



## **TO-220AB**



	MILLIM	IETERS	INCHES		
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	
ØР	3.54	3.94	0.139	0.155	
Q	2.60	3.00	0.102	0.118	
ECN: X12- DWG: 547	0208-Rev. N, (	08-Oct-12			

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



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