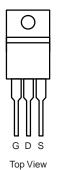


# N-Channel 30 V (D-S) MOSFET

PRODUCT SUMMARY						
V <sub>DS</sub> (V)	30					
$R_{DS(on)}$ ( $\Omega$ ) at $V_{GS}$ = 10 V	0. 007					
$R_{DS(on)}$ ( $\Omega$ ) at $V_{GS}$ = 4.5 V	0. 010					
I <sub>D</sub> (A)	70					
Configuration	Single					
Package	TO-220AB					

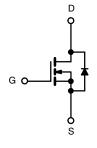
#### TO-220AB



### **FEATURES**

- TrenchFET<sup>®</sup> power MOSFET
- Package with low thermal resistance
- + 100 %  $\rm R_g$  and UIS tested





N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS	(T <sub>C</sub> = 25 °C, unless	otherwise noted	i)		
PARAMETER		SYMBOL	LIMIT	UNIT	
Drain-Source Voltage		V <sub>DS</sub>	30	V	
Gate-Source Voltage		V <sub>GS</sub>	± 20	V	
Continuous Drain Current	$T_C = 25 \ ^\circ C \ ^a$	Ŀ	70		
Continuous Drain Current	T <sub>C</sub> = 125 °C	l <sub>D</sub>	50		
Continuous Source Current (Diode Conduction) <sup>a</sup>		I <sub>S</sub>	70	А	
Pulsed Drain Current <sup>b</sup>		I <sub>DM</sub>	250		
Single Pulse Avalanche Current	L = 0.1 mH	I <sub>AS</sub>	33		
Single Pulse Avalanche Energy		E <sub>AS</sub>	54	mJ	
Maximum Power Dissipation <sup>b</sup>	T <sub>C</sub> = 25 °C	P	71 W		
	T <sub>C</sub> = 125 °C	PD	23	vv	
Operating Junction and Storage Temperature	Range	T <sub>J</sub> , T <sub>stg</sub>	-55 to +175	°C	

THERMAL RESISTANCE RATINGS				
PARAMETER		SYMBOL	LIMIT	UNIT
Junction-to-Ambient	PCB Mount <sup>c</sup>	R <sub>thJA</sub>	50	°C/W
Junction-to-Case (Drain)	÷		2.1	C/W

#### 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).

<b>SPECIFICATIONS</b> ( $T_C = 25 \ ^{\circ}C$ ,	unless otherw	vise noted)					
PARAMETER	SYMBOL	TES	T CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static							
Drain-Source Breakdown Voltage	V <sub>DS</sub>	$V_{GS}$ = 0 V, $I_D$ = 250 $\mu$ A		30	-	-	V
Gate-Source Threshold Voltage	V <sub>GS(th)</sub>	$V_{DS} = V_{GS}, I_D = 250 \ \mu A$ 1.0			2.5	v	
Gate-Source Leakage	I <sub>GSS</sub>	V <sub>DS</sub> =	0 V, $V_{GS}$ = ± 20 V	-	-	± 100	nA
		$V_{GS} = 0 V$	V <sub>DS</sub> = 30 V	-	-	1	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	$V_{GS} = 0 V$	$V_{DS}=30~V,~T_J=125~^\circ C$	-	-	50	μA
		$V_{GS} = 0 V$	$V_{DS}$ = 30 V, $T_{J}$ = 175 °C	-	-	150	
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	$V_{GS} = 10 V$	$V_{DS} \ge 5 V$	70	-	-	А
		$V_{GS} = 10 V$	I <sub>D</sub> = 20 A	-	0.007	-	- V - V
Drain Source On State Desistance ?	Р	V <sub>GS</sub> = 10 V	I <sub>D</sub> = 20 A, T <sub>J</sub> = 125 °C	-	0.010	-	
Drain-Source On-State Resistance <sup>a</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V	I <sub>D</sub> = 20 A, T <sub>J</sub> = 175 °C	-	0.014	-	
		$V_{GS} = 4.5 V$	I <sub>D</sub> = 15 A	-	0.010	-	
Forward Transconductance b	<b>g</b> fs	V <sub>DS</sub>	= 15 V, I <sub>D</sub> = 15 A	-	100	-	S
Dynamic <sup>b</sup>							
Input Capacitance	C <sub>iss</sub>			-	-	1500	
Output Capacitance	C <sub>oss</sub>	$V_{GS} = 0 V$	V <sub>DS</sub> = 25 V, f = 1 MHz	-	-	260	pF
Reverse Transfer Capacitance	C <sub>rss</sub>	]		-	-	95	
Total Gate Charge <sup>c</sup>	Qg			-	46	75	
Gate-Source Charge <sup>c</sup>	Q <sub>gs</sub>	$V_{GS} = 10 V$	$V_{DS} = 20 \text{ V}, I_D = 50 \text{ A}$	-	10	-	nC
Gate-Drain Charge <sup>c</sup>	Q <sub>gd</sub>			-	8	-	
Gate Resistance	R <sub>g</sub>	f = 1 MHz		1.3	2.8	4.5	Ω
Turn-On Delay Time <sup>c</sup>	t <sub>d(on)</sub>			-	9	15	
Rise Time <sup>c</sup>	t <sub>r</sub>	- V <sub>DD</sub> =	= 20 V, R <sub>I</sub> = 0.4 Ω	-	19	30	
Turn-Off Delay Time <sup>c</sup>	t <sub>d(off)</sub>	$I_D \cong 50 \text{ A}, V_{GEN} = 10 \text{ V}, R_g = 1 \Omega$ $I_D \cong 50 \text{ A}, V_{GEN} = 10 \text{ V}, R_g = 1 \Omega$ $- 10$		40	– ns		
Fall Time <sup>c</sup>	t <sub>f</sub>			15			
Source-Drain Diode Ratings and Chara	acteristics <sup>b</sup>						
Pulsed Current <sup>a</sup>	I <sub>SM</sub>			-	-	200	А
Forward Voltage	V <sub>SD</sub>	I <sub>F</sub> =	30 A, V <sub>GS</sub> = 0 V	-	0.87	1.5	V

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.

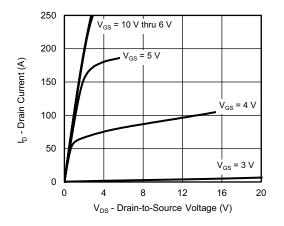
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

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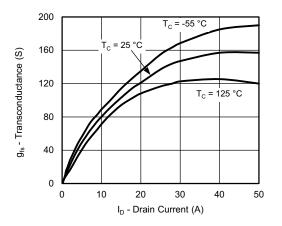
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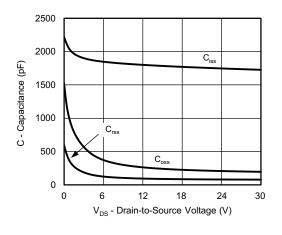
# **TYPICAL CHARACTERISTICS** ( $T_A = 25$ °C, unless otherwise noted)



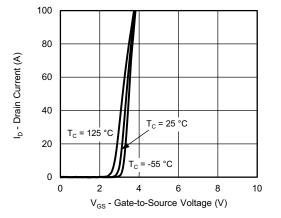
**Output Characteristics** 



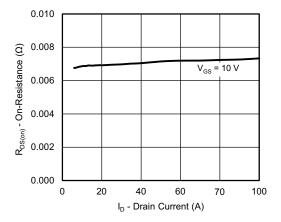
Transconductance



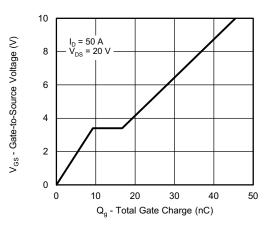
#### Capacitance



**Transfer Characteristics** 



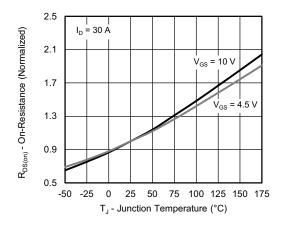
**On-Resistance vs. Drain Current** 



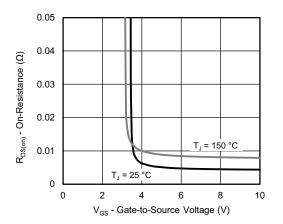
**Gate Charge** 



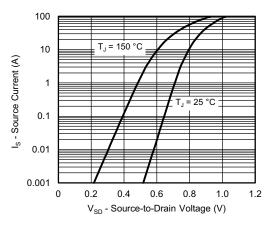
## **TYPICAL CHARACTERISTICS** ( $T_A = 25 \text{ °C}$ , unless otherwise noted)



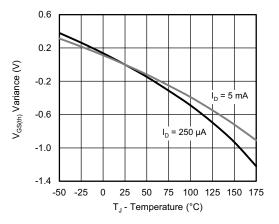
#### **On-Resistance vs. Junction Temperature**



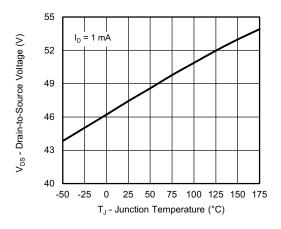
On-Resistance vs. Gate-to-Source Voltage



Source Drain Diode Forward Voltage



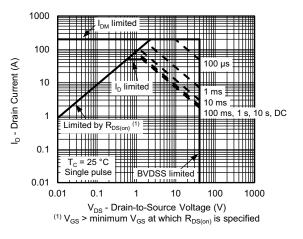




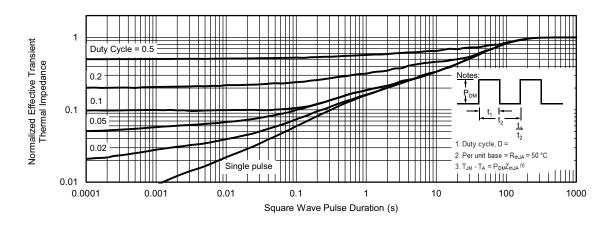
Drain Source Breakdown vs. Junction Temperature



## **THERMAL RATINGS** ( $T_A = 25 \text{ °C}$ , unless otherwise noted)



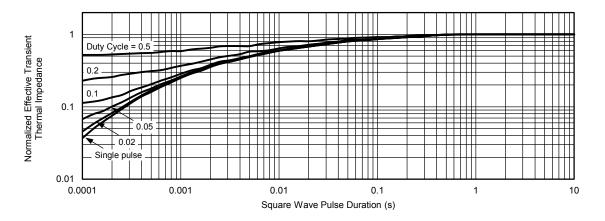
Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient



## **THERMAL RATINGS** ( $T_A = 25 \text{ °C}$ , unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Case

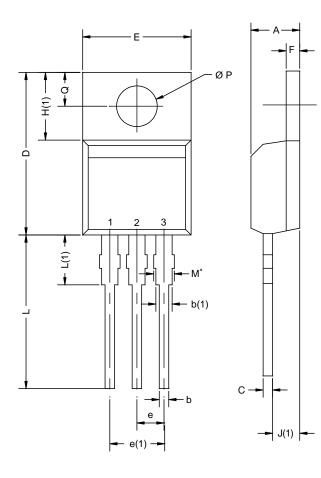
#### Note

- 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.



# **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	
ØΡ	3.54	3.94	0.139	0.155	
Q	2.60	3.00	0.102	0.118	
ECN: X12-0 DWG: 5471	0208-Rev. N, (	08-Oct-12			

### Notes

 $^{\star}$  M = 1.32 mm to 1.62 mm (dimension including protrusion) Heatsink hole for HVM



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