

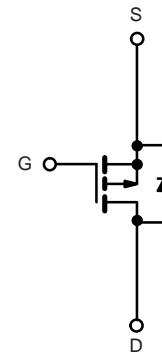
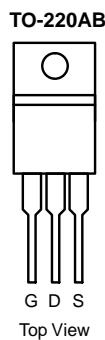
VBM2305 Datasheet

P-Channel 30 V (D-S) MOSFET

PRODUCT SUMMARY		
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A) ^a
- 30	0.004 at $V_{GS} = - 10$ V	-100
	0.005 at $V_{GS} = - 4.5$ V	-90

FEATURES

- Compliant to RoHS Directive 2002/95/EC



ABSOLUTE MAXIMUM RATINGS ($T_C = 25$ °C, unless otherwise noted)			
Parameter	Symbol	Limit	Unit
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_J = 175$ °C)	I_D	- 100	A
$T_C = 125$ °C		- 80	
Pulsed Drain Current	I_{DM}	- 300	
Avalanche Current	I_{AR}	- 80	
Repetitive Avalanche Energy ^b	E_{AR}	180	mJ
Power Dissipation	P_D	187 ^d	W
$T_A = 25$ °C (TO-220AB and TO-263)		3.75	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 175	°C

THERMAL RESISTANCE RATINGS				
Parameter	Symbol	Limit	Unit	
Junction-to-Ambient	R_{thJA}	40	°C/W	
PCB Mount (TO-263) ^c		62.5		
Junction-to-Case	R_{thJC}	0.8		

Notes:

- a. Package limited.
- b. Duty cycle ≤ 1 %.
- c. When mounted on 1" square PCB (FR-4 material).
- d. See SOA curve for voltage derating.

* Pb containing terminations are not RoHS compliant, exemptions may apply.

SPECIFICATIONS ($T_J = 25^\circ\text{C}$, unless otherwise noted)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0 \text{ V}$, $I_D = -250 \mu\text{A}$	-30			V
Gate Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}$, $I_D = -250 \mu\text{A}$	-1		-3	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0 \text{ V}$, $V_{GS} = \pm 20 \text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -30 \text{ V}$, $V_{GS} = 0 \text{ V}$			-1	
		$V_{DS} = -30 \text{ V}$, $V_{GS} = 0 \text{ V}$, $T_J = 125^\circ\text{C}$			-50	μA
		$V_{DS} = -30 \text{ V}$, $V_{GS} = 0 \text{ V}$, $T_J = 175^\circ\text{C}$			-250	
On-State Drain Current ^a	$I_{D(\text{on})}$	$V_{DS} = -5 \text{ V}$, $V_{GS} = -10 \text{ V}$	-120			A
Drain-Source On-State Resistance ^a	$R_{DS(\text{on})}$	$V_{GS} = -10 \text{ V}$, $I_D = -30 \text{ A}$		0.004		
		$V_{GS} = -10 \text{ V}$, $I_D = -30 \text{ A}$, $T_J = 125^\circ\text{C}$		0.006		Ω
		$V_{GS} = -10 \text{ V}$, $I_D = -30 \text{ A}$, $T_J = 175^\circ\text{C}$		0.008		
		$V_{GS} = -4.5 \text{ V}$, $I_D = -20 \text{ A}$		0.005		
Forward Transconductance ^a	g_{fs}	$V_{DS} = -15 \text{ V}$, $I_D = -75 \text{ A}$	20			S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{GS} = 0 \text{ V}$, $V_{DS} = -25 \text{ V}$, $f = 1 \text{ MHz}$		8000		
Output Capacitance	C_{oss}			1565		pF
Reversen Transfer Capacitance	C_{rss}			715		
Total Gate Charge ^c	Q_g	$V_{DS} = -15 \text{ V}$, $V_{GS} = -10 \text{ V}$, $I_D = -75 \text{ A}$		160	240	
Gate-Source Charge ^c	Q_{gs}			32		nC
Gate-Drain Charge ^c	Q_{gd}			30		
Turn-On Delay Time ^c	$t_{d(\text{on})}$			25	40	
Rise Time ^c	t_r	$V_{DD} = -15 \text{ V}$, $R_L = 0.2 \Omega$ $I_D \geq -75 \text{ A}$, $V_{GEN} = -10 \text{ V}$, $R_g = 2.5 \Omega$		225	360	
Turn-Off Delay Time ^c	$t_{d(\text{off})}$			150	240	
Fall Time ^c	t_f			210	340	
Source-Drain Diode Ratings and Characteristics^b ($T_C = 25^\circ\text{C}$)						
Continuous Current	I_S	$I_F = -75 \text{ A}$, $V_{GS} = 0 \text{ V}$			-80	
Pulsed Current	I_{SM}				-240	A
Forward Voltage ^a	V_{SD}			-1.2	-1.5	V
Reverse Recovery Time	t_{rr}			55	100	ns
Peak Reverse Recovery Current	$I_{RM(\text{REC})}$			2.5	5	A
Reverse Recovery Charge	Q_{rr}			0.07	0.25	μC

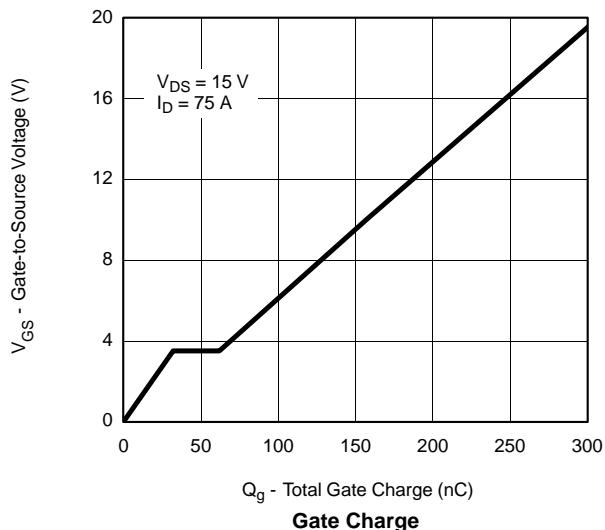
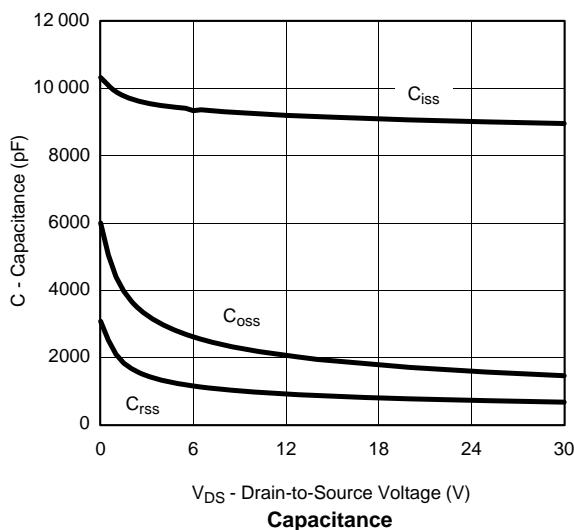
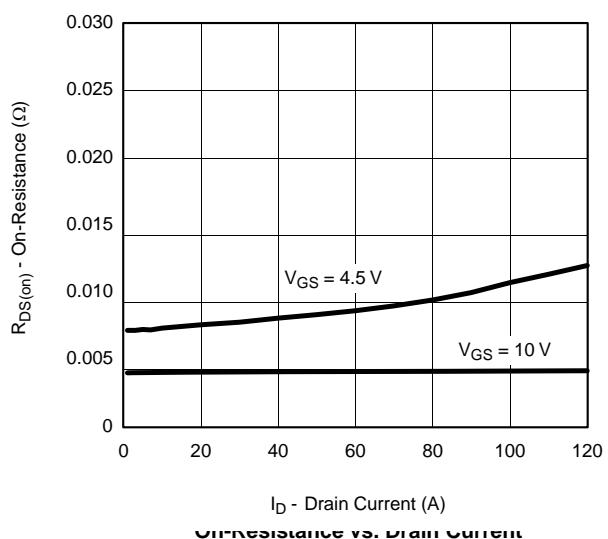
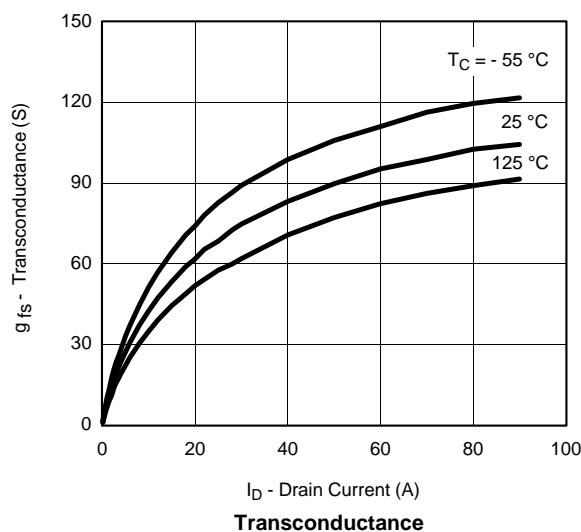
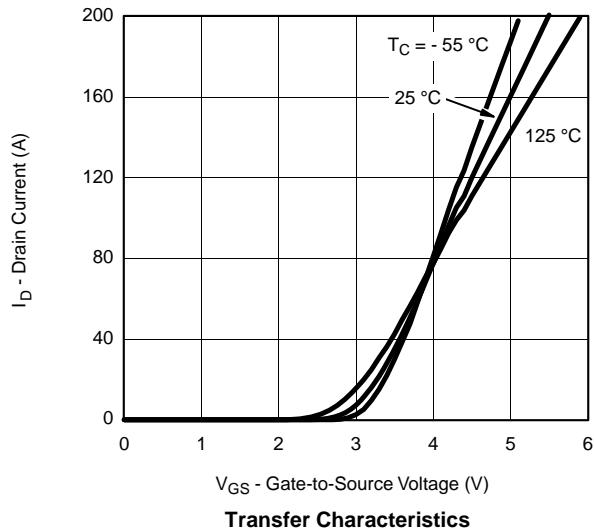
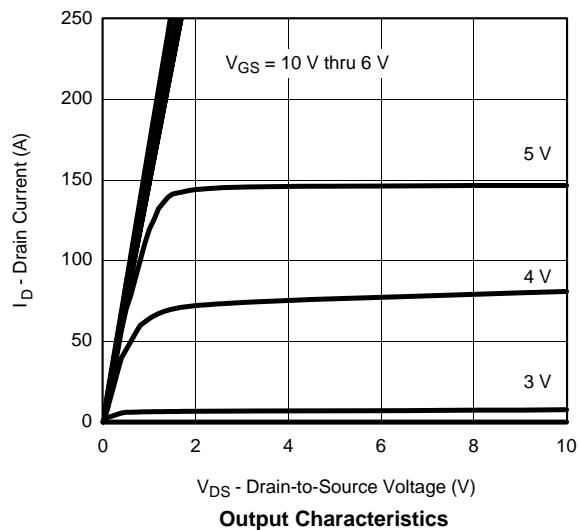
Notes:

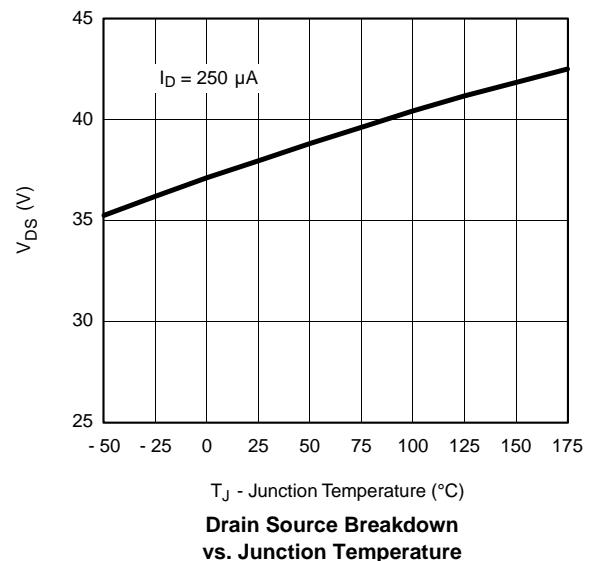
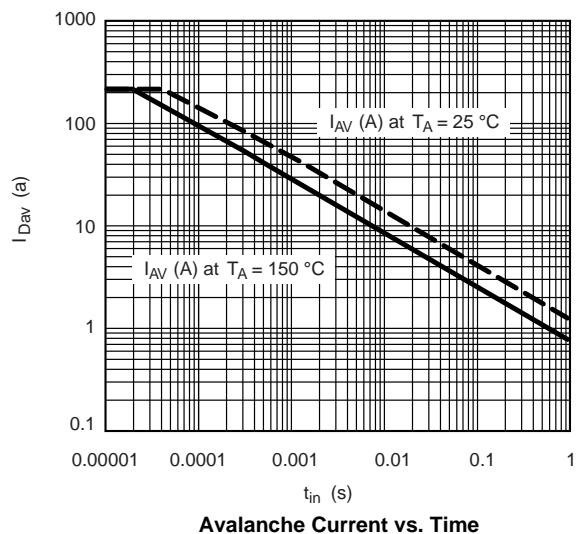
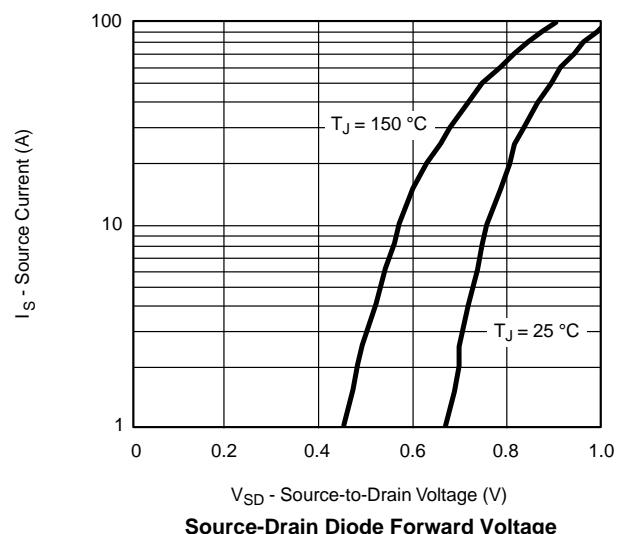
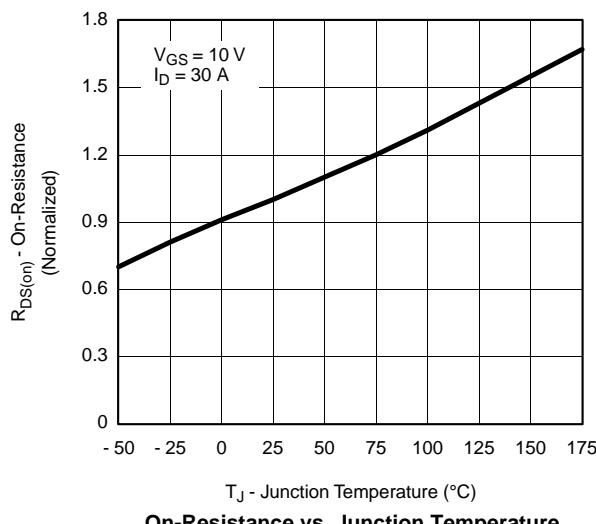
a. Pulse test; pulse width $\leq 300 \mu\text{s}$, duty cycle $\leq 2\%$.

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

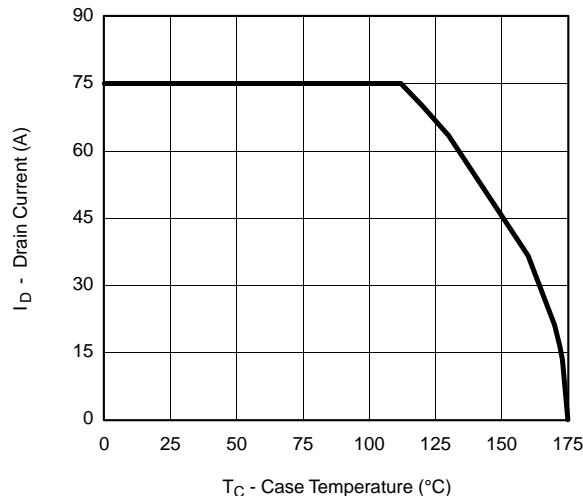
c. Independent of operating temperature.

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.

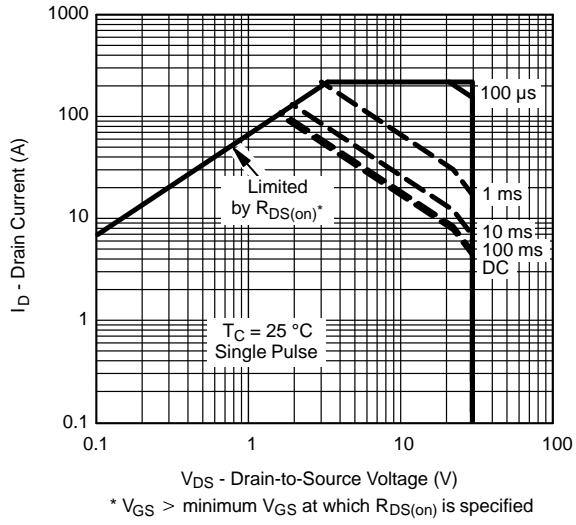
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)


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THERMAL RATINGS

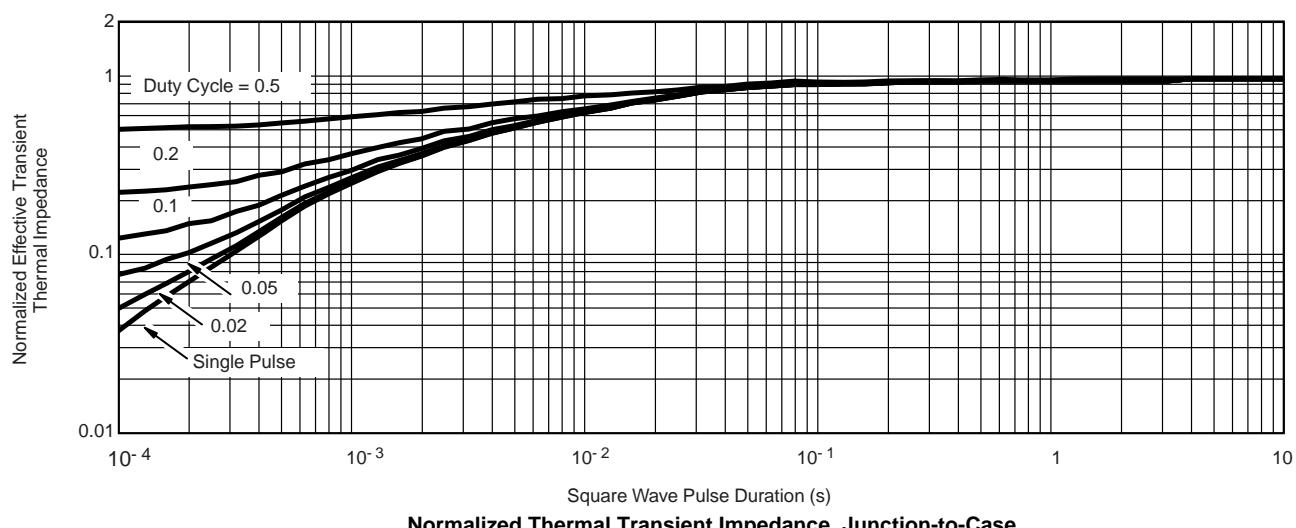


Maximum Avalanche and Drain Current
vs. Case Temperature



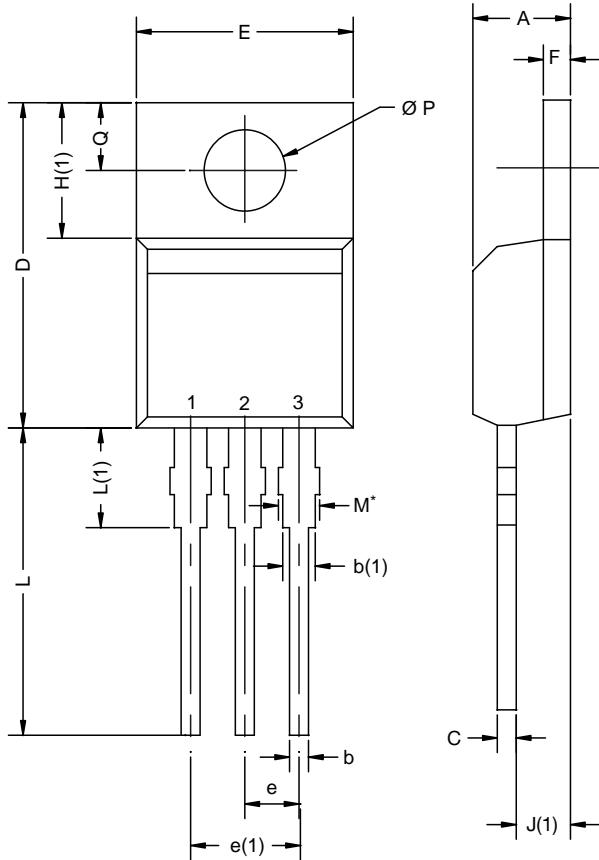
* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

TO-220AB



DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	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
c	0.36	0.61	0.014	0.024
D	14.85	15.49	0.585	0.610
E	10.04	10.51	0.395	0.414
e	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
Ø P	3.54	3.94	0.139	0.155
Q	2.60	3.00	0.102	0.118

Notes

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

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