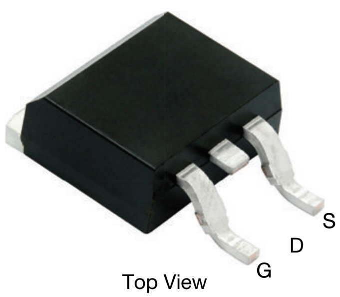
80N20M5-VB TO263 Datasheet

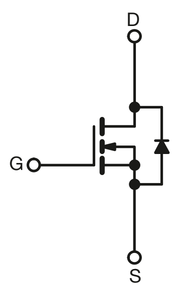
N-Channel 200 V (D-S) 175 °C MOSFET

PRODUCT SUMMARY	
V_{DS} (V)	200
$R_{DS(on)}$ Typ. (Ω) at V_{GS} = 10 V	0.0076
$R_{DS(on)}$ Typ. (Ω) at V_{GS} = 7.5 V	0.0086
Q_g typ. (nC)	58
I_D (A)	100
Configuration	Single

TO-263



Top View



N-Channel MOSFET

FEATURES

- Thunder power MOSFET
- Maximum 175 °C junction temperature
- 100 % R_g and UIS tested

RoHS COMPLIANT
HALOGEN FREE

APPLICATIONS

- Power supplies:
  - Uninterruptible power supplies
  - AC/DC switch-mode power supplies
  - Lighting
- Synchronous rectification
- DC/DC converter
- Motor drive switch
- DC/AC inverter
- Solar micro inverter
- Class D audio amplifier

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C, unless otherwise noted)

PARAMETER		SYMBOL	LIMIT	UNIT
Drain-source voltage		V_{DS}	200	V
Gate-source voltage		V_{GS}	± 20	
Continuous drain current	T_C = 25 °C	I_D	100	A
	T_C = 125 °C		62	
Pulsed drain current (t = 100 μs)		I_{DM}	300	
Continuous source-drain diode current		I_S	100	
Single pulse avalanche current [a]	L = 0.1 mH	I_{AS}	60	
Single pulse avalanche energy [a]		E_{AS}	180	mJ
Maximum power dissipation	T_C = 25 °C	P_D	375 [b]	W
	T_C = 125 °C		125 [b]	
Operating junction and storage temperature range		T_J, T_{stg}	-55 to +175	°C
Soldering recommendations (peak temperature) [c]			260	

THERMAL RESISTANCE RATINGS

PARAMETER		SYMBOL	MAXIMUM	UNIT
Maximum junction-to-ambient (PCB mount) [c]		R_{thJA}	40	°C/W
Maximum junction-to-case (drain)	Steady state	R_{thJC}	0.4	

Notes

a. Duty cycle ≤ 1 %.
b. See SOA curve for voltage derating.
c. When mounted on 1" square PCB (FR4 material).
d. Package limited.

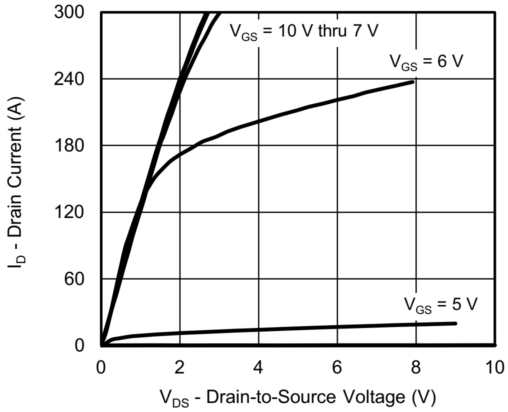
SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Static						
Drain-source breakdown voltage	V_{DS}	V_{GS} = 0 V, I_D = 250 μA	200	-	-	V
Gate-source threshold voltage	$V_{GS(th)}$	V_{DS} = V_{GS} , I_D = 250 μA	2	-	4	V
Gate-source leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V	-	-	250	nA
Zero gate voltage drain current	I_{DSS}	V_{DS} = 200 V, V_{GS} = 0 V	-	-	1	μA
		V_{DS} = 200 V, V_{GS} = 0 V, T_J = 125 °C	-	-	150	
		V_{DS} = 200 V, V_{GS} = 0 V, T_J = 175 °C	-	-	5	mA
On-state drain current [a]	$I_{D(on)}$	V_{DS} ≥ 10 V, V_{GS} = 10 V	60	-	-	A
Drain-source on-state resistance [a]	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 40 A	-	0.0076	-	Ω
		V_{GS} = 7.5 V, I_D = 40 A	-	0.0086	-	
Forward transconductance [a]	g_{fs}	V_{DS} = 15 V, I_D = 40 A	-	63	-	S
Dynamic [b]						
Input capacitance	C_{iss}	V_{DS} = 100 V, V_{GS} = 0 V, f = 1 MHz	-	3120	-	pF
Output capacitance	C_{oss}		-	280	-	
Reverse transfer capacitance	C_{rss}		-	24	-	
Total gate charge	Q_g	V_{DS} = 100 V, V_{GS} = 10 V, I_D = 60 A	-	58	87	nC
Gate-source charge	Q_{gs}		-	17.6	-	
Gate-drain charge	Q_{gd}		-	17.2	-	
Output charge	Q_{oss}	V_{DS} = 100 V, V_{GS} = 0 V	-	108	162	
Gate resistance	R_g	f = 1 MHz	1.5	3	5	Ω
Turn-on delay time	$t_{d(on)}$	V_{DD} = 100 V, R_L = 1.66 Ω, I_D ≅ 60 A, V_{GEN} = 10 V, R_g = 1 Ω	-	14	28	ns
Rise time	t_r		-	125	250	
Turn-off delay time	$t_{d(off)}$		-	27	54	
Fall time	t_f		-	80	150	
Drain-Source Body Diode Characteristics						
Pulse diode forward current (t = 100 μs)	I_{SM}		-	-	240	A
Body diode voltage	V_{SD}	I_F = 30 A, V_{GS} = 0 V	-	0.85	1.5	V
Body diode reverse recovery time	t_{rr}	I_F = 30 A, dI/dt = 100 A/μs	-	150	300	ns
Body diode reverse recovery charge	Q_{rr}		-	0.9	1.8	nC
Reverse recovery fall time	t_a		-	125	-	ns
Reverse recovery rise time	t_b		-	25	-	
Body diode peak reverse recovery charge	$I_{RM(REC)}$		-	11.5	20	A

Notes

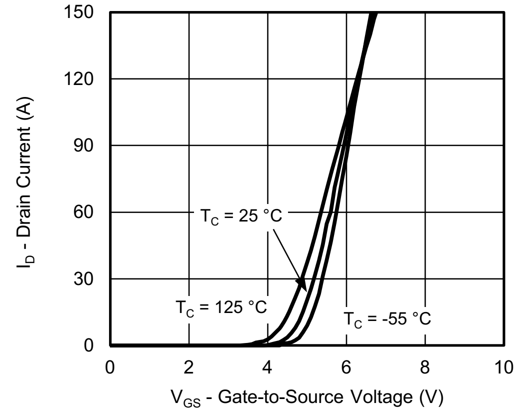
a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

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.

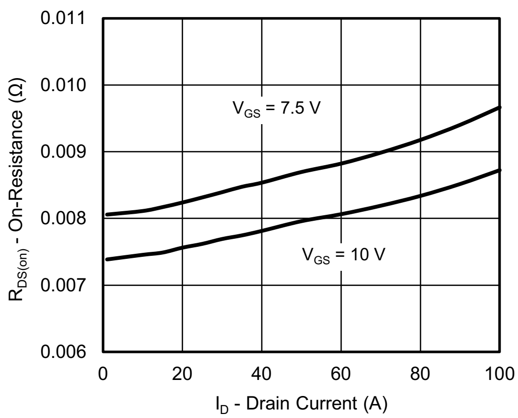
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



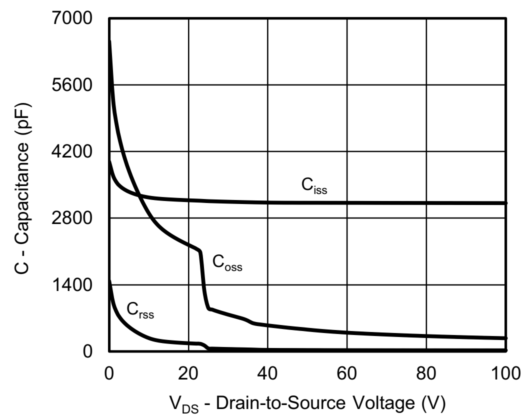
Output Characteristics



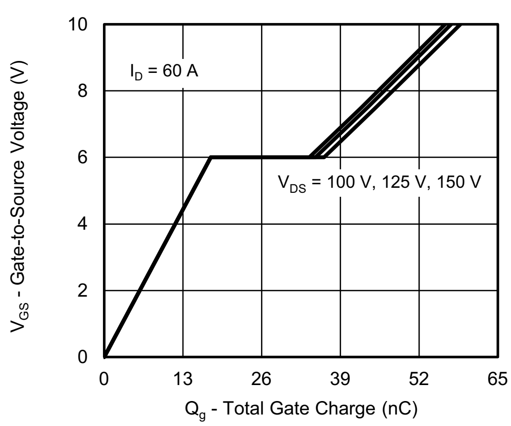
Transfer Characteristics



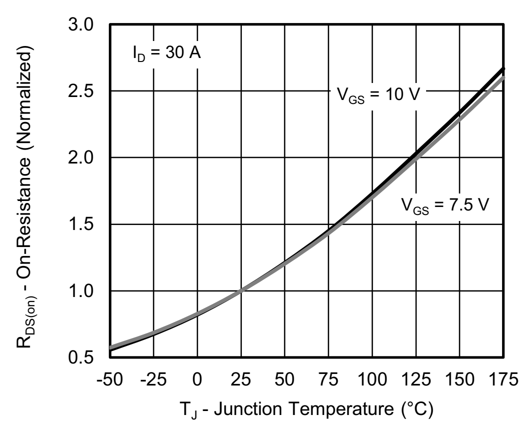
On-Resistance vs. Drain Current and Gate Voltage



Capacitance

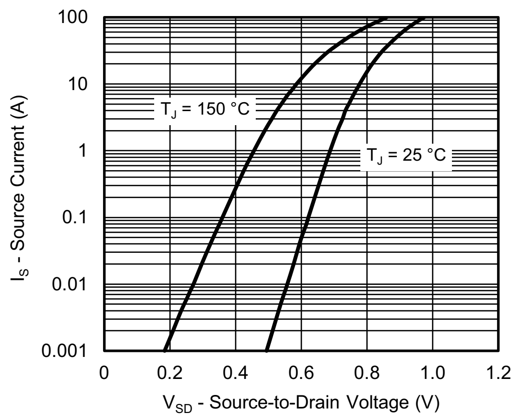


Gate Charge

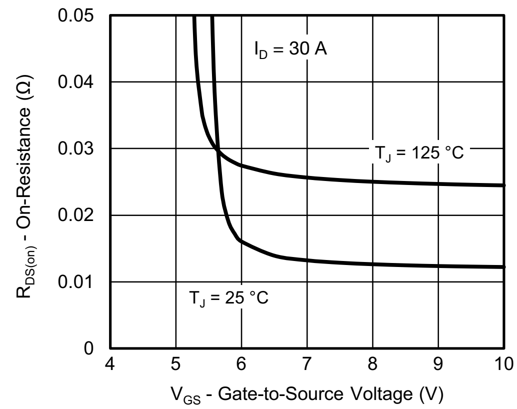


On-Resistance vs. Junction Temperature

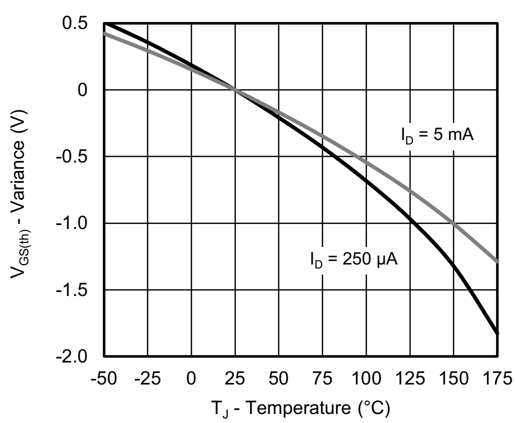
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



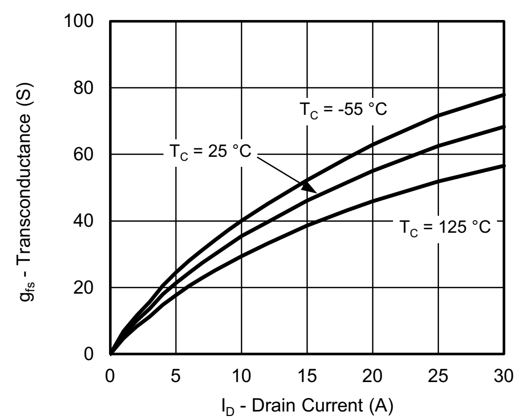
Source-Drain Diode Forward Voltage



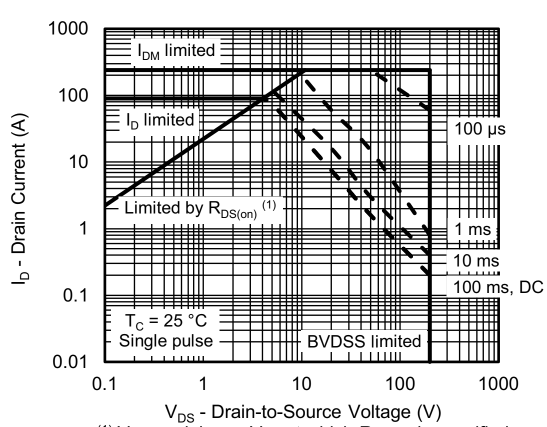
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



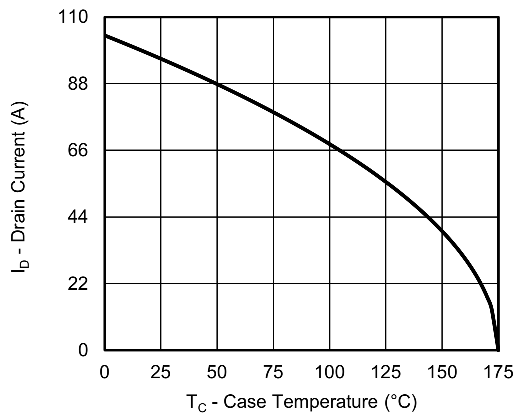
Transconductance



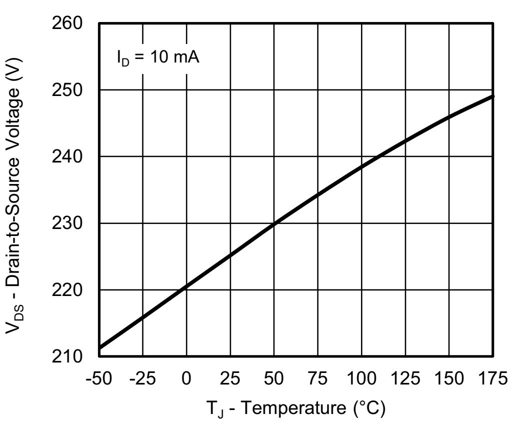
(1) V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Ambient

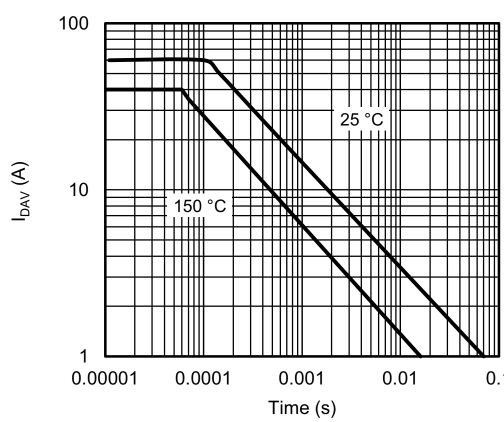
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Current Derating [a]



Drain Source Breakdown vs. Junction Temperature

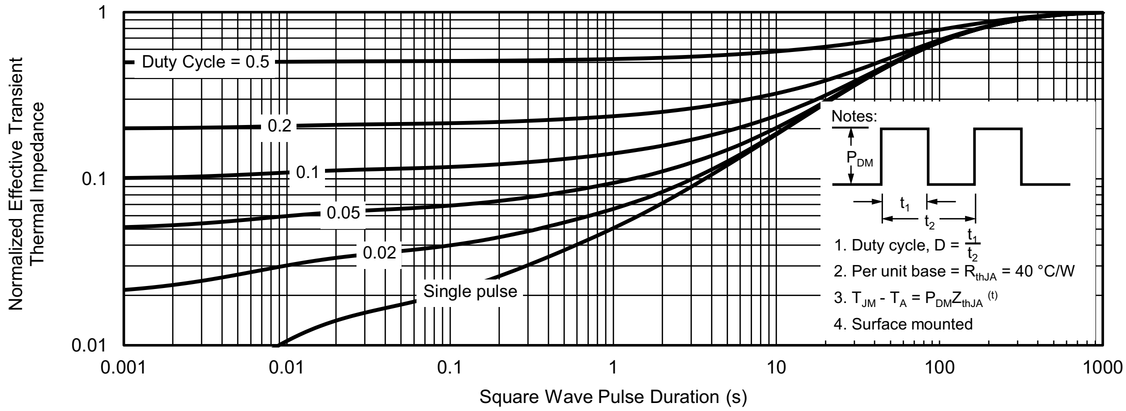


I_{DAV} vs. Time

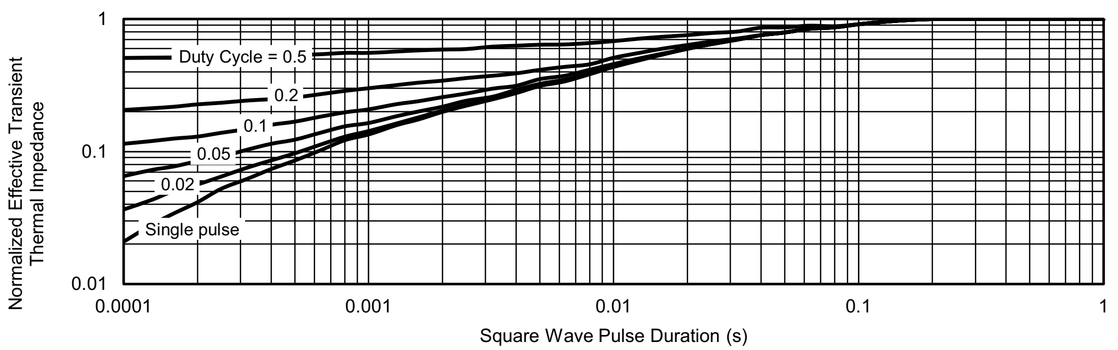
Note

a. The power dissipation P_D is based on T_J max. = 25 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

Disclaimer

All products due to improve reliability, function or design or for other reasons, product specifications and data are subject to change without notice.

Taiwan VBsemi Electronics Co., Ltd., branches, agents, employees, and all persons acting on its or their representatives (collectively, the "Taiwan VBsemi"), assumes no responsibility for any errors, inaccuracies or incomplete data contained in the table or any other any disclosure of any information related to the product.(www.VBsemi.com)

Taiwan VBsemi makes no guarantee, representation or warranty on the product for any particular purpose of any goods or continuous production. To the maximum extent permitted by applicable law on Taiwan VBsemi relinquished: (1) any application and all liability arising out of or use of any products; (2) any and all liability, including but not limited to special, consequential damages or incidental ; (3) any and all implied warranties, including a particular purpose, non-infringement and merchantability guarantee.

Statement on certain types of applications are based on knowledge of the product is often used in a typical application of the general product VBsemi Taiwan demand that the Taiwan VBsemi of. Statement on whether the product is suitable for a particular application is non-binding. It is the customer's responsibility to verify specific product features in the products described in the specification is appropriate for use in a particular application. Parameter data sheets and technical specifications can be provided may vary depending on the application and performance over time. All operating parameters, including typical parameters must be made by customer's technical experts validated for each customer application. Product specifications do not expand or modify Taiwan VBsemi purchasing terms and conditions, including but not limited to warranty herein.

Unless expressly stated in writing, Taiwan VBsemi products are not intended for use in medical, life saving, or life sustaining applications or any other application. Wherein VBsemi product failure could lead to personal injury or death, use or sale of products used in Taiwan VBsemi such applications using client did not express their own risk. Contact your authorized Taiwan VBsemi people who are related to product design applications and other terms and conditions in writing.

The information provided in this document and the company's products without a license, express or implied, by estoppel or otherwise, to any intellectual property rights granted to the VBsemi act or document. Product names and trademarks referred to herein are trademarks of their respective representatives will be all.

Material Category Policy

Taiwan VBsemi Electronics Co., Ltd., hereby certify that all of the products are determined to be oHS compliant and meets the definition of restrictions under Directive of the European Parliament 2011/65 / EU, 2011 Nian. 6. 8 Ri Yue restrict the use of certain hazardous substances in electrical and electronic equipment (EEE) - modification, unless otherwise specified as inconsistent.(www.VBsemi.com)

Please note that some documents may still refer to Taiwan VBsemi RoHS Directive 2002/95 / EC. We confirm that all products identified as consistent with the Directive 2002/95 / EC European Directive 2011/65 /.

Taiwan VBsemi Electronics Co., Ltd. hereby certify that all of its products comply identified as halogen-free halogen-free standards required by the JEDEC JS709A. Please note that some Taiwanese VBsemi documents still refer to the definition of IEC 61249-2-21, and we are sure that all products conform to confirm compliance with IEC 61249-2-21 standard level JS709A.