VBGQF1806 Datasheet
N-Channel 85V (D-S) MOSFET

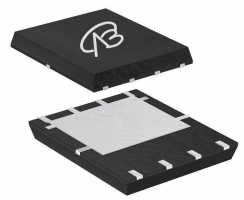
PRODUCT SUMMARY		
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)[a]
85	0.008at V_{GS} = 10 V	56
	0.012at V_{GS} = 4.5 V	50

FEATURES

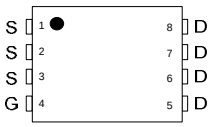
- 175 °C Junction Temperature
- SGT technology Power MOSFET
- Material categorization:

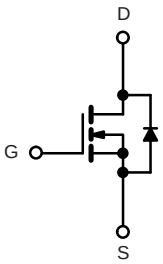
RoHS COMPLIANT

DFN3x3



Top View





N-Channel MOSFET

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)[b]	T_C = 25 °C	I_D	56	A
	T_C = 100 °C		35[a]	
Pulsed Drain Current		I_{DM}	168	
Continuous Source Current (Diode Conduction)		I_S	85[a]	
Avalanche Current		I_{AS}	118	
Single Avalanche Energy (Duty Cycle ≤ 1 %)	L = 0.1 mH	E_{AS}	130	mJ
Maximum Power Dissipation	T_C = 25 °C	P_D	136	W
	T_A = 25 °C		3[b], 8.3[b, c]	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 175	°C

THERMAL RESISTANCE RATINGS					
Parameter		**Symbol**	**Typical**	**Maximum**	**Unit**
Maximum Junction-to-Ambient[a]	t ≤ 10 sec	R_{thJA}	15	18	°C/W
	Steady State		40	50	
Maximum Junction-to-Case		R_{thJC}	0.85	1.1	

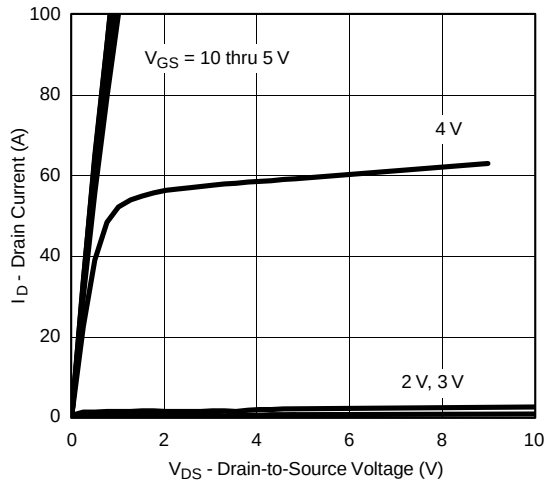
Notes:
a. Package limited.
b. Surface mounted on 1" x 1" FR4 board.
c. t ≤ 10 s.

SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)						
Parameter	**Symbol**	**Test Conditions**	**Min.**	**Typ.[a]**	**Max.**	**Unit**
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0 V, I_D = 250 µA	85			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	1	2	3	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 85V, V_{GS} = 0 V			1	µA
		V_{DS} = 85V, V_{GS} = 0 V, T_J = 125 °C			50	
		V_{DS} = 85V, V_{GS} = 0 V, T_J = 175 °C			250	
On-State Drain Current[b]	$I_{D(on)}$	V_{DS} = 5 V, V_{GS} = 10 V	60			A
Drain-Source On-State Resistance[b]	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 20 A		0.007		Ω
		V_{GS} = 10 V, I_D = 20 A, T_J = 125 °C		0.008		
		V_{GS} = 10 V, I_D = 20 A, T_J = 175 °C		0.010		
		V_{GS} = 4.5 V, I_D = 20A		0.012		
Forward Transconductance[b]	g_{fs}	V_{DS} = 15 V, I_D = 20 A		60		S
Dynamic						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		5600		pF
Output Capacitance	C_{oss}			470		
Reverse Transfer Capacitance	C_{rss}			225		
Total Gate Charge[c]	Q_g	V_{DS} = 30 V, V_{GS} = 10 V, I_D = 50 A		68	70	nC
Gate-Source Charge[c]	Q_{gs}			11		
Gate-Drain Charge[c]	Q_{gd}			13		
Turn-On Delay Time[c]	$t_{d(on)}$	V_{DD} = 30 V, R_L = 0.6 Ω I_D ≅ 50 A, V_{GEN} = 10 V, R_g = 2.5 Ω		15	21	ns
Rise Time[c]	t_r			15	28	
Turn-Off Delay Time[c]	$t_{d(off)}$			35	56	
Fall Time[c]	t_f			24	34	
Source-Drain Diode Ratings and Characteristics (T_C = 25 °C)						
Pulsed Current	I_{SM}				168	A
Diode Forward Voltage	V_{SD}	I_F = 20 A, V_{GS} = 0 V		1	1.5	V
Reverse Recovery Time	t_{rr}	I_F = 20 A, di/dt = 100 A/µs		4	135	ns

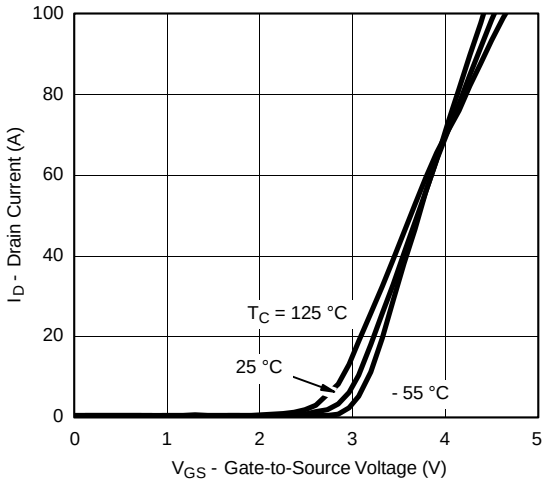
Notes:
a. For design aid only; not subject to production testing.
b. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
c. Independent of operating temperature.

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.

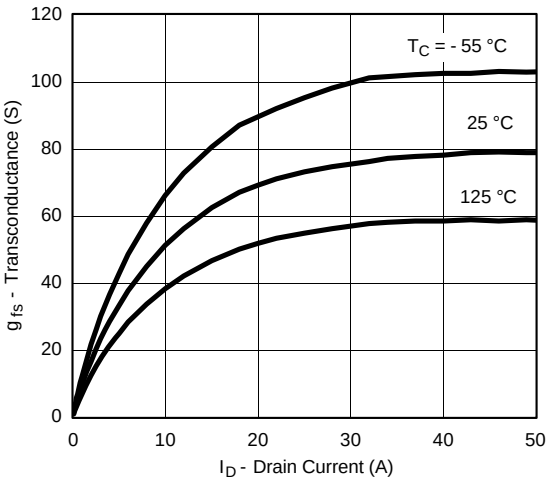
TYPICAL CHARACTERISTICS (25 °C unless noted)



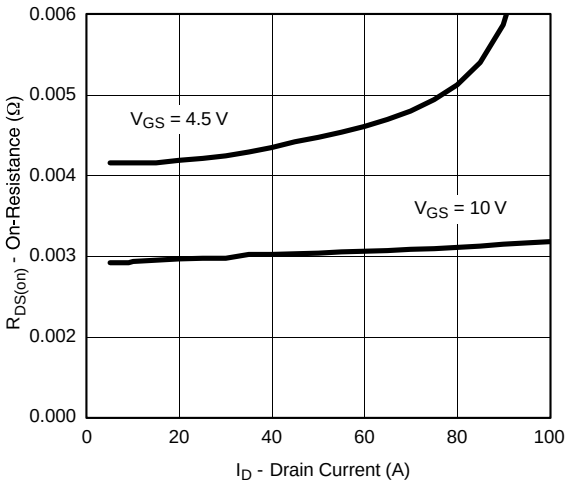
Output Characteristics



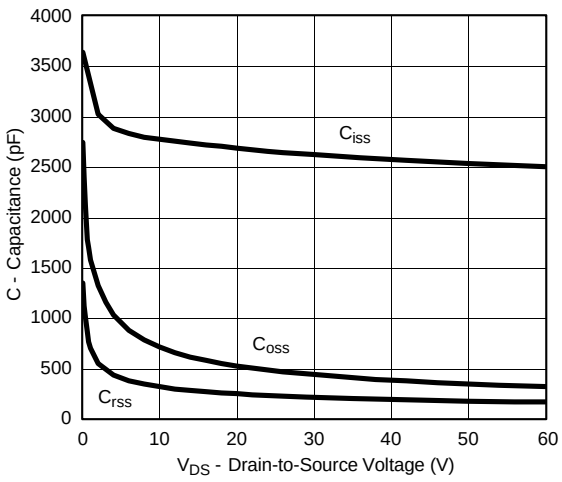
Transfer Characteristics



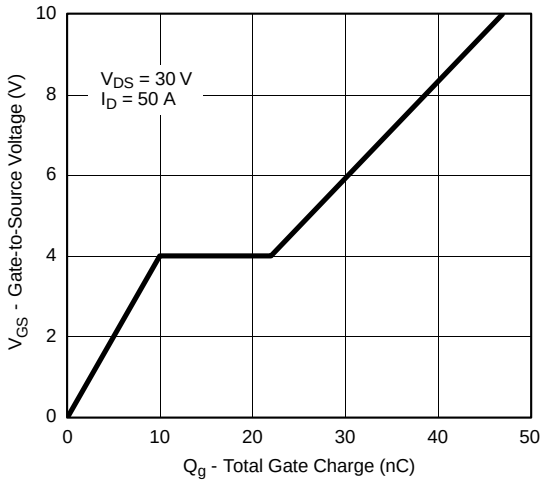
Transconductance



On-Resistance vs. Drain Current

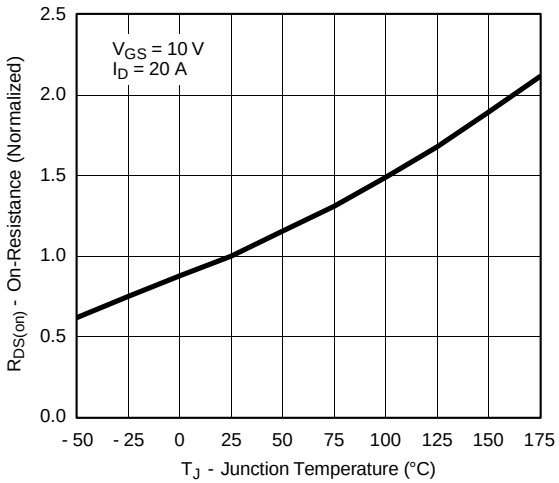


Capacitance

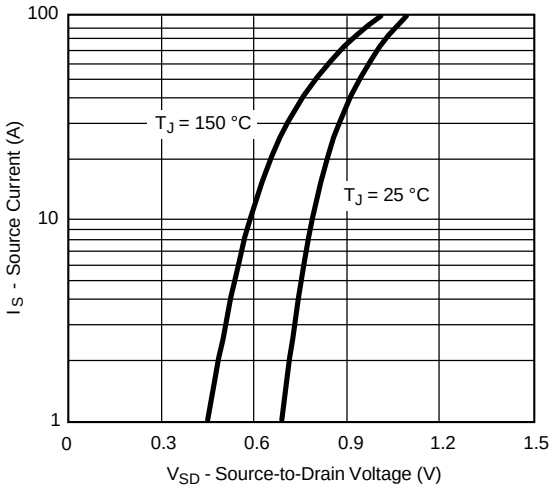


Gate Charge

TYPICAL CHARACTERISTICS (25 °C unless noted)

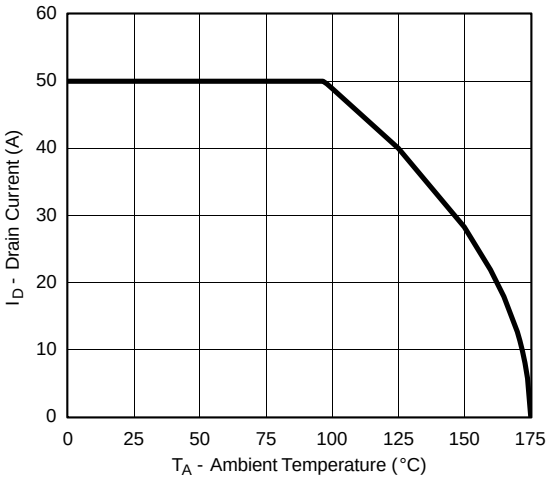


On-Resistance vs. Junction Temperature

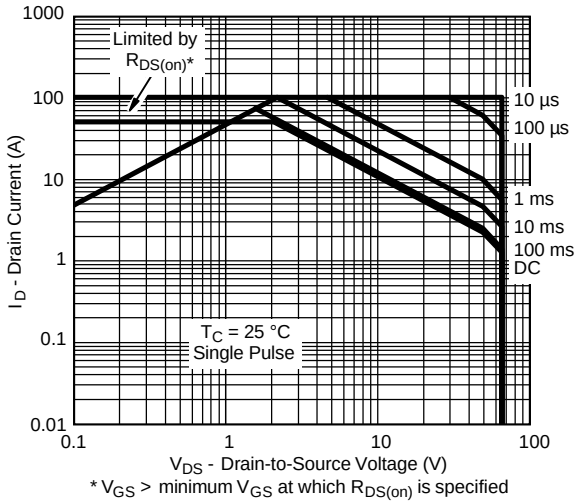


Source-Drain Diode Forward Voltage

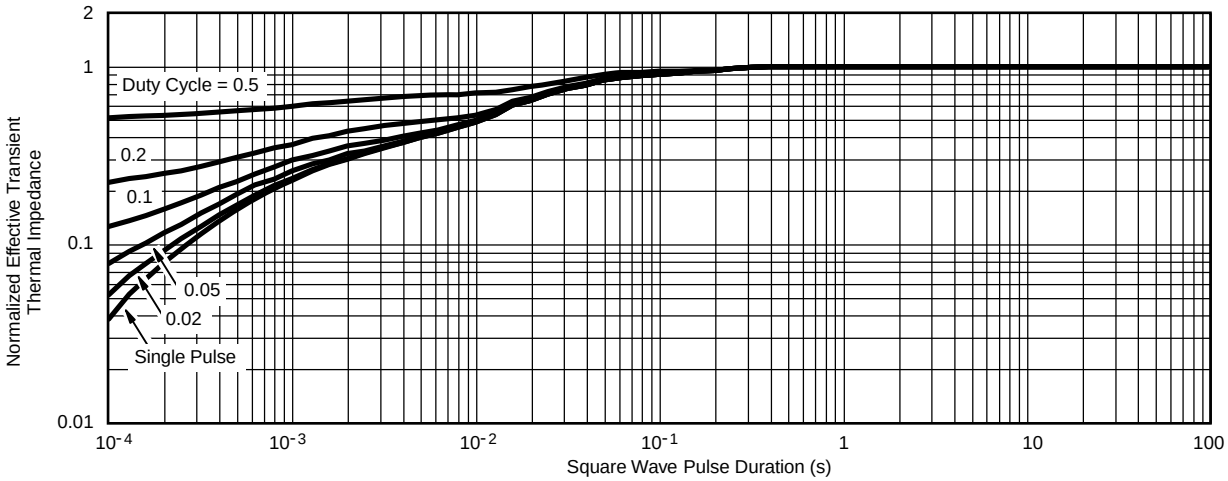
THERMAL RATINGS



Maximum Drain Current vs. Ambient Temperature

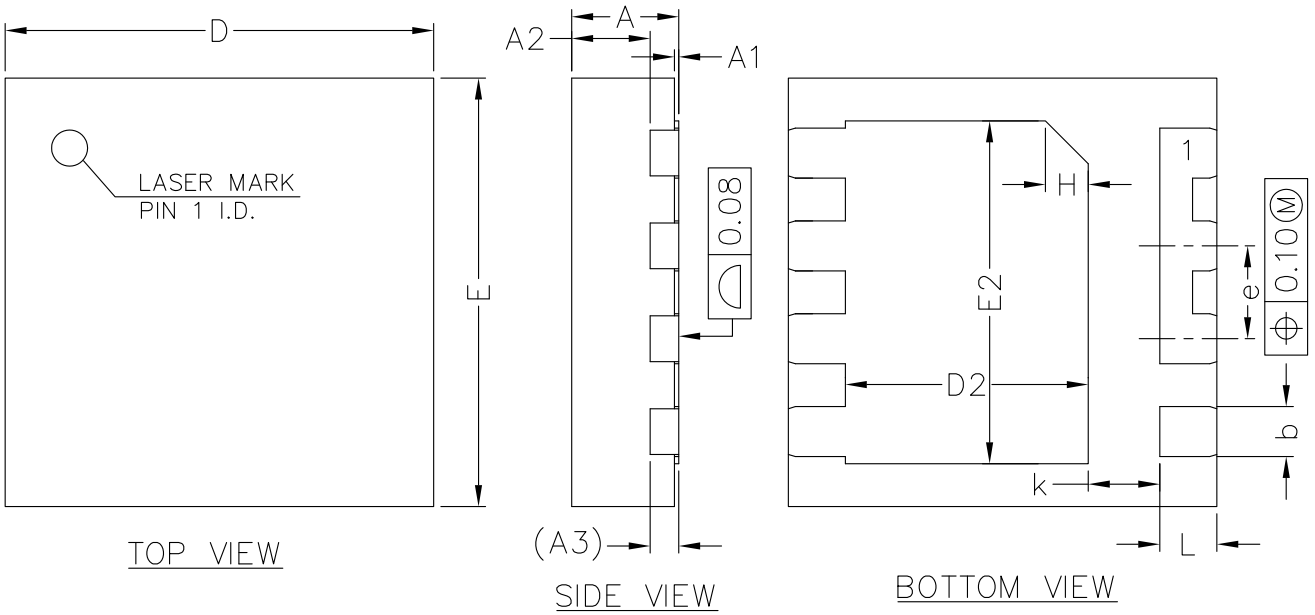


Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

DFN3x3





SIDE VIEW

COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	0.70	0.75	0.80
A1	0.00	0.02	0.05
A2	0.50	0.55	0.60
A3		0.20REF	
b	0.30	0.35	0.40
D	2.90	3.00	3.10
E	2.90	3.00	3.10
D2	1.60	1.70	1.80
E2	2.30	2.40	2.50
e	0.55	0.65	0.75
K	0.40	0.50	0.60
L	0.35	0.40	0.45

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