

BSC205N10LS G-VB Datasheet

N-Channel 100-V (D-S) MOSFET

PRODUCT SUMMARY

$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)
100	0.017 at $V_{GS} = 10$ V	30

FEATURES

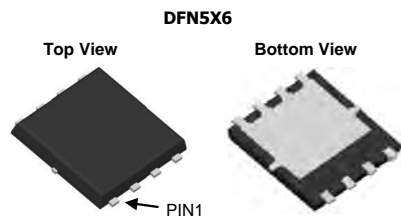
- Trench Power MOSFET
- 175 °C Junction Temperature
- Low Thermal Resistance Package
- 100 % R_g Tested



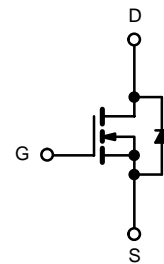
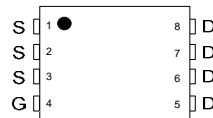
RoHS
COMPLIANT

APPLICATIONS

- Isolated DC/DC Converters



Top View



N-Channel MOSFET

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

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-source voltage	V_{DS}	100	V
Gate-source voltage	V_{GS}	± 20	
Continuous drain current ($T_J = 150$ °C)	$T_C = 25$ °C	30	A
	$T_C = 70$ °C	19	
	$T_A = 25$ °C	10 ^{b, c}	
	$T_A = 70$ °C	8.5 ^{b, c}	
Pulsed drain current ($t = 100$ μ s)	I_{DM}	75	
Continuous source-drain diode current	$T_C = 25$ °C	56	
	$T_A = 25$ °C	4.5 ^{b, c}	
Single pulse avalanche current	I_{AS}	20	
Single pulse avalanche energy	E_{AS}	20	mJ
Maximum power dissipation	$T_C = 25$ °C	60	W
	$T_C = 70$ °C	40	
	$T_A = 25$ °C	5 ^{b, c}	
	$T_A = 70$ °C	3.2 ^{b, c}	
Operating junction and storage temperature range	T_J, T_{stg}	-55 to +150	°C
Soldering recommendations (peak temperature) ^c		260	

THERMAL RESISTANCE RATINGS

PARAMETER	SYMBOL	TYPICAL	MAXIMUM	UNIT
Maximum junction-to-ambient ^b	R_{thJA}	20	25	°C/W
Maximum junction-to-case (drain)	R_{thJC}	1.6	2	

No e

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.	MAX.	UNIT	
Static							
Drain-source breakdown voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA	100	-	-	V	
V _{DS} temperature coefficient	ΔV _{DS} /T _J	I _D = 10 mA	-	81	-	mV/°C	
V _{GS(th)} temperature coefficient	ΔV _{GS(th)} /T _J	I _D = 250 μA	-	-7.5	-		
Gate-source threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	3	-	5	V	
Gate-source leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V	-	-	100	nA	
Zero gate voltage drain current	I _{DSS}	V _{DS} = 100 V, V _{GS} = 0 V	-	-	1	μA	
		V _{DS} = 100 V, V _{GS} = 0 V, T _J = 70 °C	-	-	15		
On-state drain current ^a	I _{D(on)}	V _{DS} ≥ 10 V, V _{GS} = 10 V	40	-	-	A	
Drain-source on-state resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 10 A	-	0.0170	-	Ω	
		V _{GS} = 7.5 V, I _D = 10 A	-	0.0200	-		
Forward transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 10 A	-	46	-	S	
Dynamic ^b							
Input capacitance	C _{iss}	V _{DS} = 50 V, V _{GS} = 0 V, f = 1 MHz	-	1470	-	pF	
Output capacitance	C _{oss}		-	132	-		
Reverse transfer capacitance	C _{rss}		-	11.2	-		
Total gate charge	Q _g	V _{DS} = 50 V, V _{GS} = 10 V, I _D = 10 A	-	20	-	nC	
		V _{DS} = 50 V, V _{GS} = 7.5 V, I _D = 10 A	-	15	-		
Gate-source charge	Q _{gs}		-	6.45	-		
Gate-drain charge	Q _{gd}		-	3.5	-		
Output charge	Q _{oss}	V _{DS} = 50 V, V _{GS} = 0 V	-	22	-		
Gate resistance	R _g	f = 1 MHz	0.2	0.76	1.4	Ω	
Turn-on delay time	t _{d(on)}	V _{DD} = 50 V, R _L = 5 Ω, I _D ≅ 10 A, V _{GEN} = 10 V, R _g = 1 Ω	-	12	24	ns	
Rise time	t _r		-	5	10		
Turn-off delay time	t _{d(off)}		-	19	38		
Fall time	t _f		-	5	10		
Turn-on delay time	t _{d(on)}	V _{DD} = 50 V, R _L = 5 Ω, I _D ≅ 10 A, V _{GEN} = 7.5 V, R _g = 1 Ω	-	15	30		
Rise time	t _r		-	6	12		
Turn-off delay time	t _{d(off)}		-	19	38		
Fall time	t _f		-	5	10		
Diode Characteristics							
Continuous source-drain diode current	I _S	T _C = 25 °C	-	-	56.8	A	
Pulse diode forward current	I _{SM}		-	-	80		
Body diode voltage	V _{SD}	I _S = 5 A, V _{GS} = 0 V	-	0.78	1.1	V	
Body diode reverse recovery time	t _{rr}	I _F = 10 A, di/dt = 100 A/μs, T _J = 25 °C	-	43	86	ns	
Body diode reverse recovery charge	Q _{rr}		-	72	144	nC	
Reverse recovery fall time	t _a		-	33	-	ns	
Reverse recovery rise time	t _b		-	10	-		

Note

- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$
 b. Guaranteed by design, not subject to production testing

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)



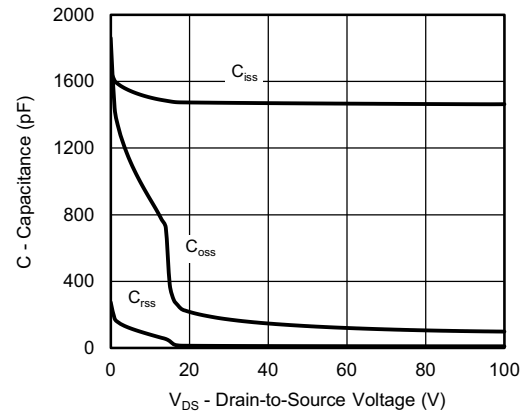
O Characteristic



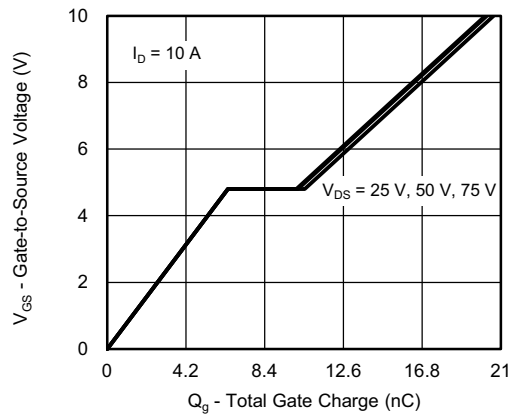
Temperature Characteristic



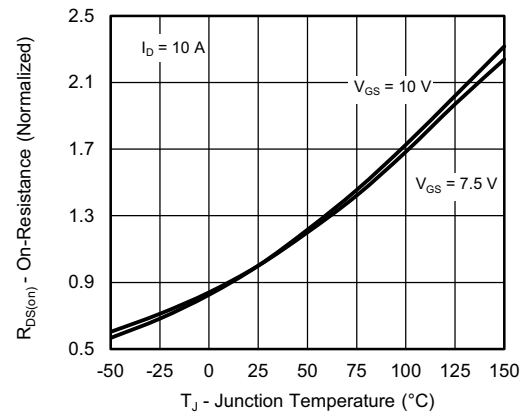
On-Resistance . **D**rain **C**urrent and **G**ate **V**oltage



Capacitance



Gate **C**harge



On-Resistance . **J**unction **T**emperature

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



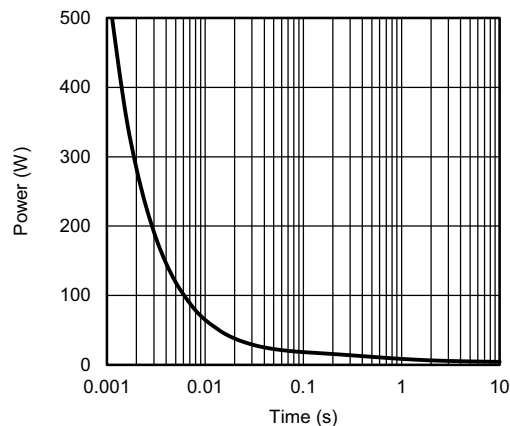
Source-Drain Diode Forward Voltage



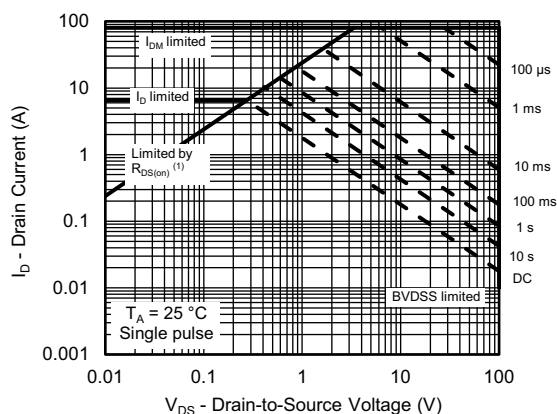
Threshold Voltage



On-Resistance - Gate-to-Source Voltage



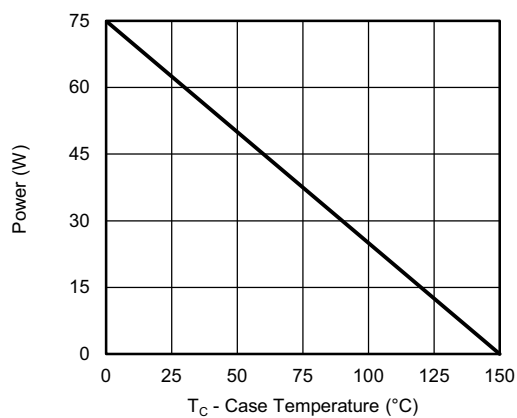
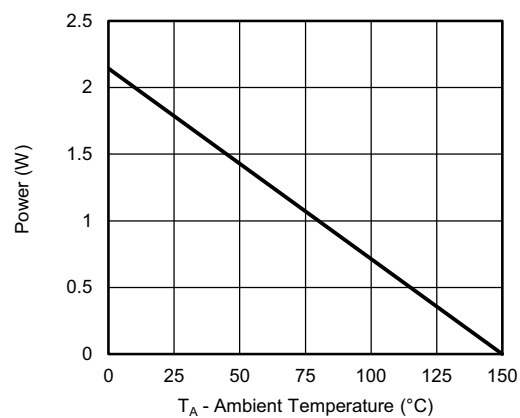
Single Pulse Power, Junction-to-Ambient



(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)

Continuous Drain Current^a

Power Dissipation - Junction-to-Case

Power Dissipation - Junction-to-Ambient
Note

- The power dissipation P_D is based on $T_{J \text{ max.}} = 150^\circ\text{C}$, 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

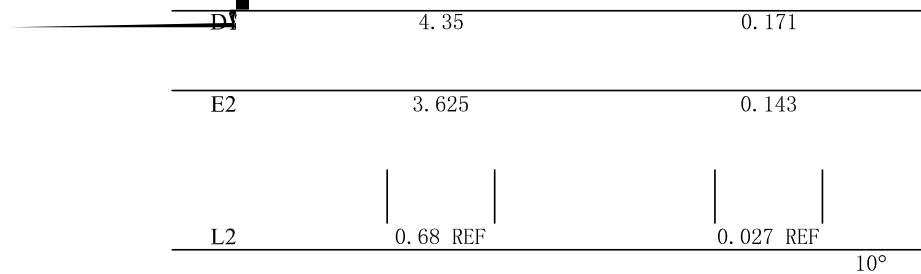
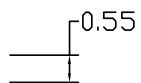
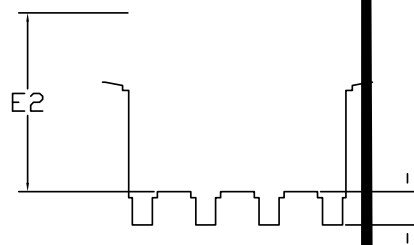
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



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No mali ed The mal T an ien Im edance, J nc ion- o-Ca e



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