

BSC040N08NS5-VB Datasheet

N-Channel 85V (D-S) MOSFET

PRODUCT SUMMARY		
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A) ^a
85	0.003at $V_{GS} = 10$ V	140
	0.004at $V_{GS} = 4.5$ V	130

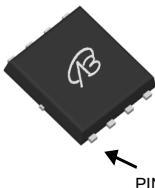
FEATURES

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



DFN5X6

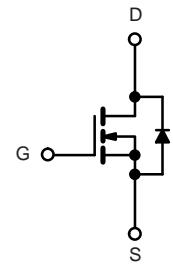
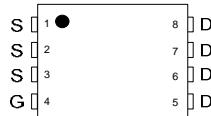
Top View



Bottom View



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	I_D	140	A
$T_C = 25$ °C		85 ^a	
Pulsed Drain Current	I_{DM}	420	
Continuous Source Current (Diode Conduction)	I_S	80 ^a	
Avalanche Current	I_{AS}	70	
Single Avalanche Energy (Duty Cycle ≤ 1 %)	E_{AS}	133	mJ
Maximum Power Dissipation	P_D	136	W
$T_C = 25$ °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	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. $t \leq 10$ s.

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

Parameter	Symbol	Test Conditions	Min.	Typ. ^a	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0 \text{ V}$, $I_D = 250 \mu\text{A}$	85			V
Gate Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}$, $I_D = 250 \mu\text{A}$	1	2	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 ^b	$I_{D(\text{on})}$	$V_{DS} = 5 \text{ V}$, $V_{GS} = 10 \text{ V}$	60			A
Drain-Source On-State Resistance ^b	$R_{DS(\text{on})}$	$V_{GS} = 10 \text{ V}$, $I_D = 20 \text{ A}$		0.003		
		$V_{GS} = 10 \text{ V}$, $I_D = 20 \text{ A}$, $T_J = 125^\circ\text{C}$		0.008		Ω
		$V_{GS} = 10 \text{ V}$, $I_D = 20 \text{ A}$, $T_J = 175^\circ\text{C}$		0.010		
		$V_{GS} = 4.5 \text{ V}$, $I_D = 46 \text{ A}$		0.004		
Forward Transconductance ^b	g_{fs}	$V_{DS} = 15 \text{ V}$, $I_D = 20 \text{ A}$		60		S
Dynamic						
Input Capacitance	C_{iss}	$V_{GS} = 0 \text{ V}$, $V_{DS} = 85 \text{ V}$, $f = 1 \text{ MHz}$		8600		
Output Capacitance	C_{oss}			470		pF
Reverse Transfer Capacitance	C_{rss}			225		
Total Gate Charge ^c	Q_g	$V_{DS} = 85 \text{ V}$, $V_{GS} = 10 \text{ V}$, $I_D = 50 \text{ A}$		92	70	
Gate-Source Charge ^c	Q_{gs}			16		nC
Gate-Drain Charge ^c	Q_{gd}			19		
Turn-On Delay Time ^c	$t_{d(\text{on})}$	$V_{DD} = 85 \text{ V}$, $R_L = 0.6 \Omega$ $I_D \geq 50 \text{ A}$, $V_{GEN} = 10 \text{ V}$, $R_g = 2.5 \Omega$		20	21	
Rise Time ^c	t_r			15	25	ns
Turn-Off Delay Time ^c	$t_{d(\text{off})}$			35	50	
Fall Time ^c	t_f			20	30	
Source-Drain Diode Ratings and Characteristics ($T_C = 25^\circ\text{C}$)						
Pulsed Current	I_{SM}				420	A
Diode Forward Voltage	V_{SD}	$I_F = 20 \text{ A}$, $V_{GS} = 0 \text{ V}$		1	1.5	V
Reverse Recovery Time	t_{rr}	$I_F = 20 \text{ A}$, $di/dt = 100 \text{ A}/\mu\text{s}$		4	135	ns

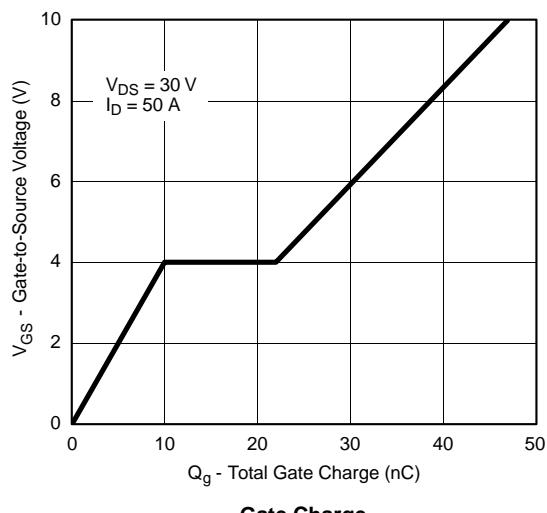
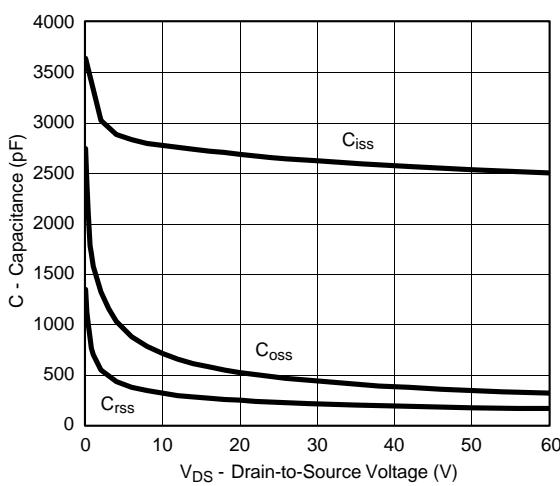
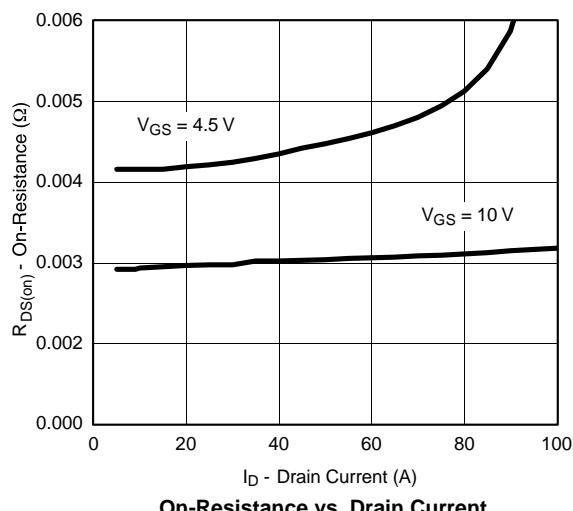
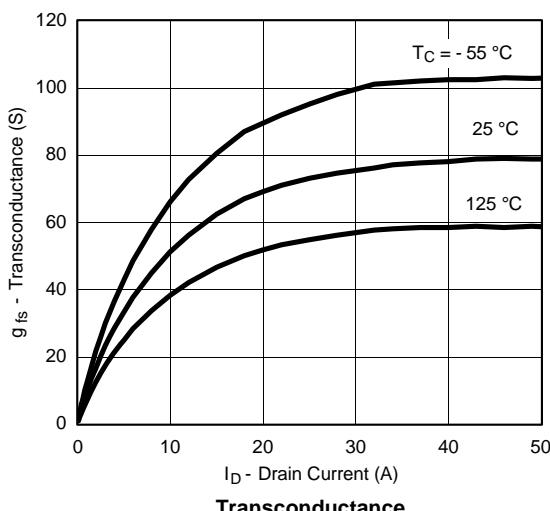
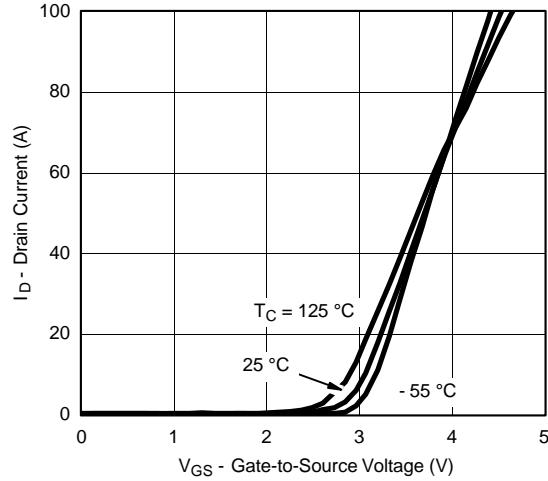
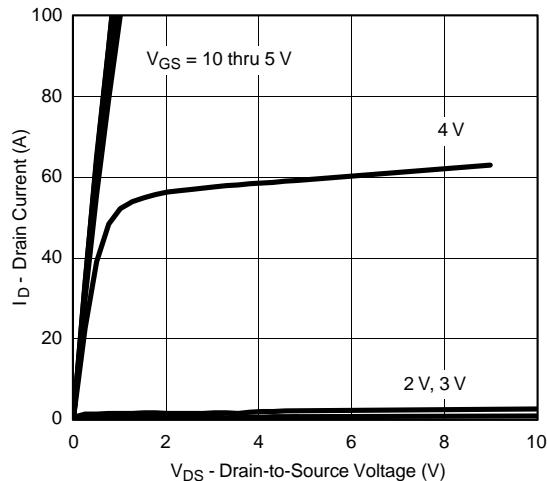
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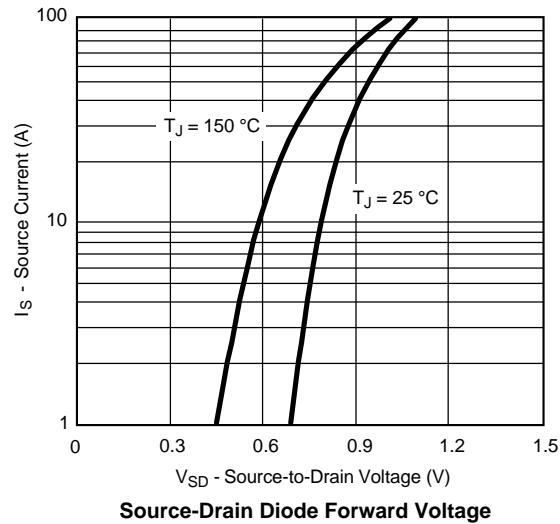
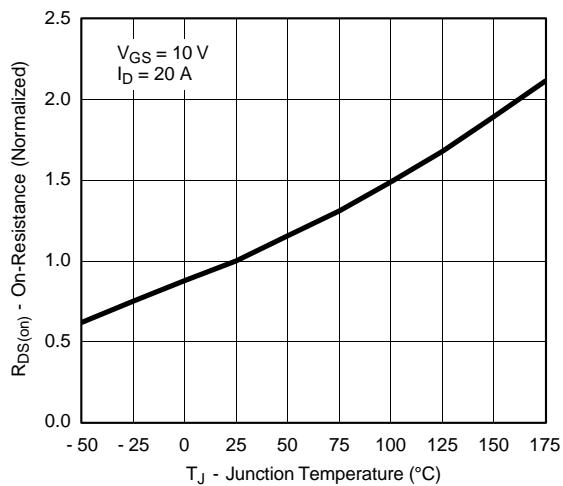
a. For design aid only; not subject to production testing.

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

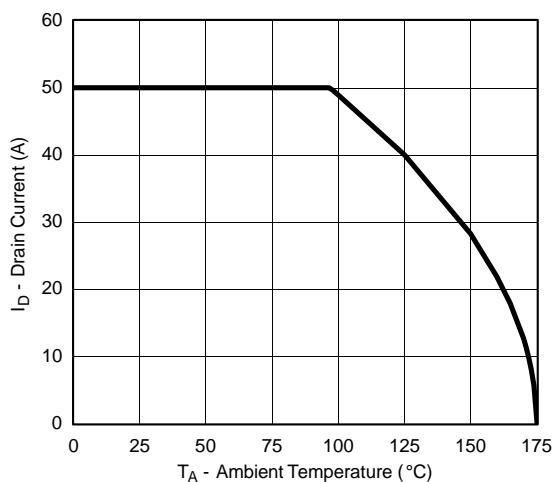
c. Independent of operating temperature.

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.

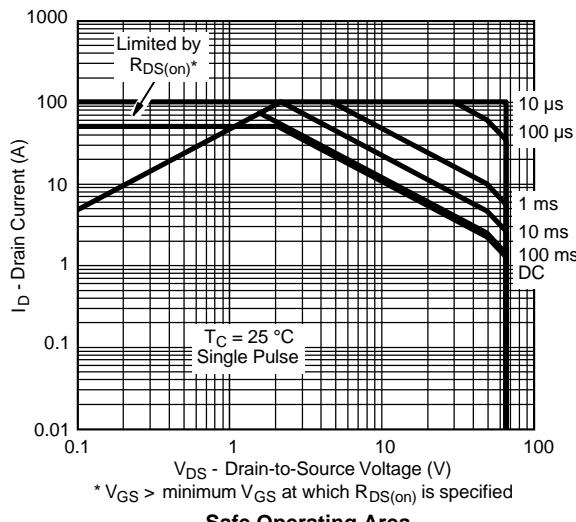
TYPICAL CHARACTERISTICS (25 °C unless noted)


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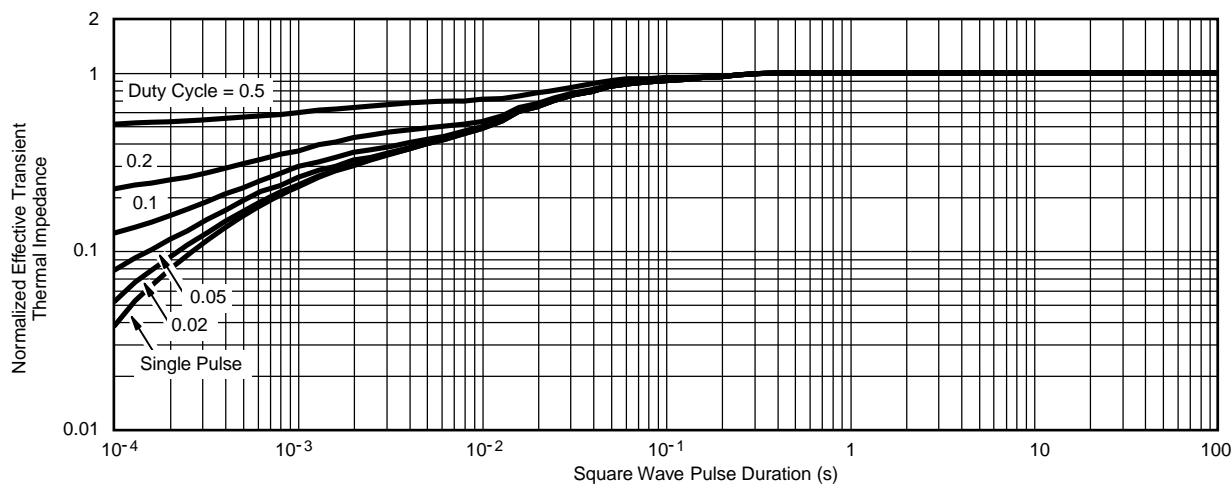
THERMAL RATINGS



Maximum Drain Current vs. Ambient Temperature

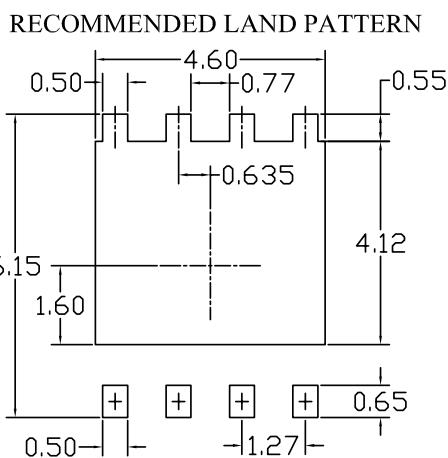
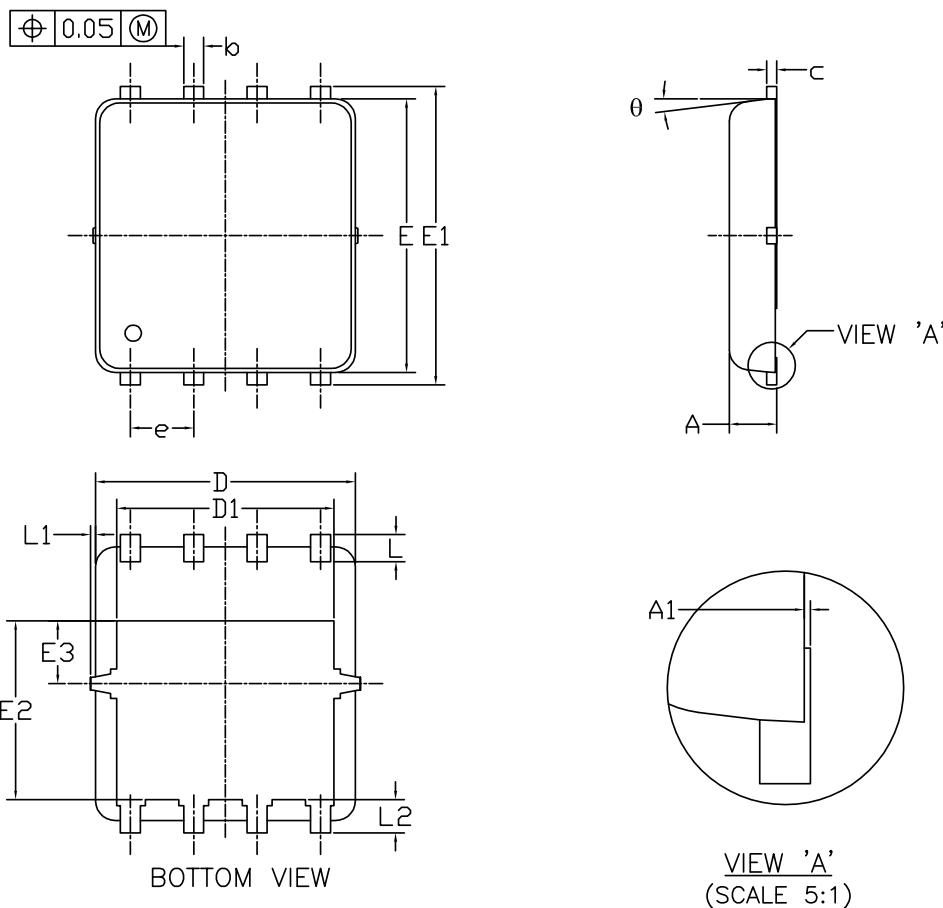


Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

DFN5x6_8L_EP1_P PACKAGE OUTLIN



UNIT: mm

NOTE

1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
MOLD FLASH AT THE NON-LEAD SIDES SHOULD BE LESS THAN 6 MILS EACH.
2. CONTROLLING DIMENSION IS MILLIMETER.
CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.

SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.85	0.95	1.00	0.033	0.037	0.039
A1	0.00	---	0.05	0.000	---	0.002
b	0.30	0.40	0.50	0.012	0.016	0.020
c	0.15	0.20	0.25	0.006	0.008	0.010
D	5.10	5.20	5.30	0.201	0.205	0.209
D1	4.25	4.35	4.45	0.167	0.171	0.175
E	5.45	5.55	5.65	0.215	0.219	0.222
E1	5.95	6.05	6.15	0.234	0.238	0.242
E2	3.525	3.625	3.725	0.139	0.143	0.147
E3	1.175	1.275	1.375	0.046	0.050	0.054
e	1.27 BSC			0.050 BSC		
L	0.45	0.55	0.65	0.018	0.022	0.026
L1	0	---	0.15	0	---	0.006
L2	0.68 REF			0.027 REF		
θ	0°	---	10°	0°	---	10°

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