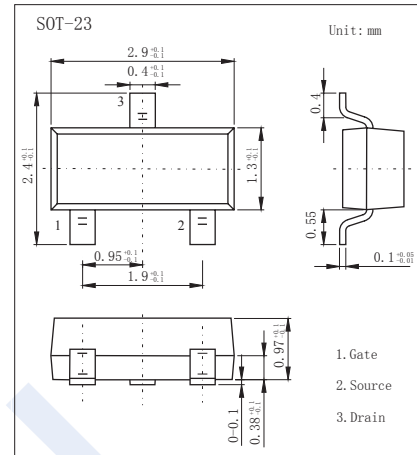
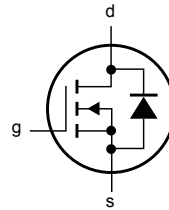


## N-Channel MOSFET

### BSN20

#### ■ Features

- TrenchMOS™ technology
- Very fast switching
- Logic level compatible
- Subminiature surface mount package.



#### ■ Absolute Maximum Ratings $T_a = 25^\circ\text{C}$

Parameter	Symbol	Rating	Unit	
Drain-source voltage	$V_{DS}$	50	V	
Gate-Source Voltage	$V_{GS}$	$\pm 20$		
Continuous Drain Current	$I_D$	$T_a = 25^\circ\text{C}$	173	mA
		$T_a = 100^\circ\text{C}$	110	
Pulsed Drain Current	$I_{DM}$	700		
Power dissipation	$P_D$	0.83	W	
Maximum Junction-to-Ambient	$R_{thJA}$	350	K/W	
Thermal resistance from junction to solder point	$R_{thJP}$	150		
Operating and storage junction temperature range	$T_J, T_{stg}$	- 65+150	$^\circ\text{C}$	

## N-Channel MOSFET

### BSN20

#### ■ Electrical Characteristics Ta = 25 °C

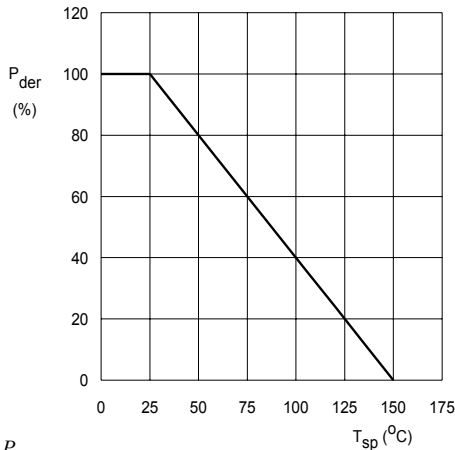
Parameter	Symbol	Testconditons	Min	Typ	Max	Unit
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0\text{ V}, I_D=10\ \mu\text{A}$	50			V
Gate-threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=1\ \text{mA}$	0.4	1.5	2	
Gate-body leakage	$I_{GSS}$	$V_{DS}=0\ \text{V}, V_{GS}=\pm 20\ \text{V}$			$\pm 100$	nA
Zero gate voltage drain current	$I_{DSS}$	$V_{DS}=40\ \text{V}, V_{GS}=0\ \text{V}$			1	uA
		$V_{DS}=40\ \text{V}, V_{GS}=0\ \text{V}, T_a = 150\ \text{C}$			10	
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS}=10\ \text{V}, I_D=100\ \text{mA}$		2.8	15	$\Omega$
		$V_{GS}=5\ \text{V}, I_D=100\ \text{mA}$		3.8	20	
Forward tran conductance	$g_{fs}$	$V_{DS}=10\ \text{V}, I_D=100\ \text{mA}$	40	170		ms
Input capacitance	$C_{iss}$	$V_{DS}=10\ \text{V}, V_{GS}=0\ \text{V}, f=1\ \text{MHz}$		17	25	pF
Output capacitance	$C_{OSS}$			7	15	
Reverse transfer capacitance	$C_{rSS}$			4	8	
Turn-on Time	$t_{d(on)}$	$V_{DD}=20\ \text{V}, R_D=180\ \Omega$ $R_{GS}=50\ \Omega, V_{GS}=10\ \text{V}$ $R_G=50\ \Omega$		1.7	8	ns
Turn-off Time	$t_{d(off)}$			8	15	
Reverse recovery time	$t_{rr}$	$I_S=180\ \text{mA}; dI/dt=100\ \text{A}/\mu\text{s}; V_{GS}=0\ \text{V};$ $V_{DS}=25\ \text{V}$		30		nC
Recovered charge	$Q_{rr}$			30		
Diode forward voltage	$V_{SD}$	$I_S=180\ \text{mA}, V_{GS}=0\ \text{V}$		0.9	1.5	V

#### ■ Marking

Marking	702.
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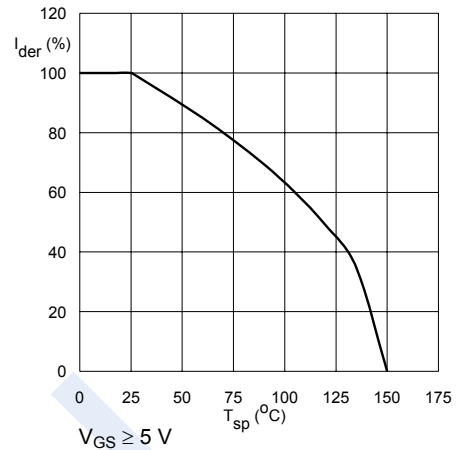
## N-Channel MOSFET BSN20

■ Typical Characteristics



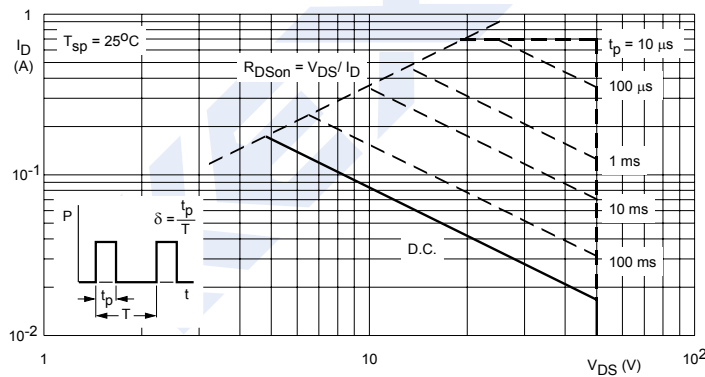
$$P_{der} = \frac{P_{tot}}{P_{tot(25^{\circ}C)}} \times 100\%$$

**Fig 1. Normalized total power dissipation as a function of solder point temperature.**



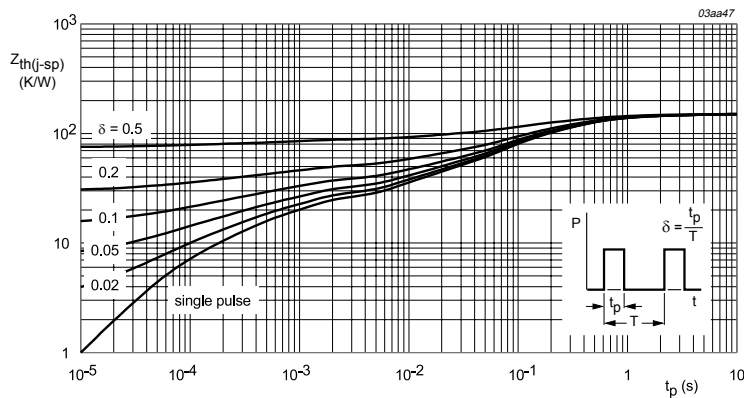
$$I_{der} = \frac{I_D}{I_{D(25^{\circ}C)}} \times 100\%$$

**Fig 2. Normalized continuous drain current as a function of solder point temperature.**



$T_{sp} = 25^{\circ}C$ ;  $I_{DM}$  is single pulse.

**Fig 3. Safe operating area; continuous and peak drain currents as a function of drain-source voltage.**

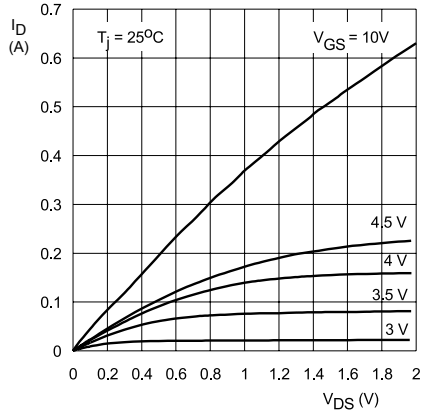


Mounted on a metal clad substrate.

**Fig 4. Transient thermal impedance from junction to solder point as a function of pulse duration.**

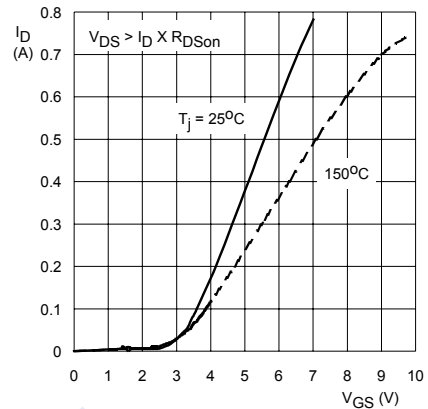
## N-Channel MOSFET BSN20

■ Typical Characteristics



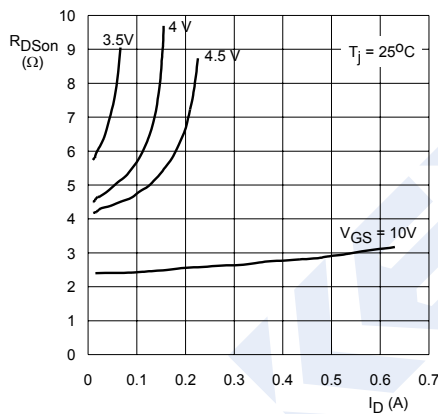
$T_j = 25^\circ\text{C}$

**Fig 5. Output characteristics: drain current as a function of drain-source voltage; typical values.**



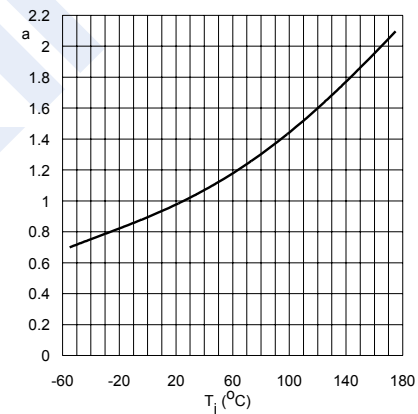
$T_j = 25^\circ\text{C}$  and  $150^\circ\text{C}$ ;  $V_{DS} \geq I_D \times R_{DSon}$

**Fig 6. Transfer characteristics: drain current as a function of gate-source voltage; typical values.**



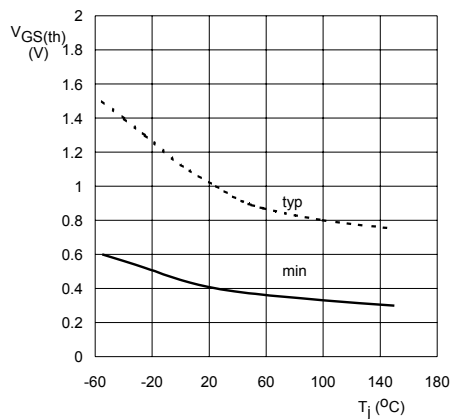
$T_j = 25^\circ\text{C}$

**Fig 7. Drain-source on-state resistance as a function of drain current; typical values.**



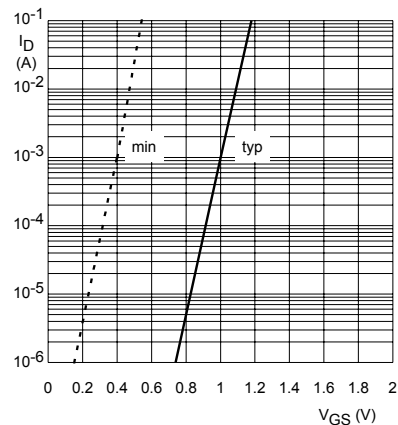
$$a = \frac{R_{DSon}}{R_{DSon}(25^\circ\text{C})}$$

**Fig 8. Normalized drain-source on-state resistance factor as a function of junction temperature.**



$I_D = 1\text{ mA}$ ;  $V_{DS} = V_{GS}$

**Fig 9. Gate-source threshold voltage as a function of junction temperature.**

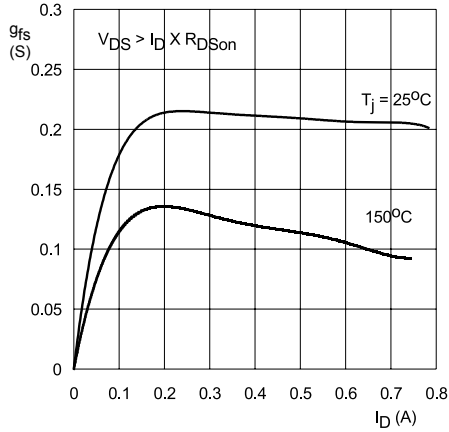


$T_j = 25^\circ\text{C}$ ;  $V_{DS} = 5\text{ V}$

**Fig 10. Sub-threshold drain current as a function of gate-source voltage.**

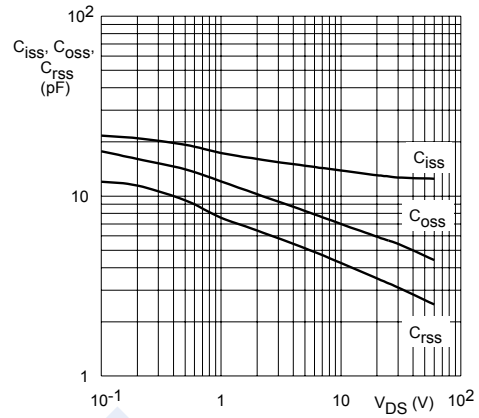
## N-Channel MOSFET BSN20

### Typical Characteristics



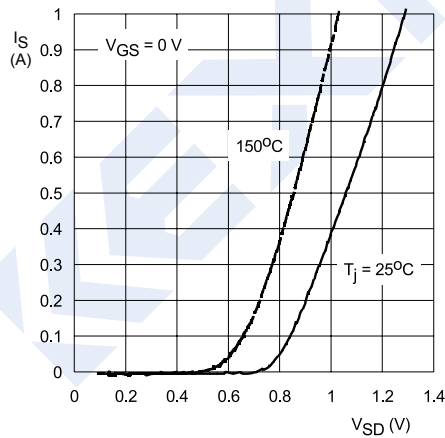
$T_j = 25\text{ }^\circ\text{C}$  and  $150\text{ }^\circ\text{C}$ ;  $V_{DS} \geq I_D \times R_{DSon}$

**Fig 11. Forward transconductance as a function of drain current; typical values.**



$V_{GS} = 0\text{ V}$ ;  $f = 1\text{ MHz}$

**Fig 12. Input, output and reverse transfer capacitances as a function of drain-source voltage; typical values.**



$T_j = 25\text{ }^\circ\text{C}$  and  $150\text{ }^\circ\text{C}$ ;  $V_{GS} = 0\text{ V}$

**Fig 13. Source (diode forward) current as a function of source-drain (diode forward) voltage; typical values.**