

/ Descriptions

TO-220 N MOS N-CHANNEL MOSFET in a TO-220 Plastic Package.

/ Features

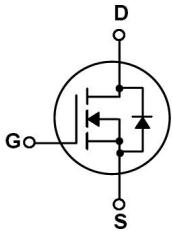
dv/dt

Low gate charge, Fast switching capability, Avalanche energy specified, Improved dv/dt capability.

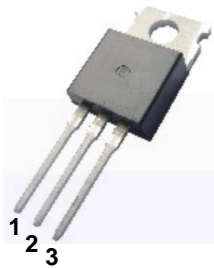
/ Applications

Designed for high voltage, high speed power switching applications such as high efficiency switched mode power supplies, active power factor correction.

/ Equivalent Circuit



/ Pinning



PIN1 G PIN 2 D PIN 3 S

/ h_{FE} Classifications & Marking

See Marking Instructions.

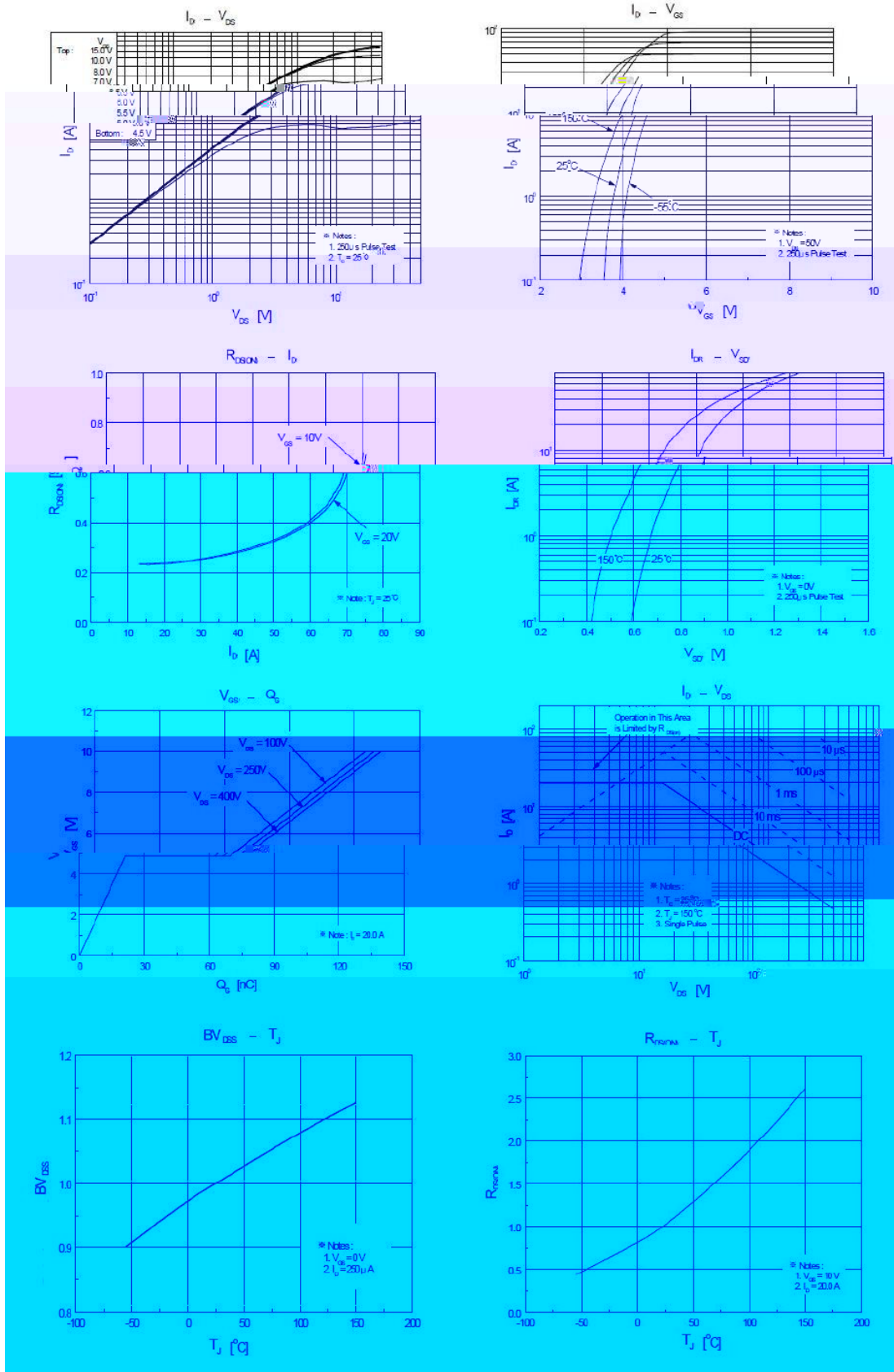
/ Absolute Maximum Ratings(Ta=25)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DSS}	400	V
Drain Current	$I_D(T_C=25)$	20	A
Drain Current	$I_D(T_C=100)$	13	A
Drain Current - Pulsed	I_{DP}	80	A
Gate-Source Voltage	V_{GSS}	±20	V
Single Pulsed Avalanche Energy	E_{AR}	28	mJ
Repetitive Avalanche Energy	E_{AS}	1110	mJ
Peak Diode Recovery dv/dt	dv/dt	4.5	V/ns
Power Dissipation	$P_D(T_C=25)$	280	W
Junction Temperature Range	T_j	150	°C
Storage Temperature Range	T_{stg}	-55 150	°C
Thermal Resistance Junction-Ambient	R_{thJA}	40	°C/W
Thermal Resistance Junction-Case	R_{thJC}	0.44	°C/W

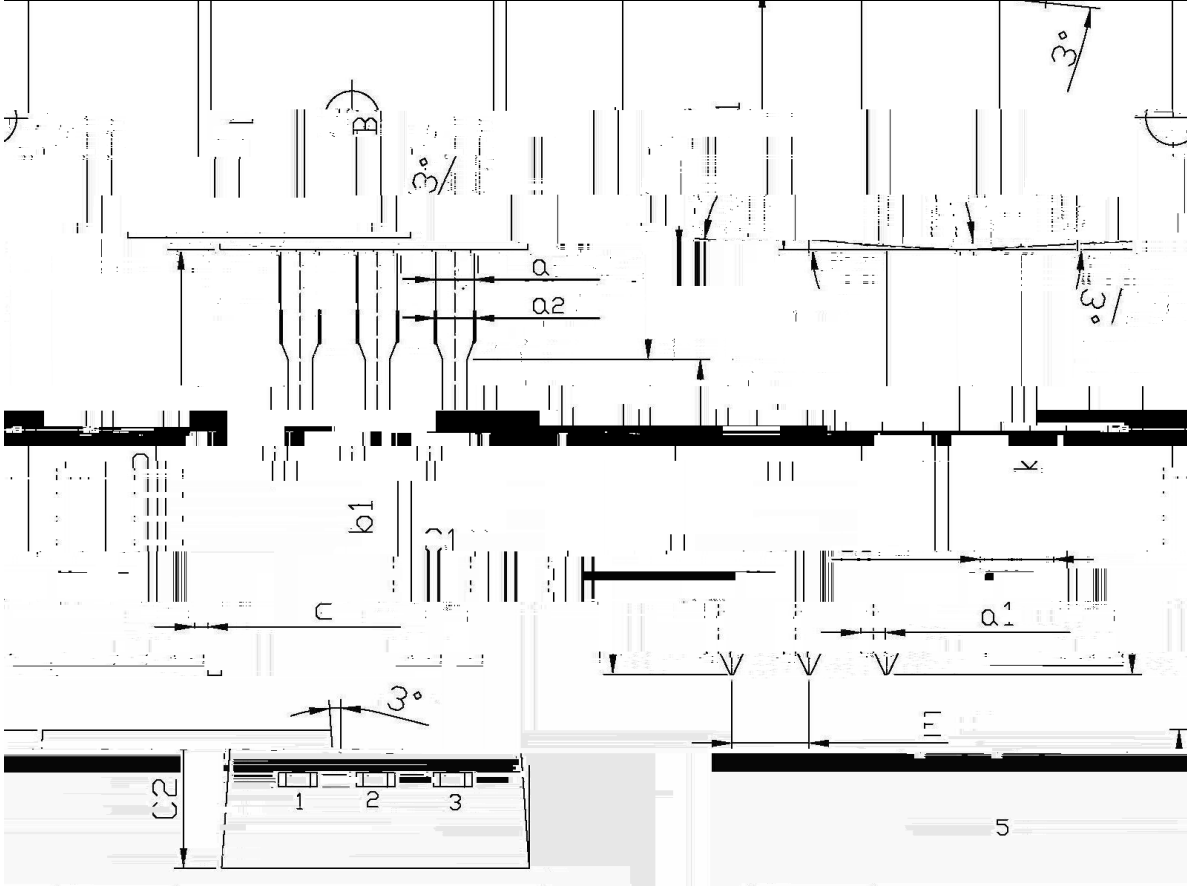
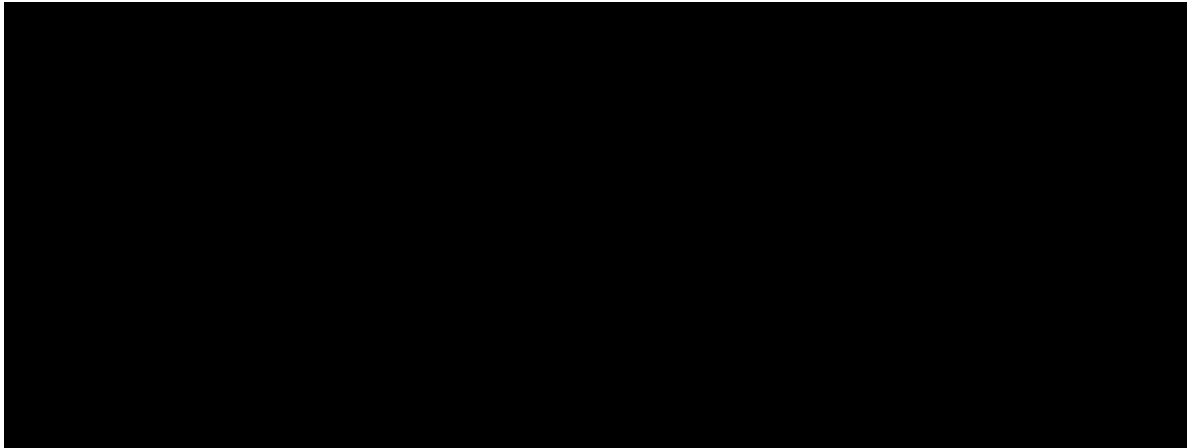
/ Electrical Characteristics(Ta=25)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{DSS}	$V_{GS}=0V$ $I_D=250\mu A$	400			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=400V$ $V_{GS}=0V$			1.0	μA
		$V_{DS}=400V$ $T_C=125$			10	
Gate-Body Leakage Current, Forward	I_{GSS}	$V_{GS}=\pm 20V$ $V_{DS}=0V$			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$ $I_D=250\mu A$	2.0		4.0	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V$ $I_D=10A$		0.23	0.40	Ω
Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS}=0V$ $I_S=20A$			1.5	V
Input Capacitance	C_{iss}	$V_{DS}=25V$ $V_{GS}=0V$ $f=1.0MHz$		2700		pF
Output Capacitance	C_{oss}			400		
Reverse Transfer Capacitance	C_{rss}			40		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=250V$ $I_D=20A$ $R_G=2.5\Omega$		100		ns
Turn-On Rise Time	t_r			400		
Turn-Off Delay Time	$t_{d(off)}$			100		
Turn-Off Fall Time	t_f			100		
Total Gate Charge	Q_g	$V_{DS}=400V$ $I_D=20A$ $V_{GS}=10V$		70		nC
Gate-Source Charge	Q_{gs}			18		
Gate-Drain Charge	Q_{gd}			35		

/ Electrical Characteristic Curve

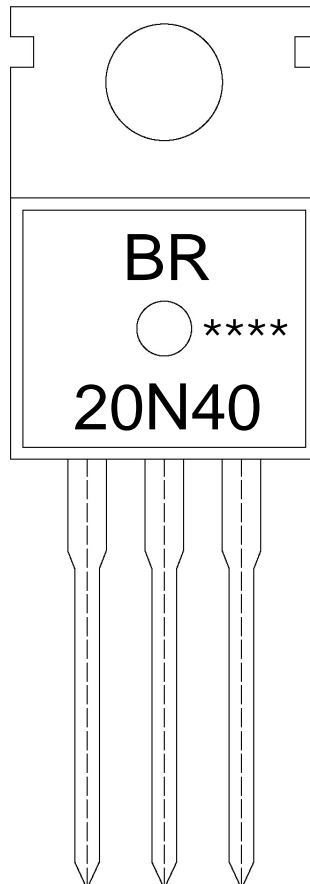


/ Package Dimensions



Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
Δ	9.8	10.2	c	1.2	1.4
a	5.6	6.4	c_1	6.3	6.7
a_1	15.7	16.1	c_2	9.0	9.4
a_2	12.6	13.6	e	2.2	2.6
b	9.6	10.6	f	0.7	0.9
b_1	1.2	1.4	f_1	1.3	1.5
c	1.2	1.4	f_2	2.3	2.7
c_1	6.3	6.7	g	0.2	0.25
c_2	9.0	9.4	h	1.25	1.45
e	2.2	2.6	h_1	0.2	0.25
f	0.7	0.9	h_2	0.2	0.25
f_1	1.3	1.5	h_3	0.2	0.25
f_2	2.3	2.7	h_4	0.2	0.25
g	0.2	0.25	h_5	0.2	0.25
h	1.25	1.45	h_6	0.2	0.25
h_1	0.2	0.25	h_7	0.2	0.25
h_2	0.2	0.25	h_8	0.2	0.25
h_3	0.2	0.25	h_9	0.2	0.25
h_4	0.2	0.25	h_{10}	0.2	0.25
h_5	0.2	0.25	h_{11}	0.2	0.25
h_6	0.2	0.25	h_{12}	0.2	0.25
h_7	0.2	0.25	h_{13}	0.2	0.25
h_8	0.2	0.25	h_{14}	0.2	0.25
h_9	0.2	0.25	h_{15}	0.2	0.25
h_{10}	0.2	0.25	h_{16}	0.2	0.25
h_{11}	0.2	0.25	h_{17}	0.2	0.25
h_{12}	0.2	0.25	h_{18}	0.2	0.25
h_{13}	0.2	0.25	h_{19}	0.2	0.25
h_{14}	0.2	0.25	h_{20}	0.2	0.25
h_{15}	0.2	0.25	h_{21}	0.2	0.25
h_{16}	0.2	0.25	h_{22}	0.2	0.25
h_{17}	0.2	0.25	h_{23}	0.2	0.25
h_{18}	0.2	0.25	h_{24}	0.2	0.25
h_{19}	0.2	0.25	h_{25}	0.2	0.25
h_{20}	0.2	0.25	h_{26}	0.2	0.25
h_{21}	0.2	0.25	h_{27}	0.2	0.25
h_{22}	0.2	0.25	h_{28}	0.2	0.25
h_{23}	0.2	0.25	h_{29}	0.2	0.25
h_{24}	0.2	0.25	h_{30}	0.2	0.25
h_{25}	0.2	0.25	h_{31}	0.2	0.25
h_{26}	0.2	0.25	h_{32}	0.2	0.25
h_{27}	0.2	0.25	h_{33}	0.2	0.25
h_{28}	0.2	0.25	h_{34}	0.2	0.25
h_{29}	0.2	0.25	h_{35}	0.2	0.25
h_{30}	0.2	0.25	h_{36}	0.2	0.25
h_{31}	0.2	0.25	h_{37}	0.2	0.25
h_{32}	0.2	0.25	h_{38}	0.2	0.25
h_{33}	0.2	0.25	h_{39}	0.2	0.25
h_{34}	0.2	0.25	h_{40}	0.2	0.25
h_{35}	0.2	0.25	h_{41}	0.2	0.25
h_{36}	0.2	0.25	h_{42}	0.2	0.25
h_{37}	0.2	0.25	h_{43}	0.2	0.25
h_{38}	0.2	0.25	h_{44}	0.2	0.25
h_{39}	0.2	0.25	h_{45}	0.2	0.25
h_{40}	0.2	0.25	h_{46}	0.2	0.25
h_{41}	0.2	0.25	h_{47}	0.2	0.25
h_{42}	0.2	0.25	h_{48}	0.2	0.25
h_{43}	0.2	0.25	h_{49}	0.2	0.25
h_{44}	0.2	0.25	h_{50}	0.2	0.25

/ Marking Instructions



BR

20N 40

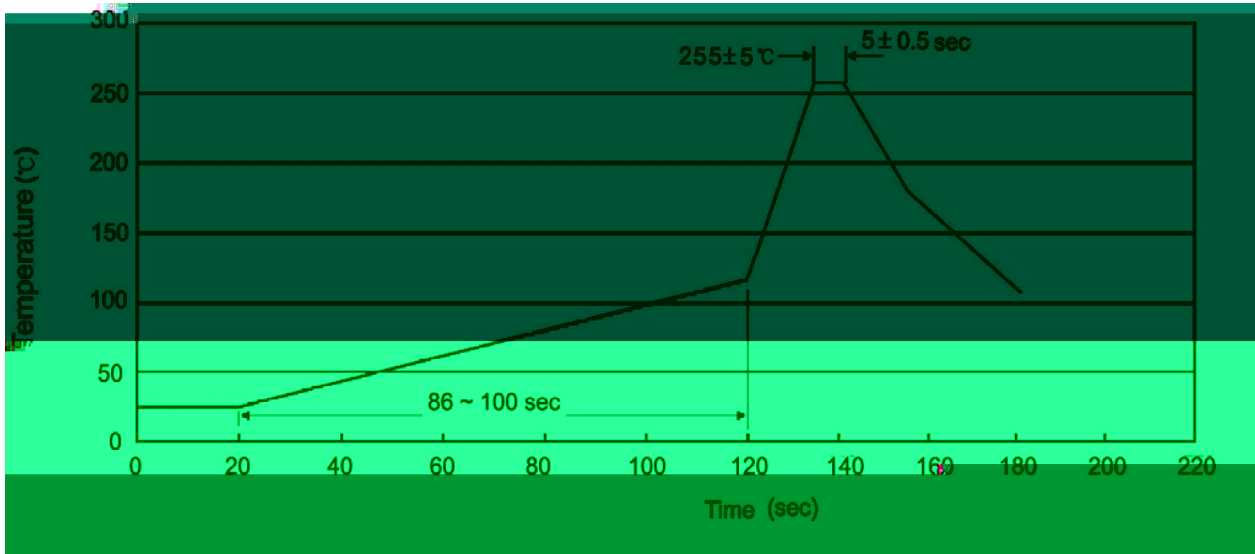
Note:

BR: Company Code

20N40: Product Type.

****: Lot No. Code, code change with Lot No.

() / Temperature Profile for Dip Soldering(Pb-Free)



Note:

- | | | | | | |
|---|-------|-----|-------|--------|---|
| 1 | 25 | 150 | 60 | 90sec; | 1.Preheating:25~150 , Time:60~90sec. |
| 2 | 255±5 | | 5±0.5 | sec; | 2.Peak Temp.:255±5 , Duration:5±0.5sec. |
| 3 | | 2 | 10 | /sec. | 3. Cooling Speed: 2~10 /sec. |

/ Resistance to Soldering Heat Test Conditions

270±5 10±1 sec. Temp.:270±5°C Time:2