

BMx12N60

N-Channel MOSFET

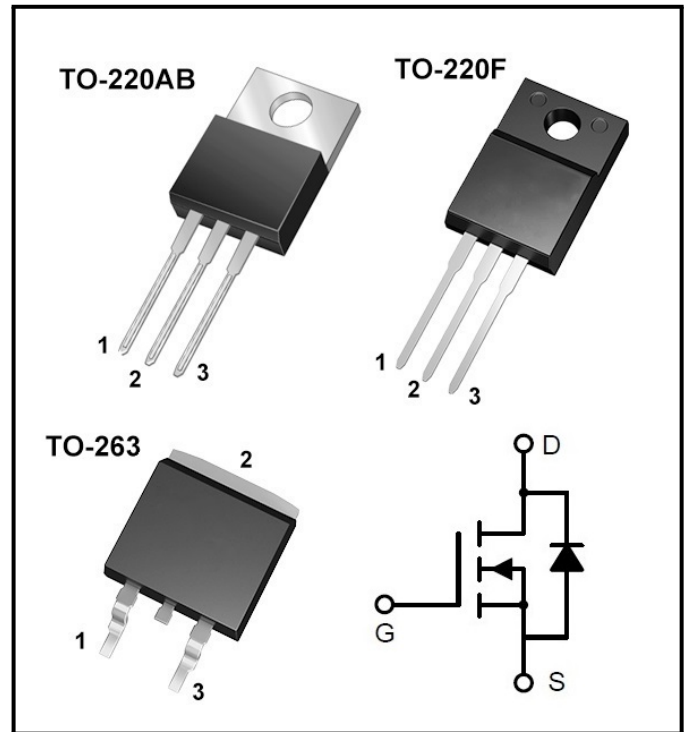
Features

- $V_{DS}=600V$
- $I_D=12A$
- $R_{DS(ON)}$ @ $V_{GS}=10V$, TYP= 0.56Ω
- Advanced Planar Process Technology
- Fast Switching
- Good EMI Performance

Applications

- Load Switch
- PWM Application
- Power Management

Package



Mechanical Data

- Molded Plastic: UL Flammability Classification Rating 94V-0
- Lead free in compliance with EU RoHS 2011/65/EU directive
- Solder bath temperature 275°C maximum, 10s per JESD 22-B106
- Case: Molded plastic
- Mounting Position: Any

Ordering information

Order code	Package	Base qty	Delivery mode
BME12N60/G	TO-220AB	50pcs/tube	1kpcs/box 5kpcs/carton
BMF12N60/G	TO-220F	50pcs/tube	1kpcs/box 5kpcs/carton
BMK12N60/G	TO-263	50pcs/tube	1kpcs/box 5kpcs/carton
BMK12N60-R/G	TO-263	800pcs/reel	800pcs/box 4kpcs/carton

Note: The order code with "G" means using a thick frame.



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Maximum Ratings (@T_A=25°C unless otherwise noted)

Symbol	Parameters	Value		Unit
		TO-220AB/TO-263	TO-220F	
V _{DS}	Drain-Source Voltage	600		V
V _{GS}	Gate-Source Voltage	±30		V
I _D	Continue Drain Current	12		A
I _{DM}	Pulsed Drain Current (Note1)	48		A
P _D	Power Dissipation	156	28	W
E _{AS}	Single Pulse Avalanche Energy (Note1)	537		mJ
T _J	Junction Temperature Range	150		°C
T _{STG}	Storage Temperature Range	-55 to +150		°C
R _{θJC}	Thermal Resistance, Junction to Case	0.8	4.4	°C/W
R _{θJA}	Rthermal Resistance, Junction to Ambient	64	49	°C/W

Electrical Characteristics (T_A=25°C unless otherwise noted)

Symbol	Parameters	Conditions	Min.	Typ.	Max.	Units
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D =250uA	600	—	—	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 600V, V _{GS} =0V	—	—	1	μA
I _{GSS}	Gate- Source Leakage Current	V _{GS} = ±30V, V _{DS} =0V	—	—	±100	nA
V _{GS(TH)}	Gate Threshold Voltage	V _{GS} = V _{DS} , I _D =250uA	2	—	4	V
R _{DS(on)}	Static Drain-source On Resistance	V _{GS} =10V, I _D =6A	—	0.56	0.65	Ω
g _{fs}	Forward Transconductance	V _{DS} =15V, I _D =6A	—	12	—	S
C _{iss}	Input capacitance	V _{DS} = 25V, V _{GS} =0V, f = 1MHz	—	2107	—	pF
C _{oss}	Output capacitance		—	180	—	
C _{rss}	Reverse transfer capacitance		—	21	—	
T _{d(on)}	Turn-on delay time (Note1)	V _{DD} =300V, I _D =12A, R _G =24Ω, V _{GS} =10V	—	31	—	ns
T _r	Turn-on Rise time (Note1)		—	40	—	
T _{d(off)}	Turn -Off Delay Time (Note1)		—	135	—	
T _f	Turn -Off Fall time (Note1)		—	49	—	
Q _{gs}	Gate to Source Charge (Note1)	V _{DD} =300V, V _{GS} =10V, I _D =12A	—	11.6	—	nC
Q _{gd}	Gate to Drain Charge (Note1)		—	15	—	
Q _g	Total Gate Charge (Note1)		—	45	—	
V _{SD}	Diode Forward Voltage	I _{SD} =12A	—	—	1.2	V
I _S	Diode Forward Current	—	—	—	12	A
I _{SM}	Diode Pulsed Current	—	—	—	48	A
T _{rr}	Reverse Recovery Time (Note1)	I _{SD} =12A, V _{GS} =0V, dI _F /dt=100A/μs	—	560	—	ns
Q _{rr}	Reverse Recovery Charge (Note1)		—	5.1	—	μC

Note1: Pulse test: 300 μs pulse width, 2% duty cycle.

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

Figure 1: Output characteristics

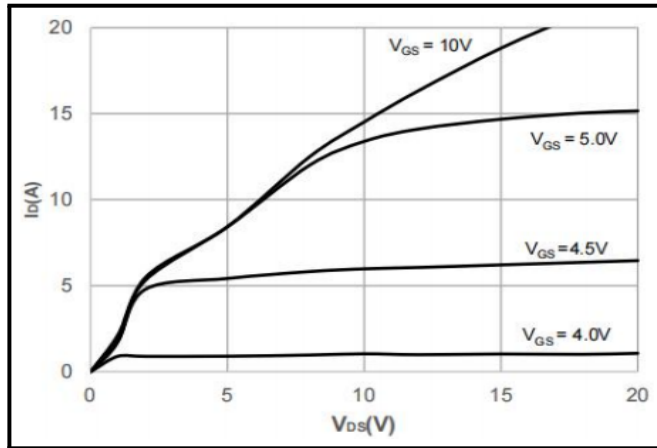


Figure 2: Typical Transfer Characteristics

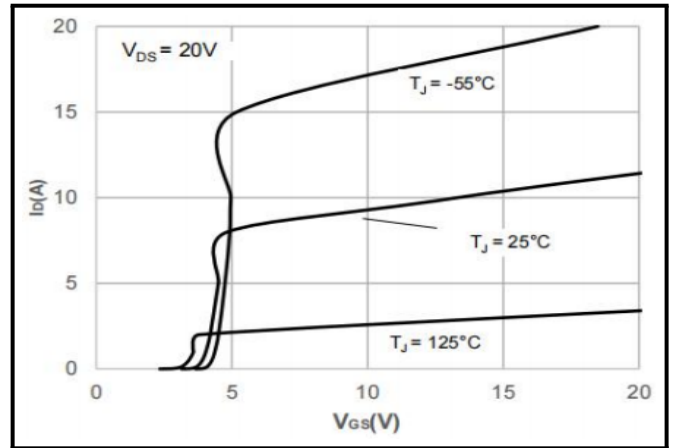


Figure 3: $R_{DS(on)}$ vs. I_D

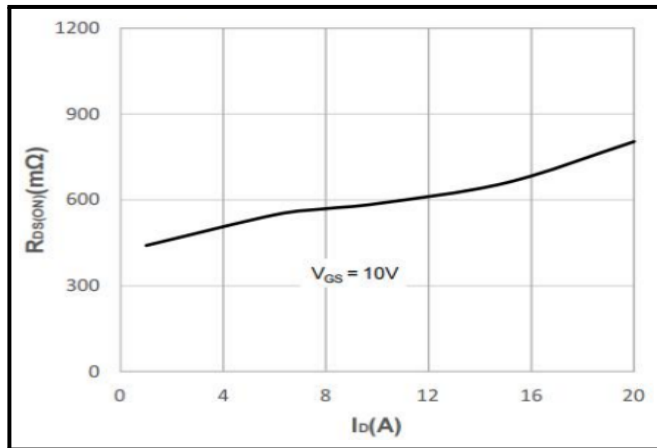


Figure 4: I_{SD} vs. V_{SD}

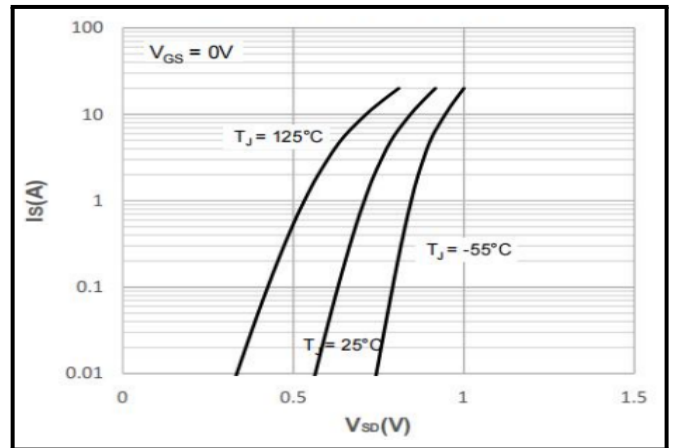


Figure 5: Gate Charge Characteristics

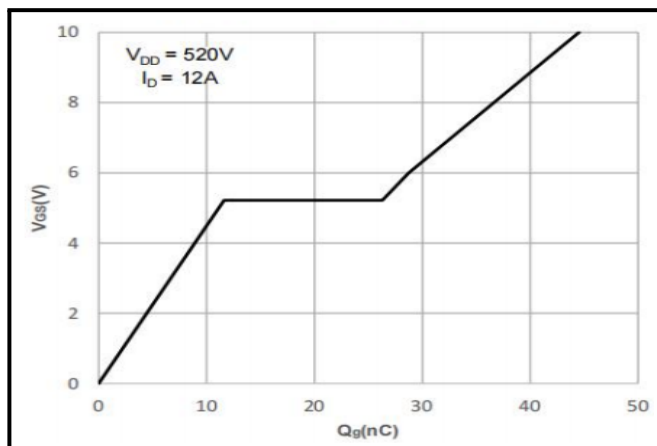
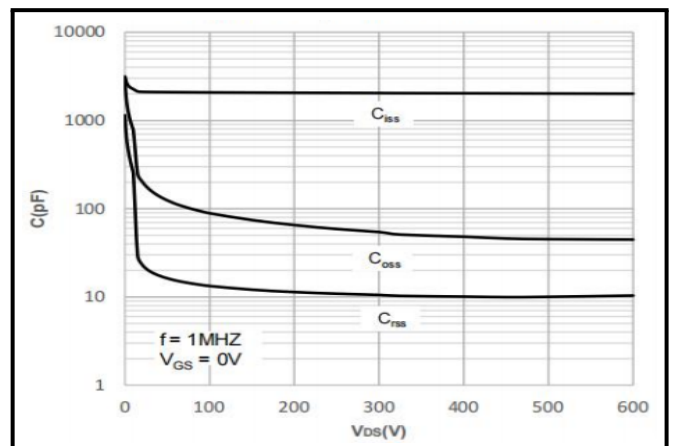


Figure 6: Capacitance Characteristics



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Figure 7: $V_{BR(DSS)}$ vs. T_J

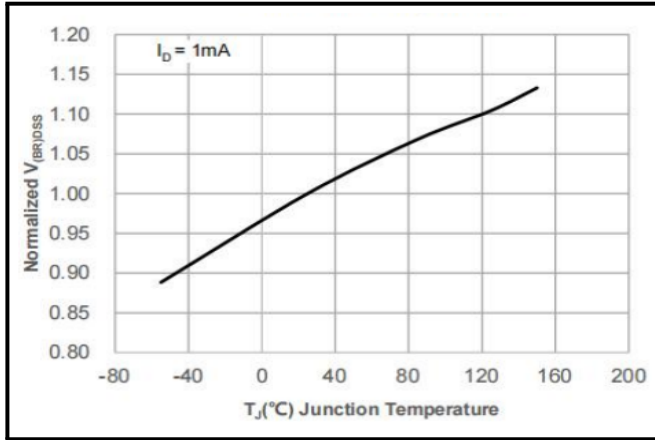


Figure 8: $R_{DS(on)}$ vs. T_J

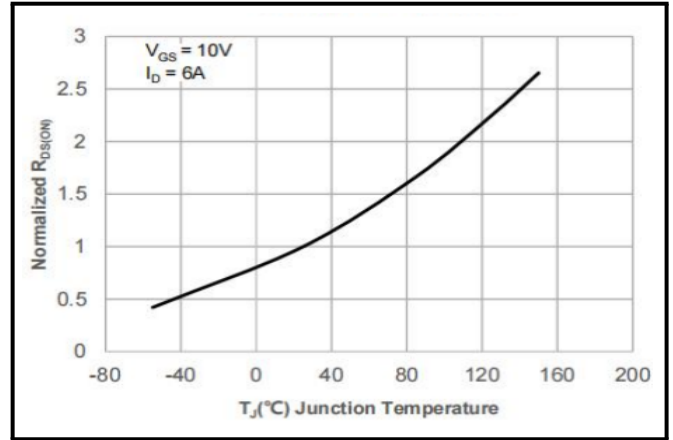


Figure 9: Maximum Safe Operating Area

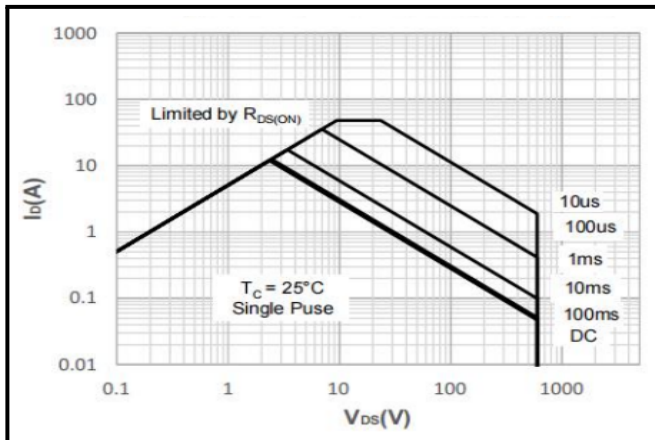


Figure 10: I_D vs. T_C

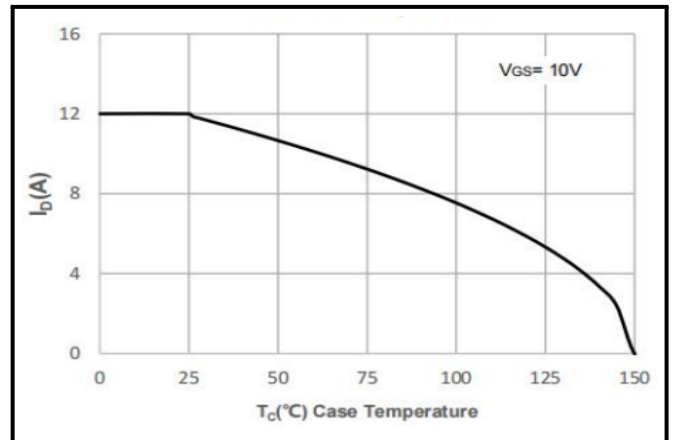


Figure 11: Normalized Maximum Transient Thermal

Impedance

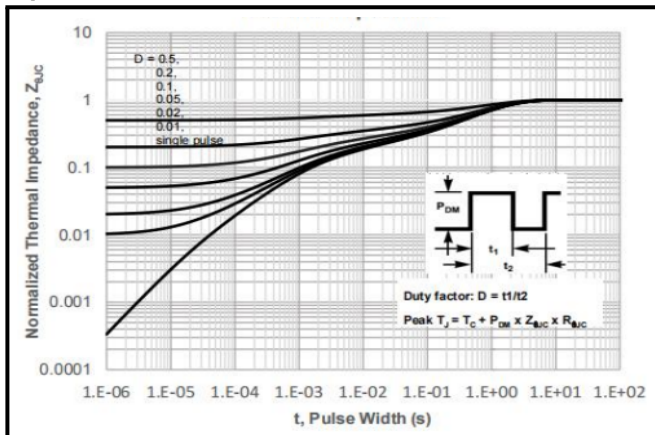
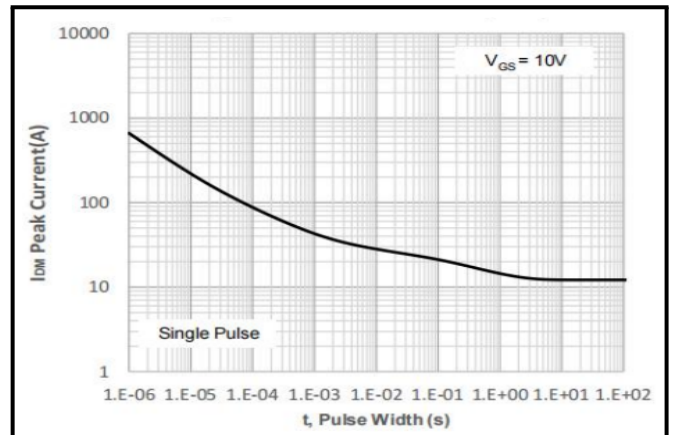


Figure 12: Peak Current Capacity



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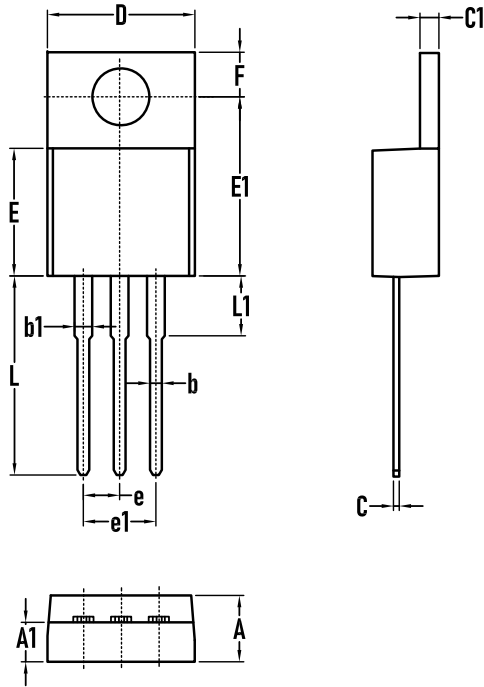
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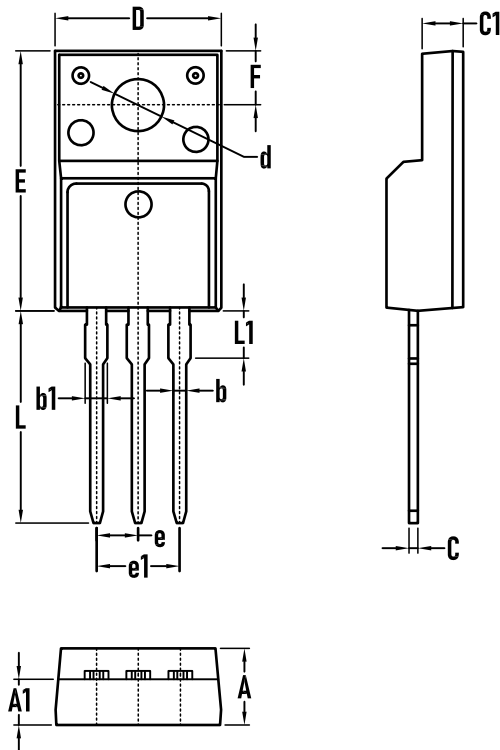
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Packaging Tape - TO-220AB



Symbol	Millimeters		
	MIN.	TYP.	MAX.
A	4.30	4.50	4.70
A1	2.52	2.67	2.82
b	0.71	0.81	0.91
b1	1.17	1.27	1.37
C	0.30	0.40	0.50
C1	1.17	1.27	1.37
D	9.90	10.00	10.20
E	8.50	8.70	8.90
E1	12.00	12.25	12.50
e	2.44	2.54	2.64
e1	4.88	5.08	5.26
F	2.60	2.75	2.80
L	13.00	13.50	14.00
L1	3.80	4.00	4.20

Packaging Tape - TO-220F



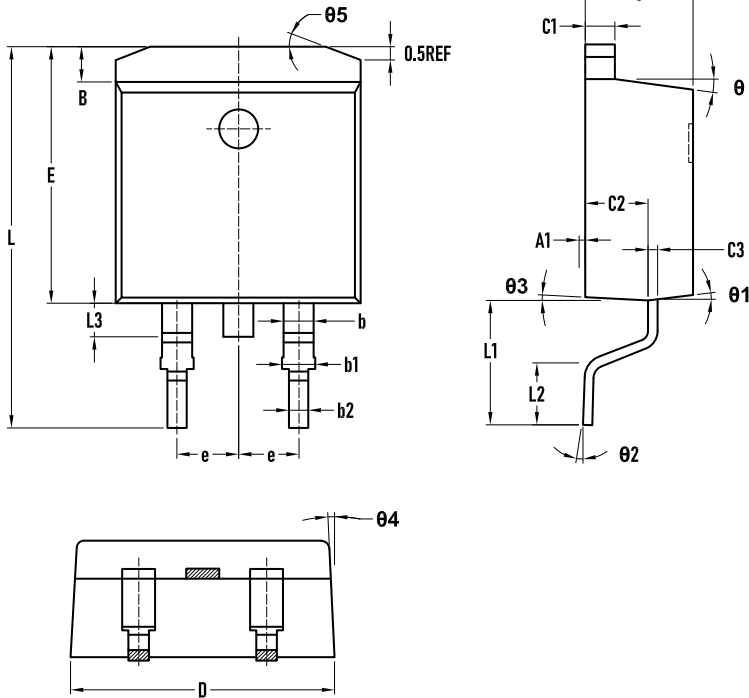
Symbol	Millimeters		
	MIN.	TYP.	MAX.
A	4.30	4.60	4.80
A1	2.70	2.80	2.90
b	0.70	0.80	0.90
b1	1.20	1.30	1.40
C	0.40	0.50	0.60
C1	2.40	2.60	2.80
D	9.90	10.00	10.20
E	15.20	15.60	16.00
e	2.44	2.54	2.64
e1	4.88	5.08	5.26
F	3.00	3.30	3.60
L	12.70	13.20	13.70
L1	2.70	2.90	3.10
d	3.10	3.20	3.30



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Packaging Tape - TO-263



Symbol	Millimeters		
	MIN.	TYP.	MAX.
A1	0	—	0.25
B	1.32	1.37	1.42
b	—	1.27	—
b1	1.30	1.40	1.45
b2	—	0.81	—
C	4.52	4.57	4.62
C1	—	1.27	—
C2	2.64	2.69	2.74
C3	—	0.38	—
D	10.11	10.16	10.21
E	10.02	10.07	10.12
e	—	2.54	—0
L	14.65	14.95	15.25
L1	4.60	4.90	5.20
L2	2.25	2.45	2.65
L3	1.10	1.30	1.50
θ	6°	7°	8°
θ1	6°	7°	8°
θ2	0°	—	8°
θ3	2°	3°	4°
θ4	2°	3°	4°
θ5	—	—	20°

