

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
40V	2.6mΩ@10V	145A
	3.6mΩ@4.5V	

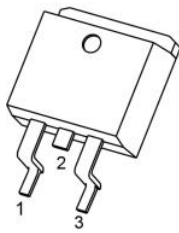
Feature

- Fast Switching
- Low Gate Charge and R_{ds(on)}
- 100% Single Pulse avalanche energy Test

Applications

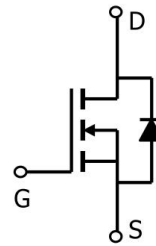
- DC-DC Converter
- Ideal for high-frequency switching and synchronous rectification

Package

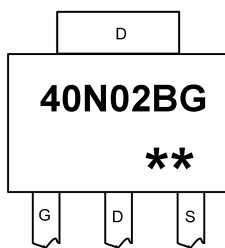


TO-263(G:1 D:2 S:3)

Circuit diagram



Marking



40N02BG =Device Code
** =Week Code

Absolute maximum ratings (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V _{DS}	40	V
Gate-Source Voltage	V _{GS}	±20	V
Continuous Drain Current ¹ (T _c =25°C)	I _D	145	A
Pulsed Drain Current ²	I _{DM}	580	A
Single Pulse Avalanche Energy ³	E _{AS}	529	mJ
Total Power Dissipation ⁴ (T _c =25°C)	P _D	175	W
Thermal Resistance Junction-Case ¹	R _{θJC}	0.71	°C/W
Storage Temperature Range	T _{STG}	-55 to 150	°C
Operating Junction Temperature Range	T _J	-55 to 150	°C

Electrical characteristics (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V , I _D =250uA	40	---	---	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =32V , V _{GS} =0V , T _J =25°C	---	---	1	uA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±20V , V _{DS} =0V	---	---	±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{GS} =V _{DS} , I _D =250uA	1	1.8	2.5	V
Static Drain-Source On-Resistance ²	R _{DS(ON)}	V _{GS} =10V , I _D =30A	---	2.6	3.3	mΩ
		V _{GS} =4.5V , I _D =20A	---	3.6	4.8	
Dynamic characteristics						
Input Capacitance	C _{iss}	V _{DS} =20V , V _{GS} =0V , f=1MHz	---	3485	---	pF
Output Capacitance	C _{oss}		---	1208	---	
Reverse Transfer Capacitance	C _{rss}		---	59	---	
Switching Characteristics						
Total Gate Charge	Q _g	V _{DS} =20V , V _{GS} =10V , I _D =65A	---	57	---	nC
Gate-Source Charge	Q _{gs}		---	9.5	---	
Gate-Drain Charge	Q _{gd}		---	11	---	
Turn-On Delay Time	T _{d(on)}	V _{DD} =20V , V _{GS} =10V , R _G =1.6Ω , I _D =65A	---	10	---	ns
Rise Time	T _r		---	3	---	
Turn-Off Delay Time	T _{d(off)}		---	35	---	
Fall Time	T _f		---	4	---	
Diode Characteristics						
Diode Forward Voltage ²	V _{SD}	V _{GS} =0V , I _S =20A , T _J =25°C	---	---	1.2	V

Note :

1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
2. The data tested by pulsed , pulse width ≅ 300us , duty cycle ≅ 2%
3. The EAS data shows Max. rating . The test condition is V_{DD}=15V, V_{GS}=10V, L=0.5mH, R_G=25Ω

Typical Characteristics

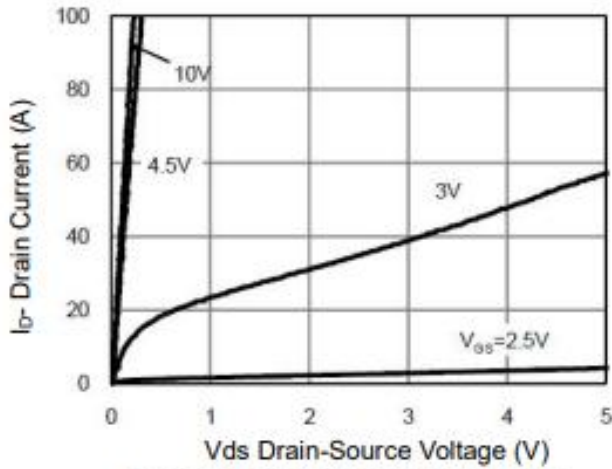


Figure 1 Output Characteristics

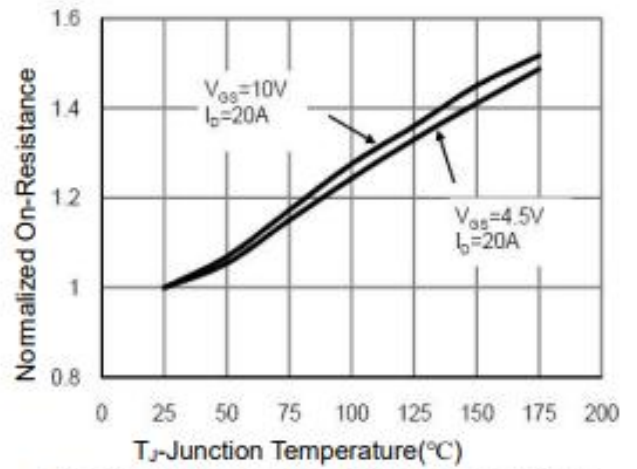


Figure 4 R_{dson} -Junction Temperature

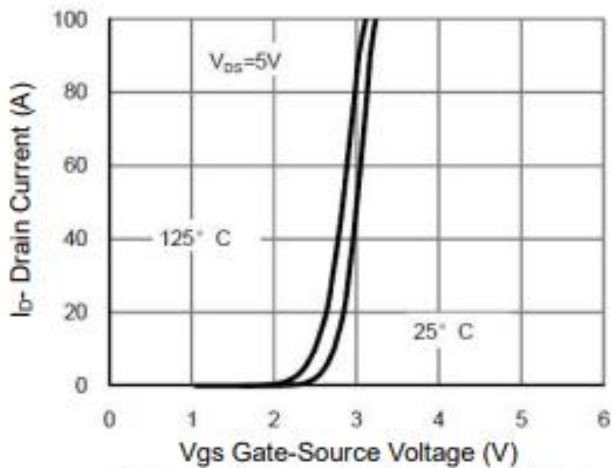


Figure 2 Transfer Characteristics

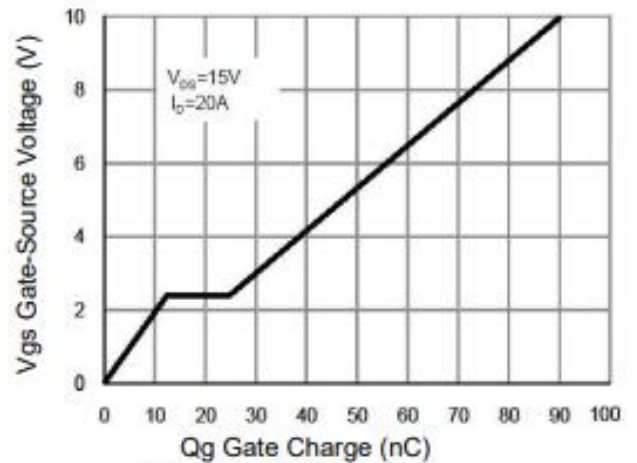


Figure 5 Gate Charge

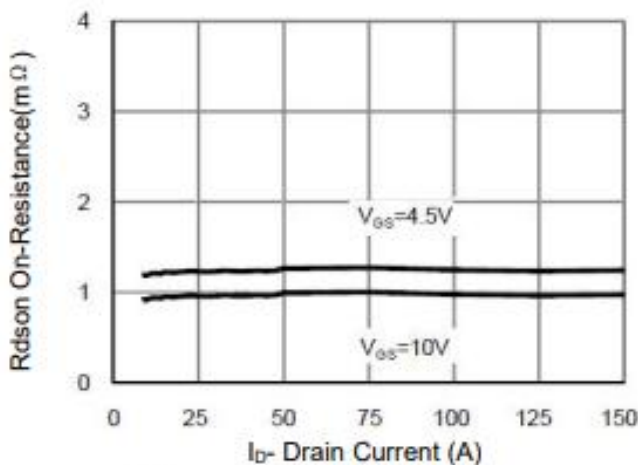


Figure 3 R_{dson} - Drain Current

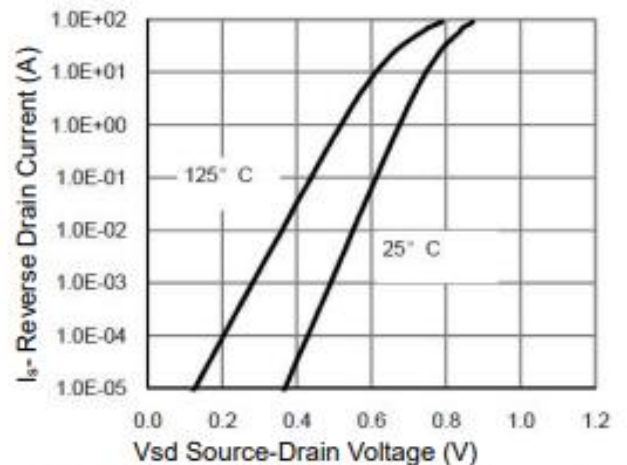


Figure 6 Source- Drain Diode Forward

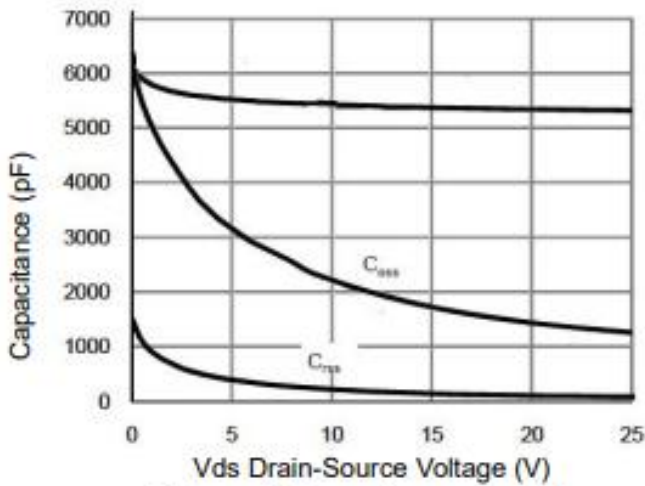


Figure 7 Capacitance vs Vds

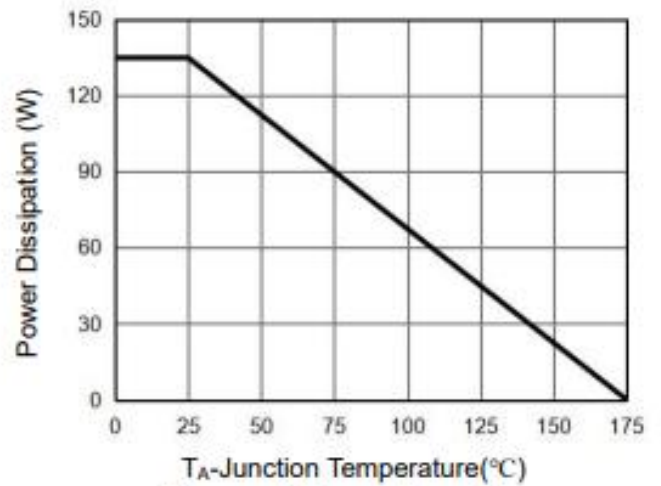


Figure 9 Power De-rating

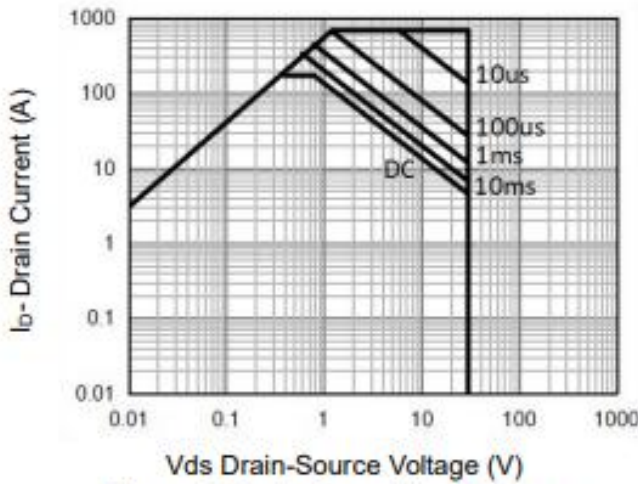


Figure 8 Safe Operation Area (Note3)

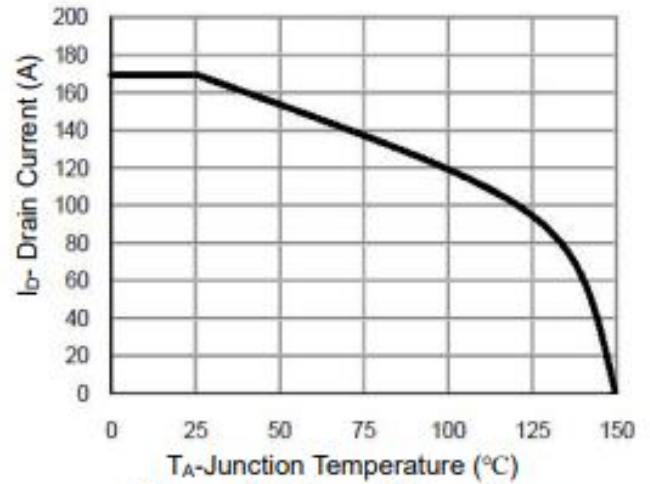


Figure 10 Current De-rating

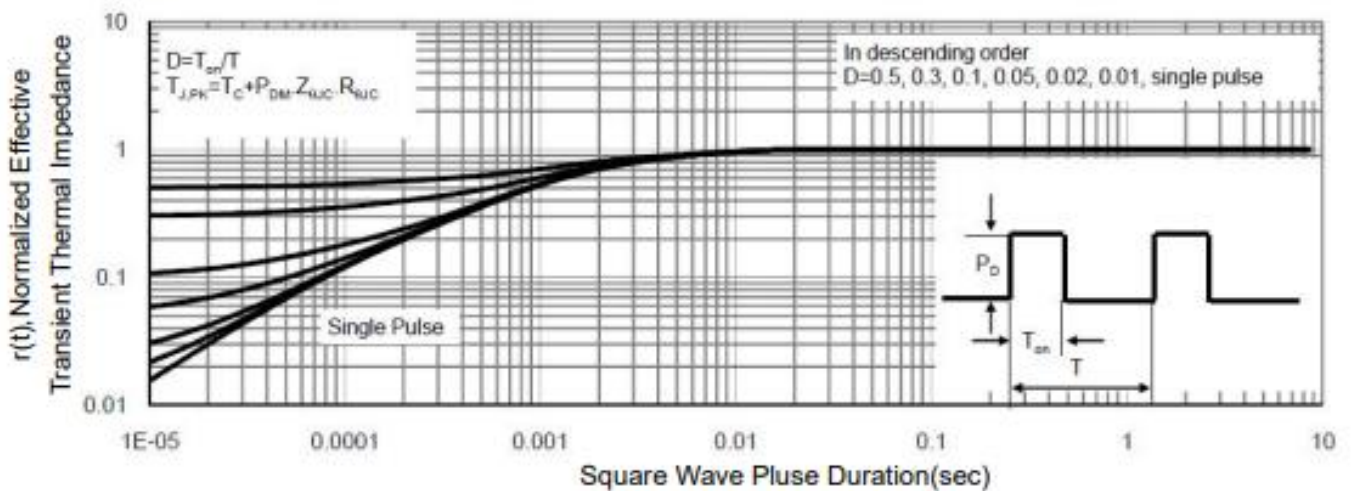
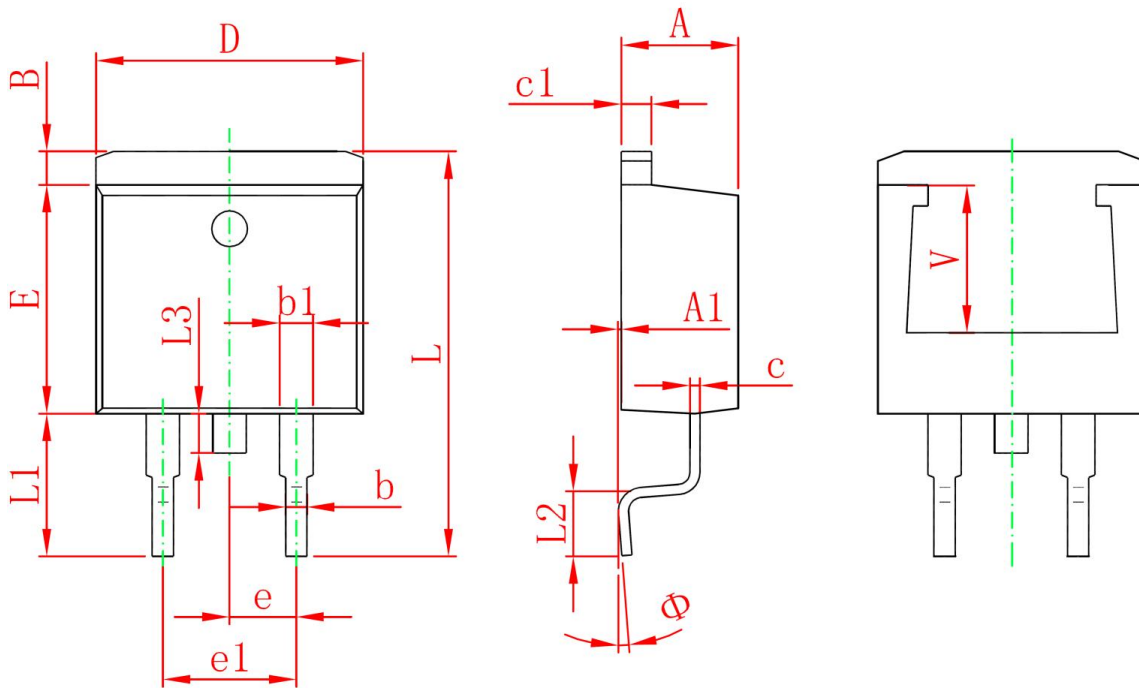


Figure 11 Normalized Maximum Transient Thermal Impedance



TO-263 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.470	4.670	0.176	0.184
A1	0.000	0.150	0.000	0.006
B	1.120	1.420	0.044	0.056
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
L	14.940	15.500	0.588	0.610
L1	4.950	5.450	0.195	0.215
L2	2.340	2.740	0.092	0.108
L3	1.300	1.700	0.051	0.067
Φ	0°	8°	0°	8°
V	5.600 REF.		0.220 REF.	

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