Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
40V	1.8mΩ@10V	180A
	2.8mΩ@4.5V	

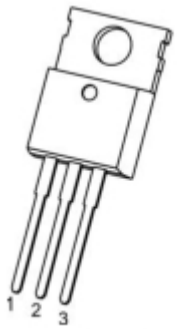
Feature

- Low Gate Charge and Rdson
- Low Reverse transfer capacitances
- 100% Single Pulse avalanche energy Test

Application

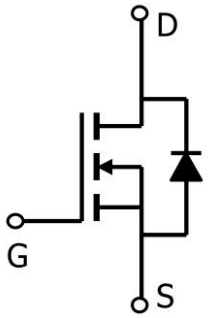
- Power switching application
- DC/DC Converter

Package



TO-220-3L-C(1:G 2:D 3:S)

Circuit diagram



Marking

40N02A =Device Code
** =Week Code

Absolute maximum ratings

(T_a=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current(Tc=25℃)	I_D	180	A
Pulsed Drain Current[2]	I_{DM}	720	A
Single Pulse Avalanche Energy[3]	E_{AS}	529	mJ
Total Power Dissipation[2](Tc=25℃)	P_D	246	W
Thermal Resistance Junction-Case[1]	$R_{\theta JC}$	0.51	℃/W
Storage Temperature Range	T_{STG}	-55 to 150	℃
Operating Junction Temperature Range	T_J	-55 to 150	℃

Electrical characteristics

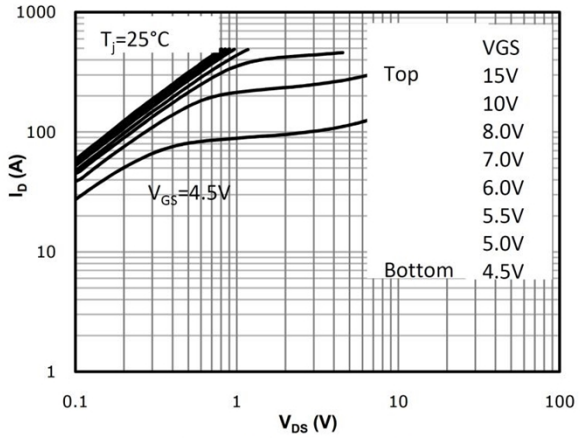
(T_A=25℃, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	$BV_{(BR)DSS}$	V_{GS} = 0V, I_D =250μA	40			V
Drain-Source Leakage Current	I_{DSS}	V_{DS} =32V,V_{GS} = 0V			1	uA
Gate-body leakage current	I_{GSS}	V_{GS} =±20V , V_{DS}=0V			±100	uA
Gate-source threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA	1	1.6	2.5	V
Static Drain-Source On-Resistance[2]	$R_{DS(on)}$	V_{GS} =10V, I_D =100A		1.8	2.3	mΩ
		V_{GS} =4.5V, I_D =30A		2.8	3.8	
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=20V, V_{GS}=0V, f=1MHz		11485		pF
Output Capacitance	C_{oss}			1228		
Reverse Transfer Capacitance	C_{rss}			259		
Switching Characteristics						
Total Gate Charge	Q_g	V_{DS}=20V, V_{GS}=10V, I_D =100A		157		pF
Gate-Source Charge	Q_{gs}			59		
Gate-Drain Charge	Q_{gd}			31		
Turn-On Delay Time	$T_{d(on)}$	V_{DD}=32V, V_{GS}=10V, R_G=2.6Ω, I_D =30A		16		nS
Rise Time	T_r			90		
Turn-Off Delay Time	$T_{d(off)}$			192		
Fall Time	T_f			83		
Diode Characteristics						
Diode Forward Voltage[2]	V_{SD}	V_{GS}=0V, I_S=1A			1.2	V

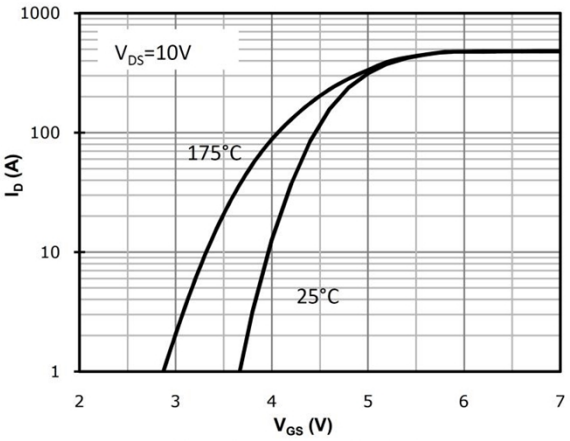
Note：

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}=20V,V_{GS}=10V,L=0.5mH,R_G=25Ω
4. The power dissipation is limited by 150℃ junction temperature

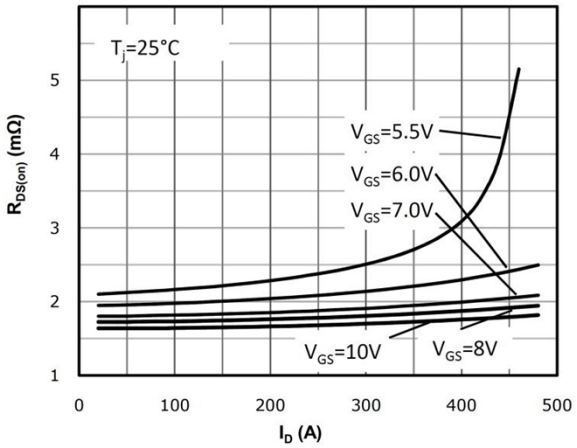
Typical Characteristics



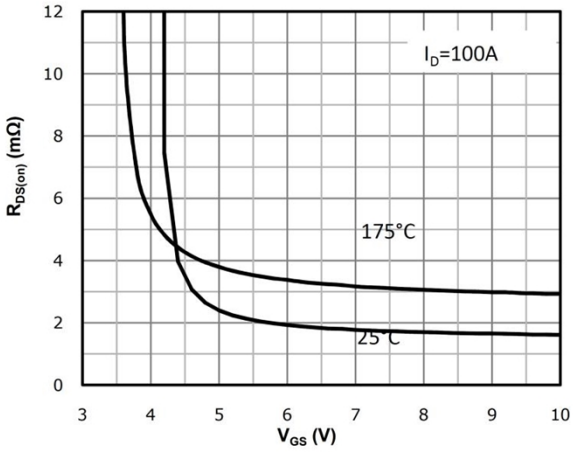
Output Characteristics



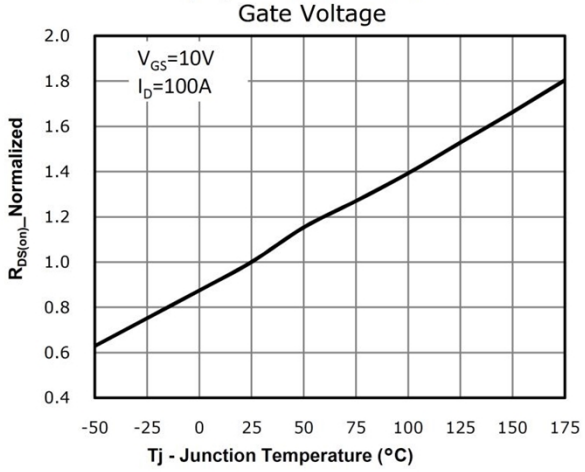
Transfer Characteristics



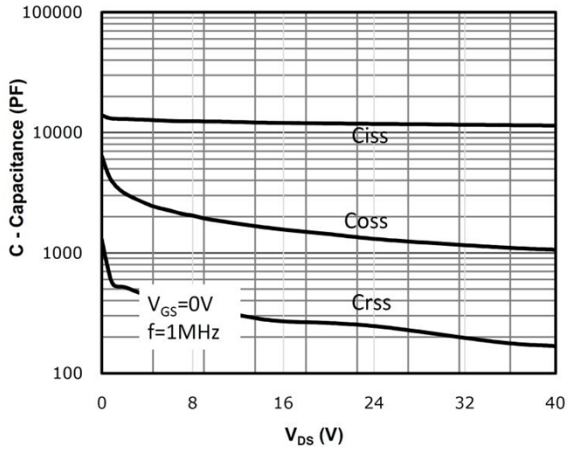
Rds(on) vs Drain Current and Gate Voltage



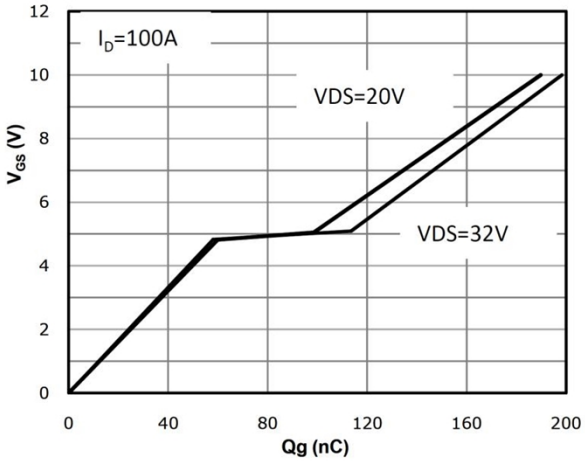
Rds(on) vs Gate Voltage



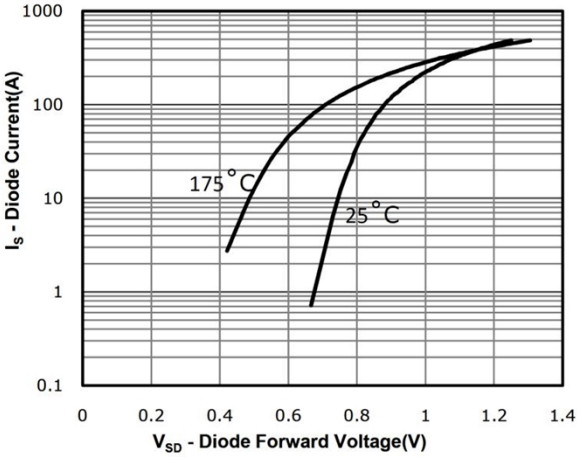
Rds(on) vs. Temperature



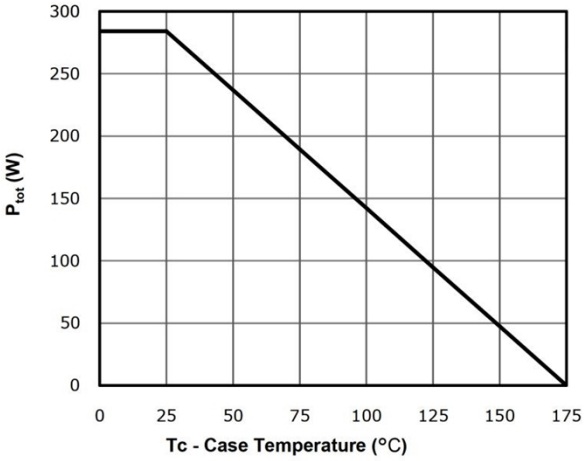
Capacitance Characteristics



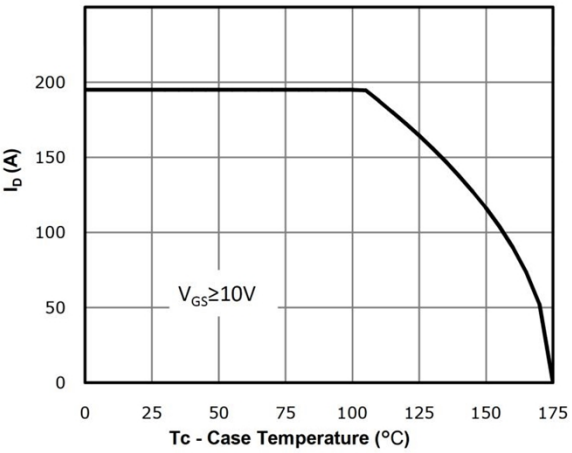
Gate Charge Characteristics



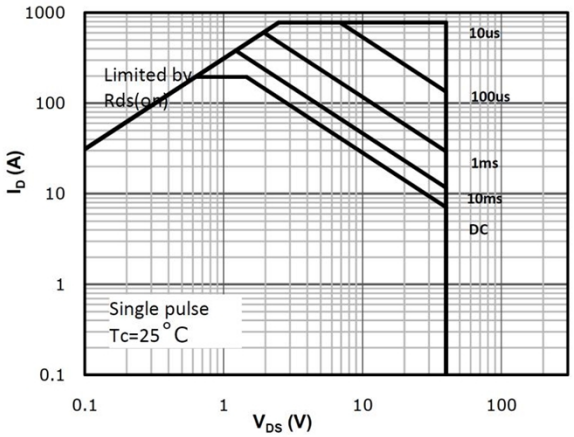
Body-diode Forward Characteristics



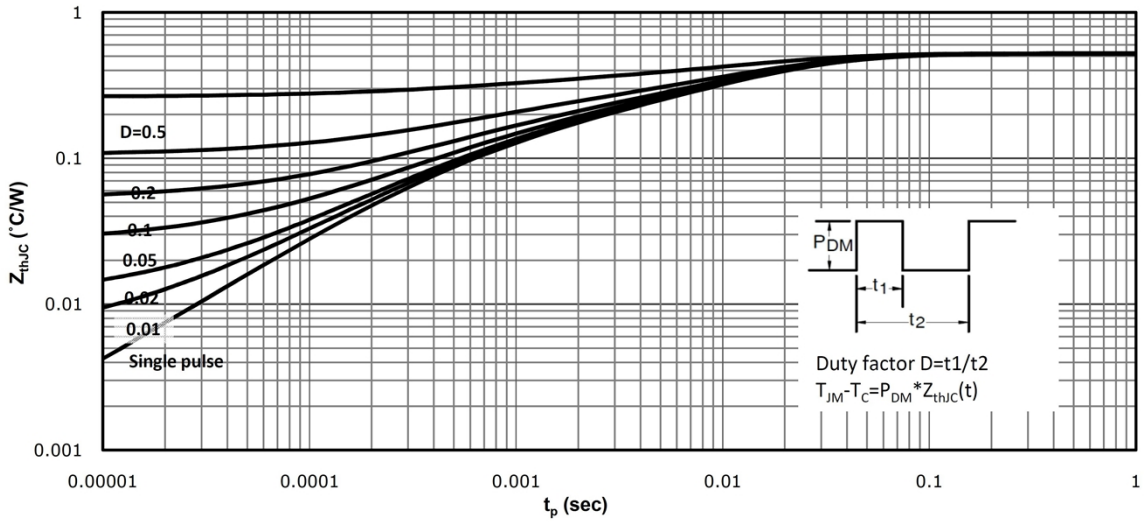
Power Dissipation



Drain Current Derating

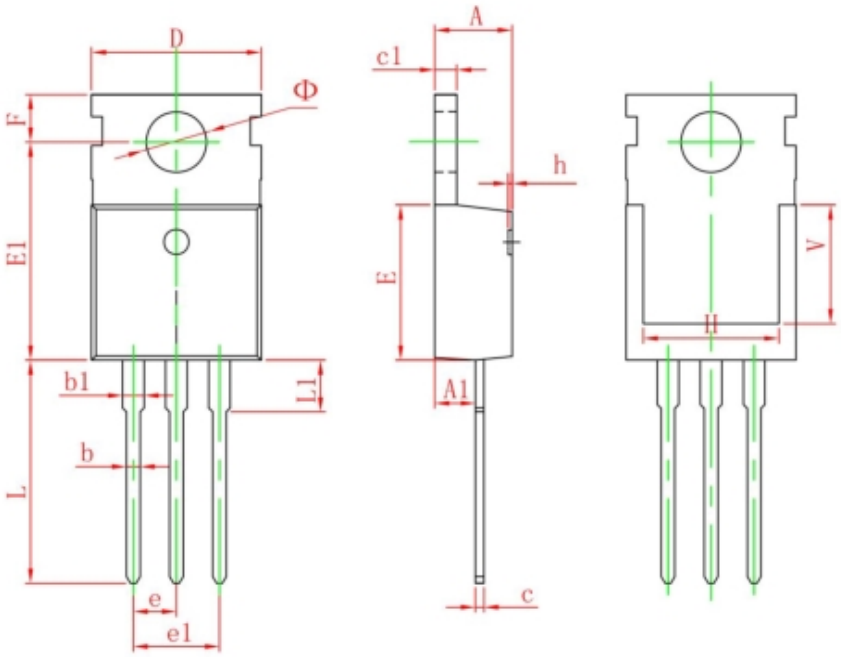


Safe Operating Area



Max. Transient Thermal Impedance

TO-220-3L-C Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181
A1	2.250	2.550	0.089	0.100
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.330	0.650	0.013	0.026
c1	1.200	1.400	0.047	0.055
D	9.910	10.250	0.390	0.404
E	8.950	9.750	0.352	0.384
E1	12.650	13.050	0.498	0.514
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.900	13.400	0.508	0.528
L1	2.850	3.250	0.112	0.128
V	6.900 REF.		0.276 REF.	
Φ	3.400	3.800	0.134	0.150