Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
40V	2.5mΩ@10V	165A

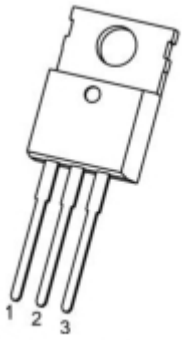
Feature

- Fast Switchin
- High density cell design for ultra low Rdson
- Excellent package for good heat dissipation
- 100% Single Pulse avalanche energy Test

Application

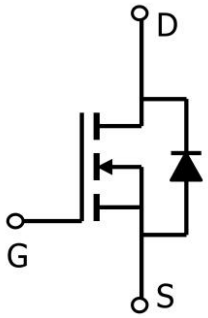
- Load switching
- PWM Application
- Power Management

Package



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

Circuit diagram



Marking

40N02H : **Product 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
Drain Current-Continuous(Tc=25℃)	I_D	165	A
Pulsed Drain Current	I_{DM}	660	A
Maximum Power Dissipation(Tc=25℃)	P_D	125	W
Single pulse avalanche energy(1)	E_{AS}	306	mJ
Thermal Resistance,Junction-to-Case(2)	$R_{\theta JC}$	1.0	℃/W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	℃

Electrical characteristics

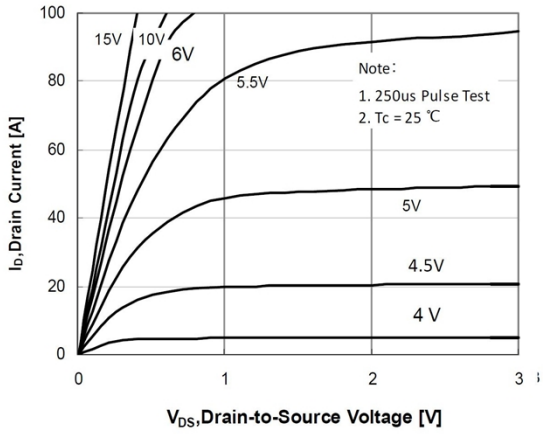
(T_A=25℃, unless otherwise noted)

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
Zero gate voltage drain 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	2.5	3.0	3.5	V
Drain-source on-resistance[2]	$R_{DS(on)}$	V_{GS} =10V, I_D =75A		2.5	3.2	mΩ
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=25V, V_{GS}=0V, f=1MHz		8980		pF
Output Capacitance	C_{oss}			520		
Reverse Transfer Capacitance	C_{rss}			415		
Switching Characteristics						
Total Gate Charge	Q_g	V_{DS}=32V, V_{GS}=10V, I_D =20A		175		pF
Gate-Source Charge	Q_{gs}			47		
Gate-Drain Charge	Q_{gd}			32		
Turn-On Delay Time	$T_{d(on)}$	V_{DD}=30V, I_D =75A, R_L=1Ω, V_{GS}=10V, R_G=10Ω		48		nS
Rise Time	T_r			83		
Turn-Off Delay Time	$T_{d(off)}$			175		
Fall Time	T_f			61		
Diode Characteristics						
Diode Forward Voltage[2]	V_{SD}	V_{GS}=0V, I_S=1A			1.2	V

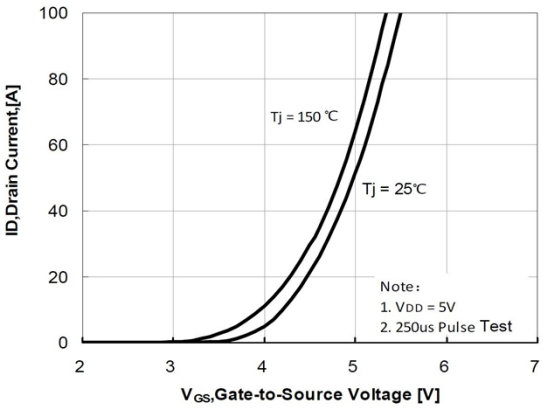
Note：

1. E_{AS} condition :T_j=25℃,V_{DD} =20V,V_G =10V,L=0.5mH,Rg=25Ω
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production

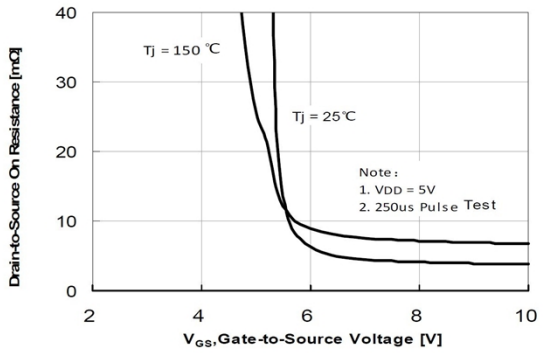
Typical Characteristics



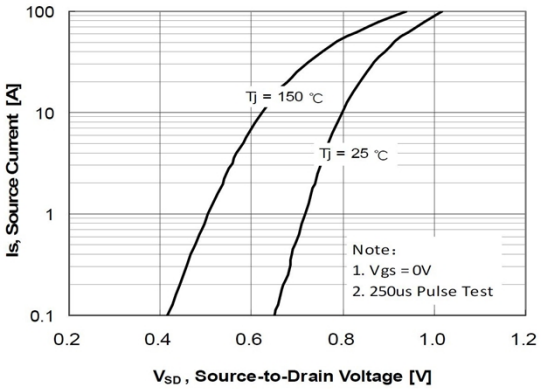
Output Characteristics



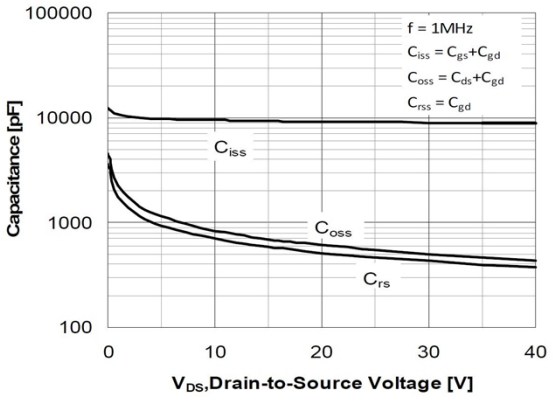
Transfer Characteristics



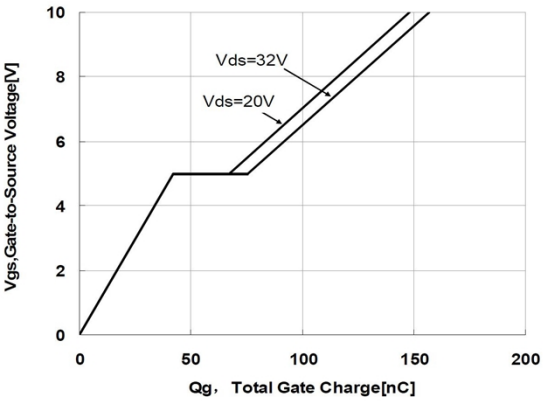
Drain-to-Source On Resistance vs Gate Voltage



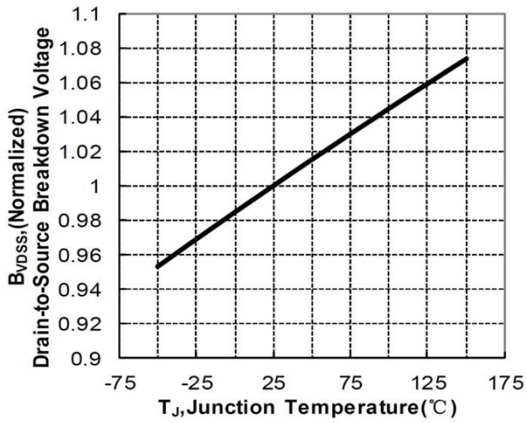
Typical Body Diode Transfer Characteristics



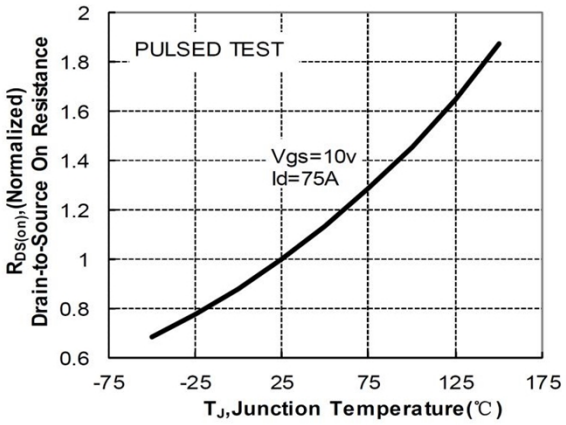
Capacitance Characteristics



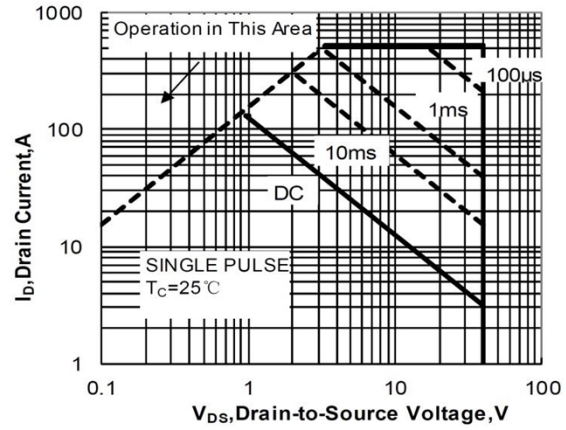
Gate Charge Characteristics



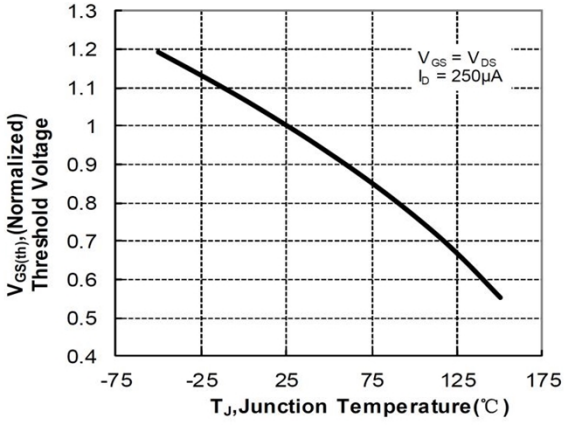
Normalized Breakdown Voltage vs Junction Temperature



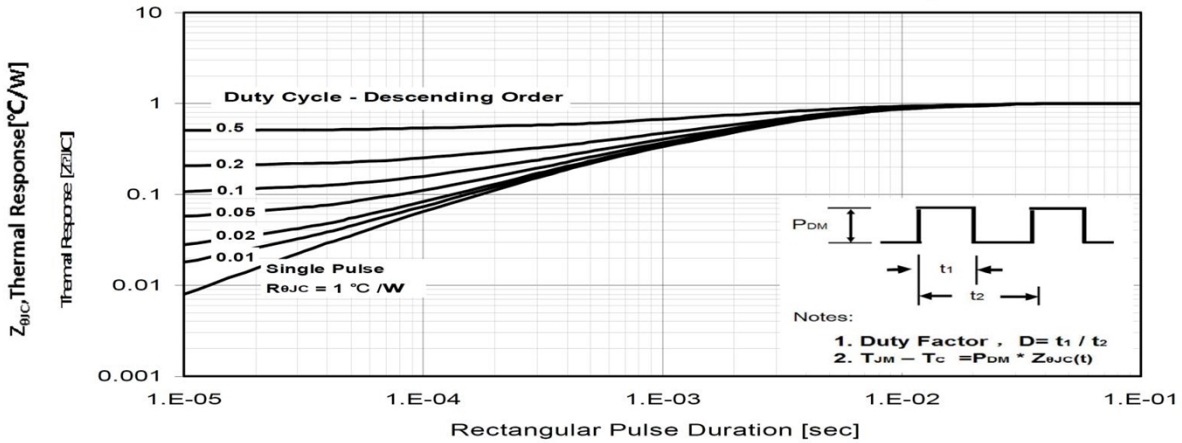
Normalized On Resistance vs Junction Temperature



Maximum Safe Operating

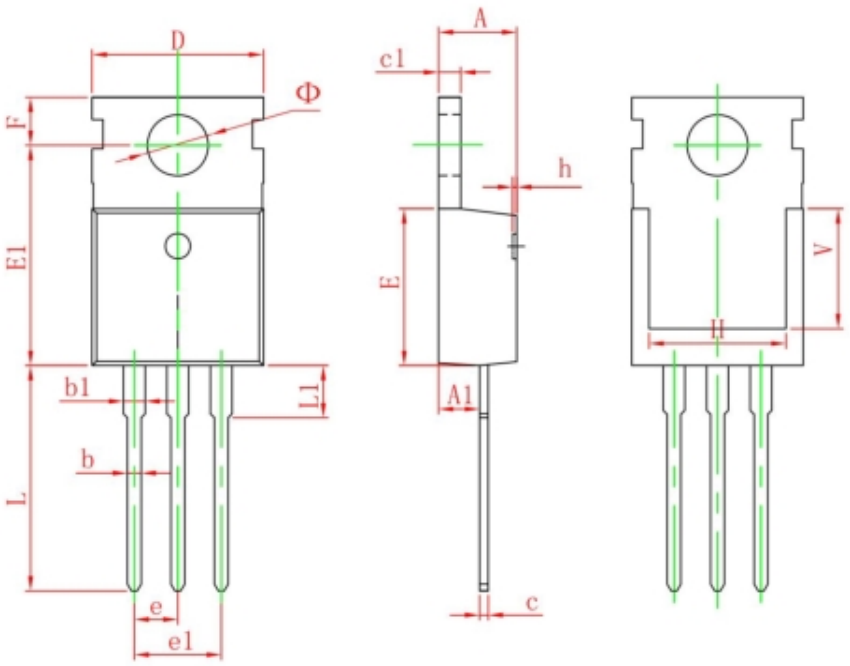


Normalized Threshold Voltage vs Junction Temperature



Maximum Effective Transient Thermal Impedance, Junction-to-Case

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