Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
40V	2.6mΩ@10V	130A
	3.3mΩ@4.5V	

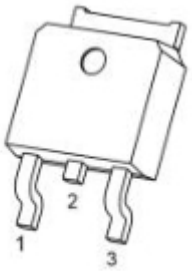
Feature

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

Application

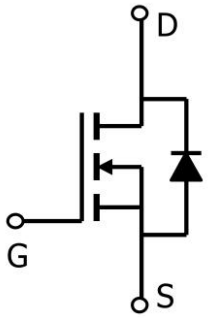
- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

Package



TO-252(1:G 2:D 3:S)

Circuit diagram



Marking

40N02G =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[1]	I_D@T_C=25℃	130	A
Continuous Drain Current[1]	I_D@T_C=100℃	92	A
Pulsed Drain Current[2]	I_{DM}	520	A
Single Pulse Avalanche Energy[3]	E_{AS}	306	mJ
Avalanche Current	I_{AS}	35	A
Total Power Dissipation[4]	P_D	135	W
Thermal Resistance Junction-ambient (Steady State)[1]	$R_{\theta JA}$	45	℃/W
Thermal Resistance Junction-Case[1]	$R_{\theta JC}$	0.93	℃/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, T_J=25℃			1	uA
		V_{DS} =32V,V_{GS} = 0V, T_J=55℃			5	
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	1.5	2	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		3.3	4.5	
Dynamic Characteristics						
Total Gate Charge	Q_g	V_{DS}=20V, V_{DS}=10V, I_D =55A		62		pF
Gate-Source Charge	Q_{gs}			9.7		
Gate-Drain Charge	Q_{gd}			9.2		
Input Capacitance	C_{iss}	V_{DS}=20V, V_{GS}=0V, f=1MHz		3515		pF
Output Capacitance	C_{oss}			854		
Reverse Transfer Capacitance	C_{rss}			62		
Switching Characteristics						
Turn-On Delay Time	$T_{d(on)}$	V_{DD}=20V, V_{GS}=10V, R_G=6Ω, I_D =55A		10		nS
Rise Time	T_r			4.8		
Turn-Off Delay Time	$T_{d(off)}$			32		
Fall Time	T_f			5.1		
Diode Characteristics						
Diode Forward Voltage[2]	V_{SD}	V_{GS}=0V, I_S=1A, T_J=25℃			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
5. The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

Typical Characteristics

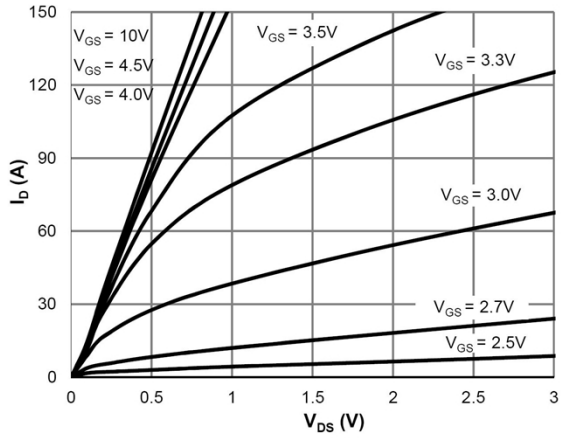


Figure 1: Saturation Characteristics

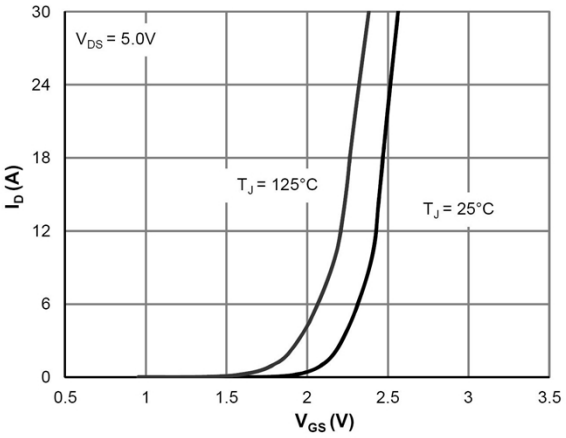


Figure 2: Transfer Characteristics

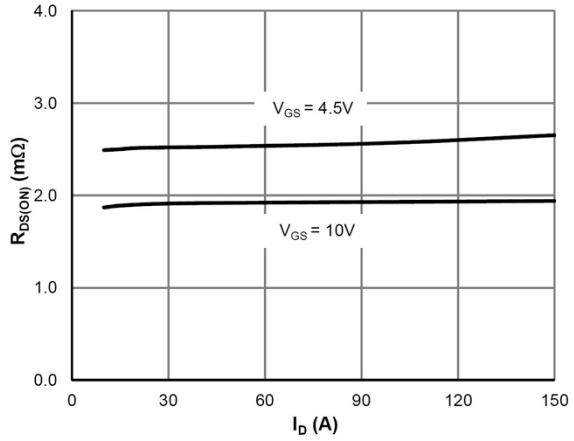


Figure 3: $R_{DS(ON)}$ vs. Drain Current

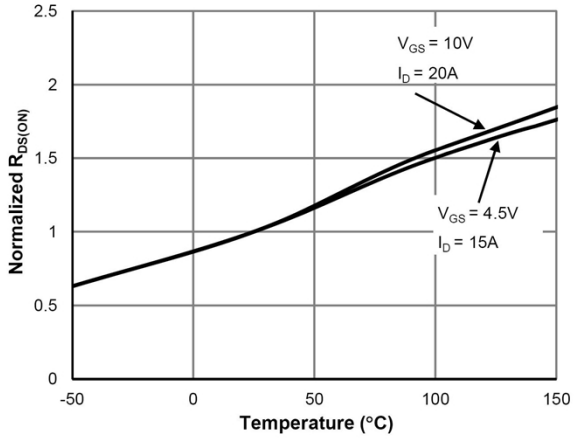


Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

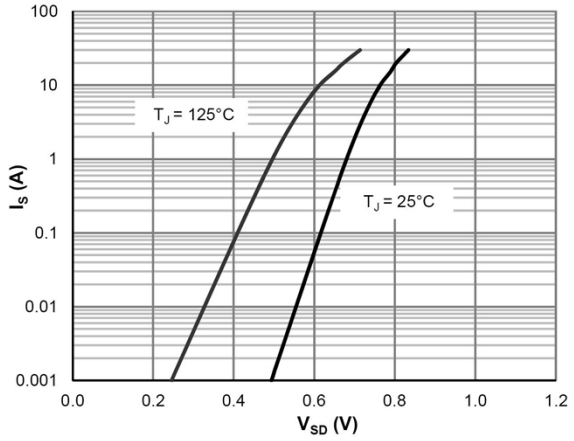


Figure 5: Body-Diode Characteristics

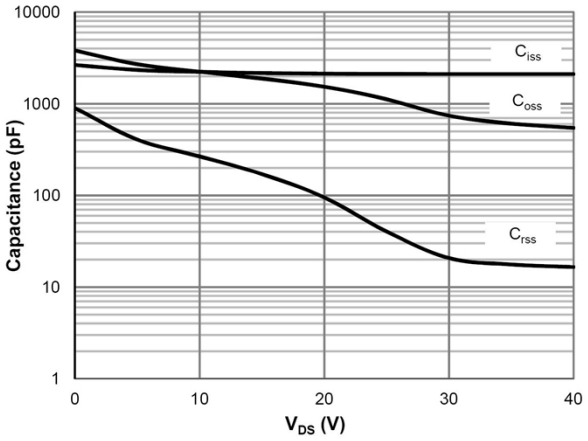


Figure 6: Capacitance Characteristics

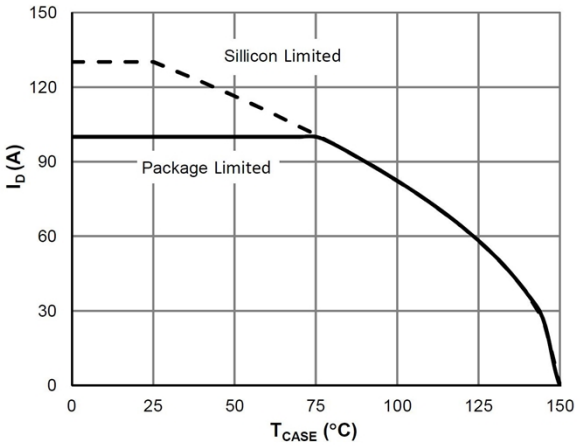


Figure 7: Current De-rating

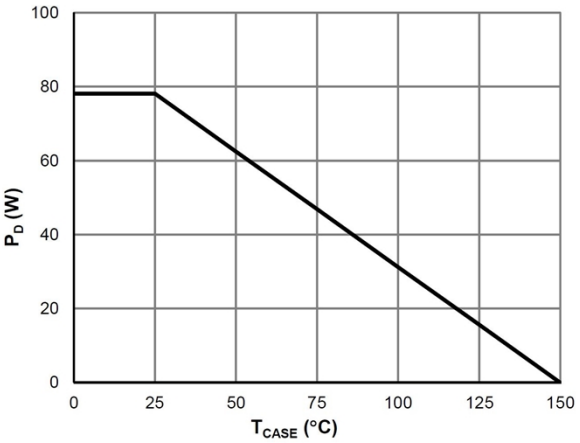


Figure 8: Power De-rating

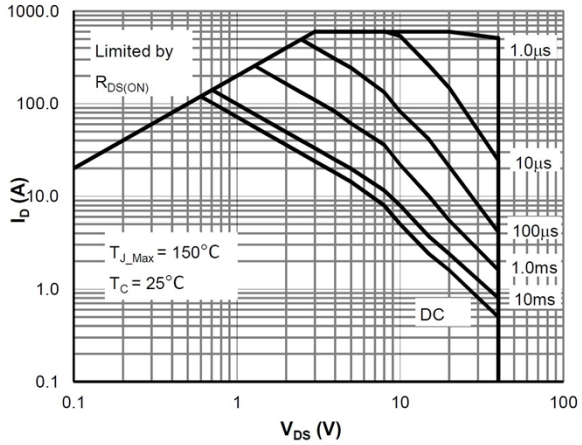


Figure 9: Maximum Safe Operating Area

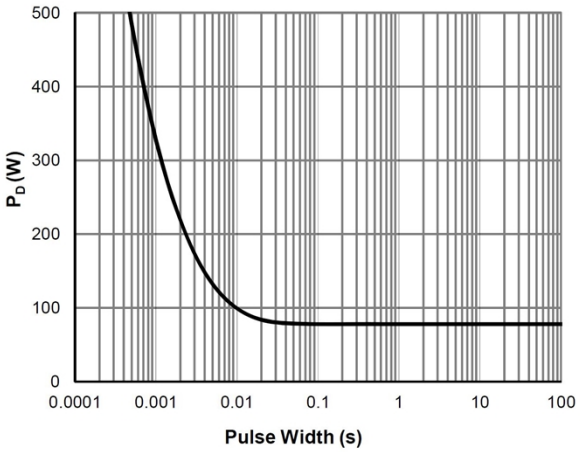


Figure 10: Single Pulse Power Rating, Junction-to-Case

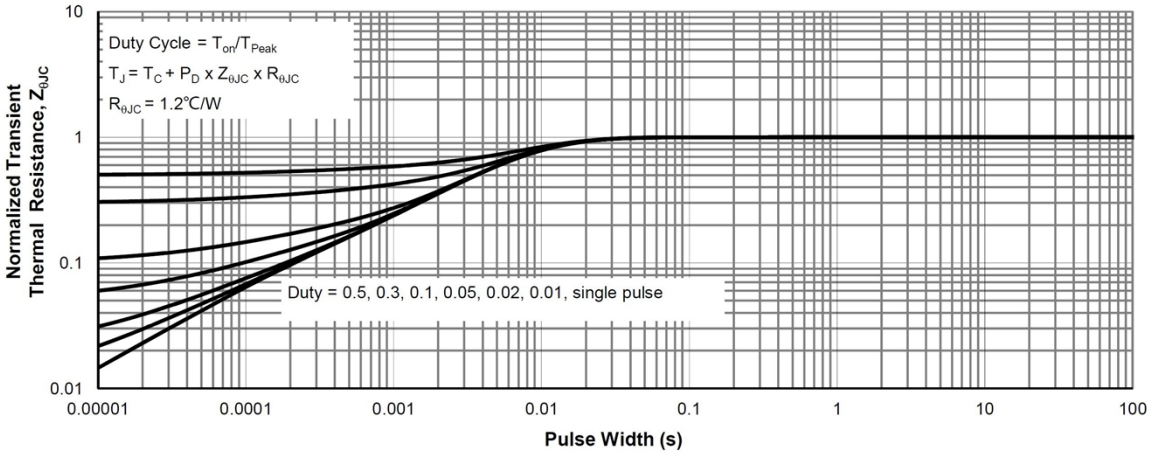
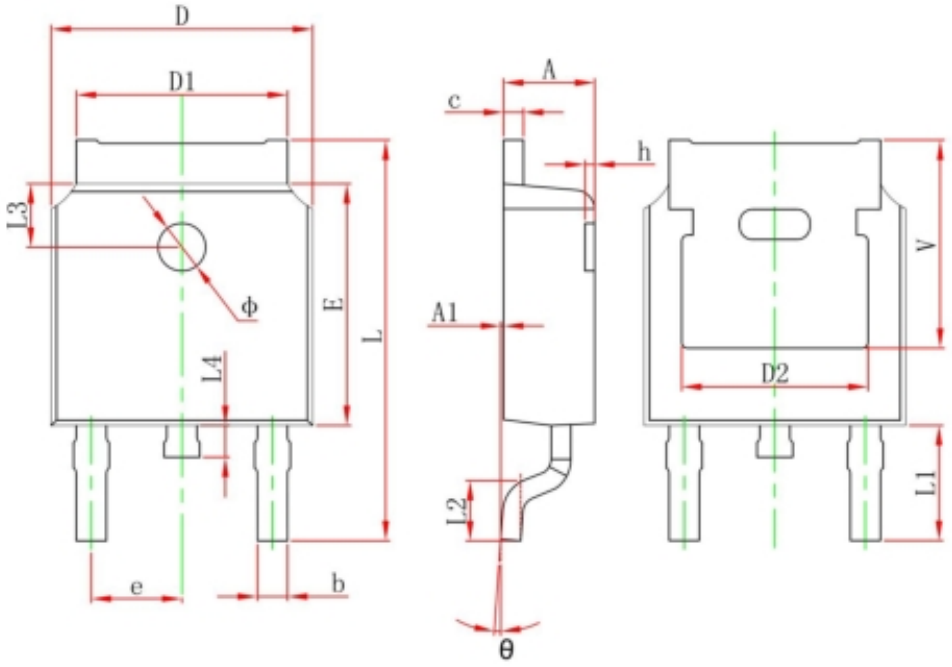


Figure 11: Normalized Maximum Transient Thermal Impedance

TO-252 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 REF.		0.211 REF.	