30V_{DS}/±20V_{GS} N-Channel Enhancement Mode MOSFET

Description

The IP15N03M has the characteristics of extremely low $R_{DS(ON)}$,high-speed switching and high efficiency in DC/DC conversion,marking it suitable for load switching and DC/DC converters.

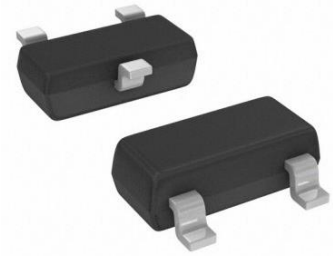
Application

- Load Switch
- DC/DC conversion
- Portable and Battery-powered Products

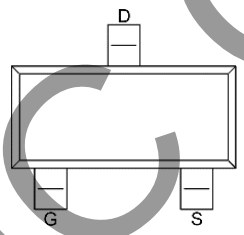
General Features

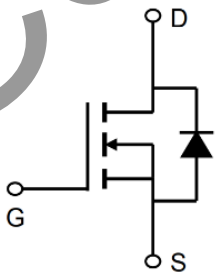
- V_{DS}=30V,I_D=8A
- $R_{DS(ON)}$=14.5mΩ（TYP.）V_{GS}=10V,I_D=5A
- $R_{DS(ON)}$=17mΩ（TYP.）V_{GS}=4.5V,I_D=4A
- Reliable and Rugged
- Avalanche Rated
- Low On-Resistance

Bottom view



SOT-23L **Top view**





schematic diagram

Package Marking and Ordering Information

Product ID	Pack		Marking	Qty(PCS)
IP15N03M	SOT23-3L	Pb-Free	IP15N03M	3000pcs/Reel

Contents

Absolute Maximum Ratings (T_C=25℃, unless otherwise noted)

Symbol	Parameter	Value	Units
V_{DS}	Drain-Source Voltage (V_{GS}=0V)	30	V
V_{GS}	Gate-Source Voltage (V_{GS}=0V,static)	±20	V
I_D	Continuous Drain Current (T_C=25℃)	8	A
	Continuous Drain Current (T_C=100℃)	6	A
I_{DM}	Pulsed Drain Current	32	A
E_{AS}	Single Pulsed Avalanche Energy	42	mJ
P_D	Maximum Power Dissipation (T_C=25℃)	1.3	W
	Maximum Power Dissipation (T_C=100℃)	0.7	W
T_J,T_{STG}	Operating,Storge Temperature Range	-55~150	℃

Thermal Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JL}$	Thermal Resistance,Junction-to-Lead	-	61	-	℃/W
$R_{\theta JA}$	Thermal Resistance,Junction-to-Ambient	-	88	-	℃/W

Electrical Characteristics (T_C=25℃, unless otherwise noted)

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V,I_D=250μA	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=30V, V_{GS}=0V	-	-	1	μA
I_{GSS}	Gate -Source Leakage Current	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}= V_{GS},I_D=250μA	1.1	1.5	1.9	V
$R_{DS(ON)}$	Drain-Source On-stage Resistance	V_{GS}=10V,I_D=5A	-	14.5	18.5	mΩ
		V_{GS}=4.5V,I_D=4A	-	17	22	

Dynamic Characteristics

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
C_{iss}	Input capacitance	V_{DS}=15V V_{GS}=0V f=1MHz	-	745	-	pF
C_{oss}	Output capacitance		-	80	-	
C_{rss}	Reverse transfer capacitance		-	70	-	
R_g	Gate Resistance	f=1MHz	-	3.1	-	Ω
Q_g	Total Gate Charge	V_{DS}=15V V_{GS}=10V I_D=6A	-	14.6	-	nC
Q_{gs}	Gate Source Charge		-	2.3	-	
Q_{gd}	Gate Drain Charge		-	3.1	-	
$t_{d(on)}$	Turn-on delay Time	V_{GS}=10V V_{DS}=15V I_D=6A R_G=1.8Ω	-	8	-	ns
t_r	Rise time		-	95	-	
$t_{d(off)}$	Turn-off delay Time		-	26	-	
t_f	Fall time		-	72	-	

Reverse Diode Characteristics

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
V_{SD}	Body Diode Forward Voltage	V_{GS}=0V,I_{SD}=1A	-	0.8	1	V
t_{rr}	Reverse Recovery Time	V_{GS}=0V,I_{SD}=6A d_i/d_t=100A/μs	-	15	-	ns
Q_{rr}	Reverse Recovery Charge		-	26	-	nC

Notes :

(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 power dissipation is limited by 150℃ junction temperature

(4) The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation

Typical Characteristics

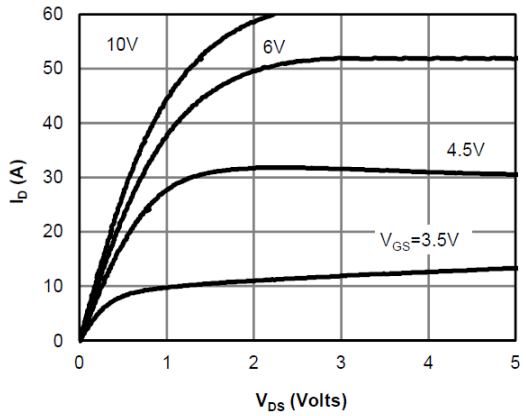


Figure 1. On-Region Characteristics

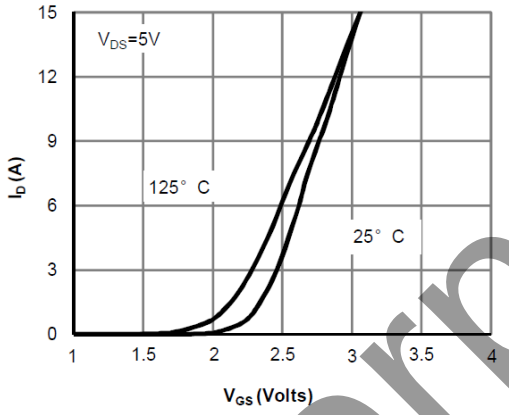


Figure 2. Transfer Characteristics

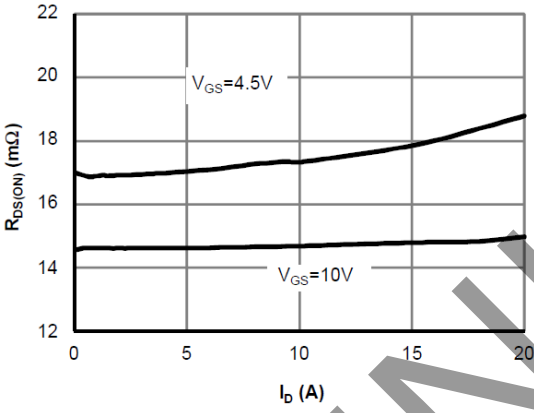


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

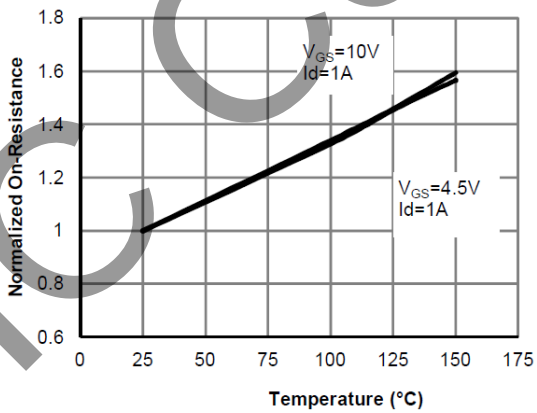


Figure 4. On-Resistance vs. Junction Temperature

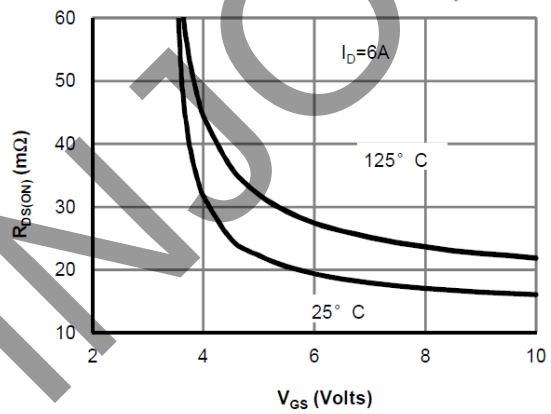


Figure 5. On-Resistance vs. Gate-Source Voltage

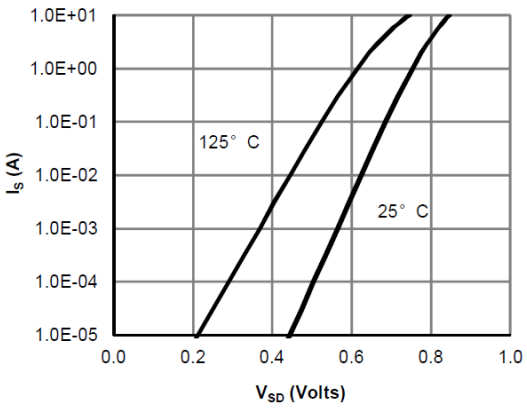


Figure 6. Body-Diode Characteristics

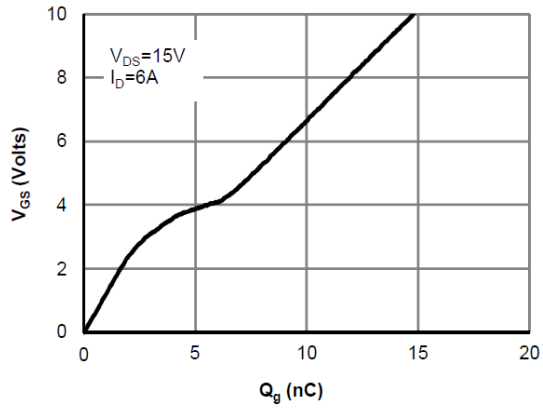


Figure 7. Gate-Charge Characteristics

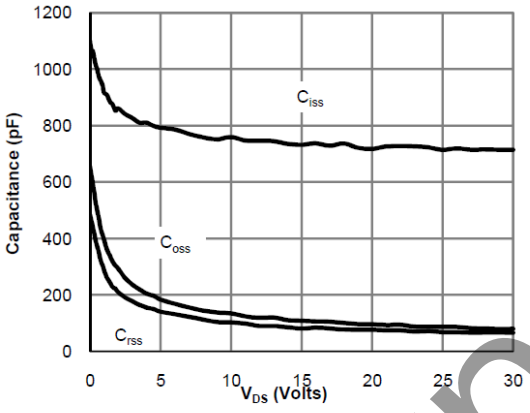


Figure 8. Capacitance Characteristics

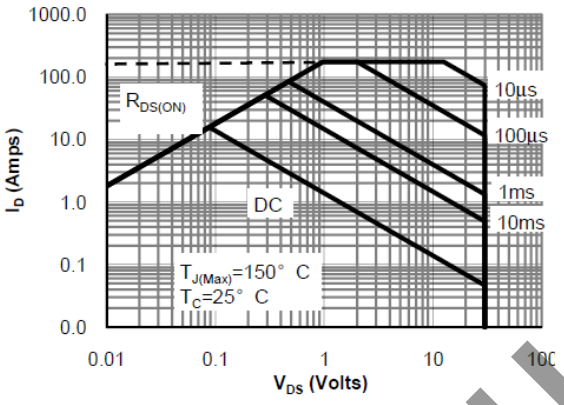


Figure 9. Maximum Forward Biased Safe Operating Area

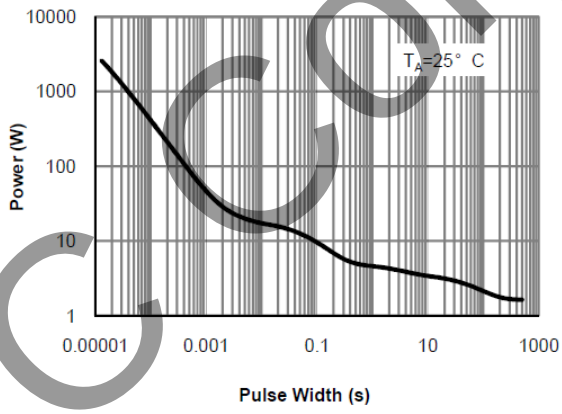


Figure 10. Single Pulse Power Rating Junction-to-Ambient

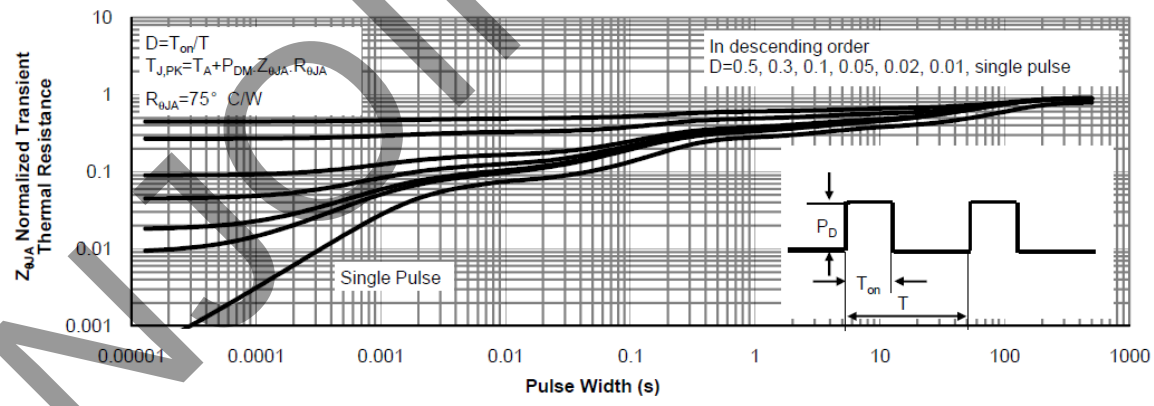
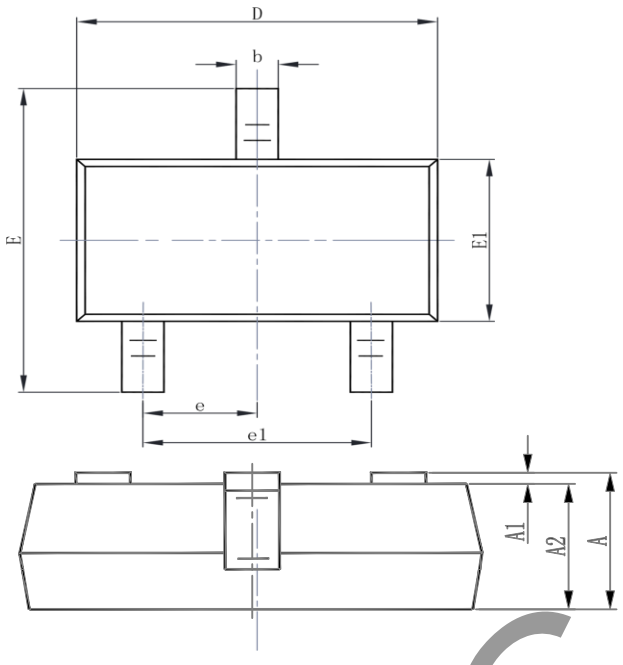
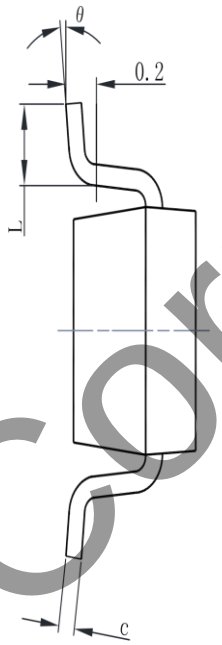


Figure 11. Normalized Maximum Transient Thermal Impedance

Package Mechanical Data-SOT23-3L





Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E1	1.500	1.700	0.059	0.067
E	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

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