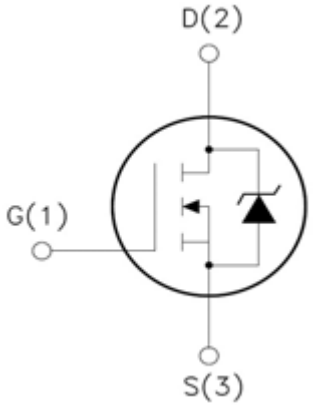
Description

The 50N03uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.



General Features

V_{DS}=30V I_D =50A

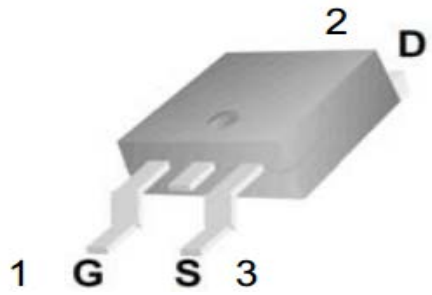
$R_{DS(ON)}$ < 13mΩ @ V_{GS}=10V (Type: 9.5mΩ)

Application

Battery protection

Load switch

Uninterruptible power supply



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
50N03	TO-263	50N03	800

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	50	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	30	A
I_{DM}	Pulsed Drain Current[2]	112	A
EAS	Single Pulse Avalanche Energy[3]	24.2	mJ
I_{AS}	Avalanche Current	22	A
P_D@T_C=25℃	Total Power Dissipation[4]	37.5	W
P_D@T_A=25℃	Total Power Dissipation[4]	2.42	W
T_{STG}	Storage Temperature Range	-55 to 175	℃
T_J	Operating Junction Temperature Range	-55 to 175	℃
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	62	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	4	℃/W

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	30	32	---	V
△BVDSS/△TJ	BVDSS Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.0193	---	V/℃
RDS(ON)	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=30A	---	9.5	13	mΩ
		V_{GS}=4.5V , I_D=15A	---	11	18	
VGS(th)	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.2	1.6	2.5	V
△$V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-3.97	---	mV/℃
IDSS	Drain-Source Leakage Current	V_{DS}=24V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=24V , V_{GS}=0V , T_J=55℃	---	---	5	
IGSS	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=5V , I_D=30A	---	34	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	1.8	---	Ω
Q_g	Total Gate Charge (4.5V)	V_{DS}=15V , V_{GS}=4.5V , I_D=15A	---	9.8	---	nC
Q_{gs}	Gate-Source Charge		---	4.2	---	
Q_{gd}	Gate-Drain Charge		---	3.6	---	
Td(on)	Turn-On Delay Time	V_{DD}=15V , V_{GS}=10V R_G=3.3Ω I_D=15A	---	4	---	ns
T_r	Rise Time		---	8	---	
Td(off)	Turn-Off Delay Time		---	31	---	
T_f	Fall Time		---	4	---	
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1MHz	---	940	---	pF
Coss	Output Capacitance		---	131	---	
Crss	Reverse Transfer Capacitance		---	109	---	
I_S	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	43	A
ISM	Pulsed Source Current[2,5]		---	---	112	A
VSD	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1	V
t_{rr}	Reverse Recovery Time	IF=30A , dI/dt=100A/μs , T_J=25℃	---	8.5	---	nS
Q_{rr}	Reverse Recovery Charge		---	2.2	---	nC

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 VDD=25V,VGS=10V,L=0.1Mh,IAS=22A

4、The power dissipation is limited by 175℃ 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

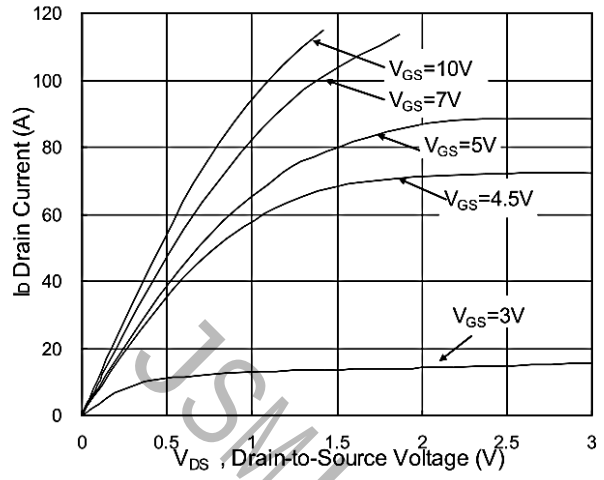


Fig.1 Typical Output Characteristics

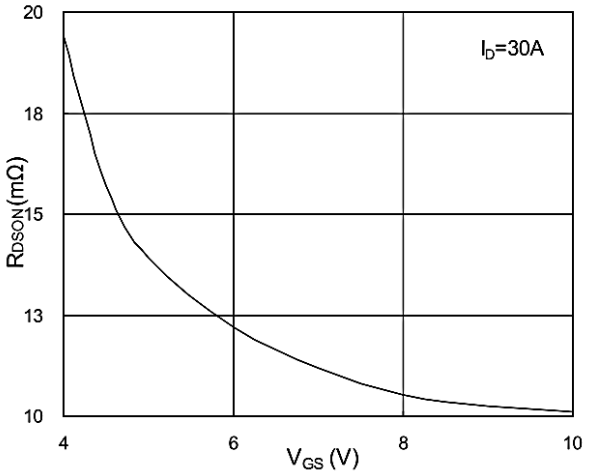


Fig.2 On-Resistance vs. G-S Voltage

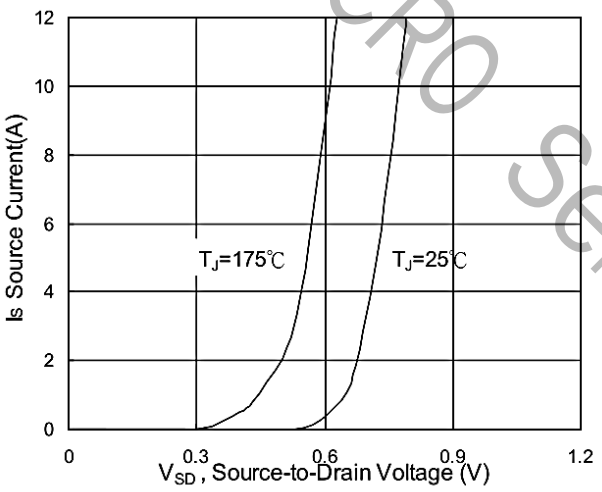


Fig.3 Forward Characteristics of Reverse

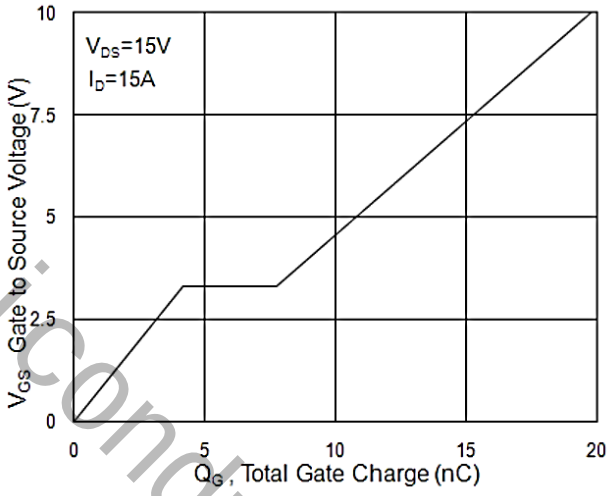


Fig.4 Gate-Charge Characteristics

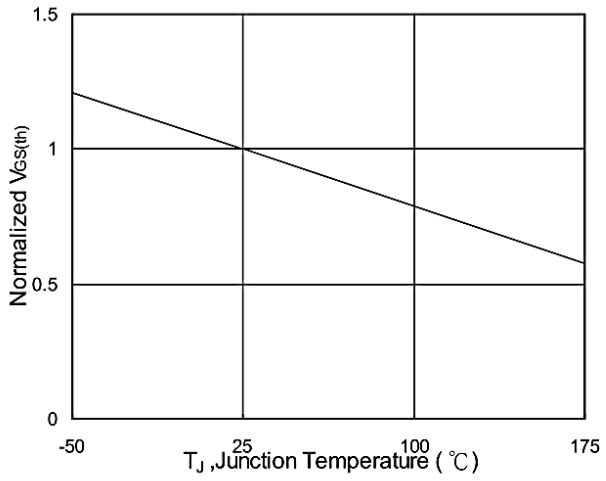


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

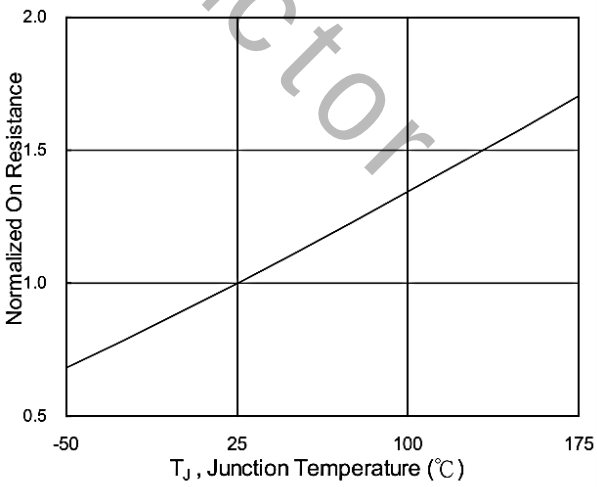


Fig.6 Normalized R_{DSON} vs. T_J

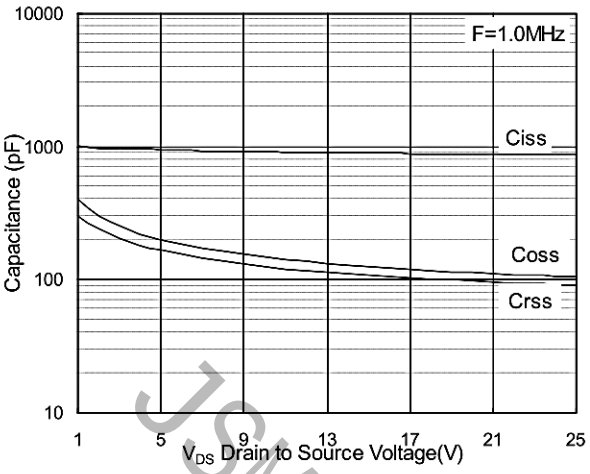


Fig.7 Capacitance

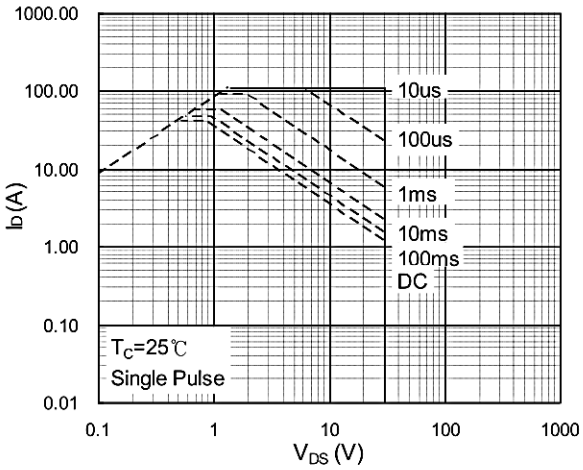


Fig.8 Safe Operating Area

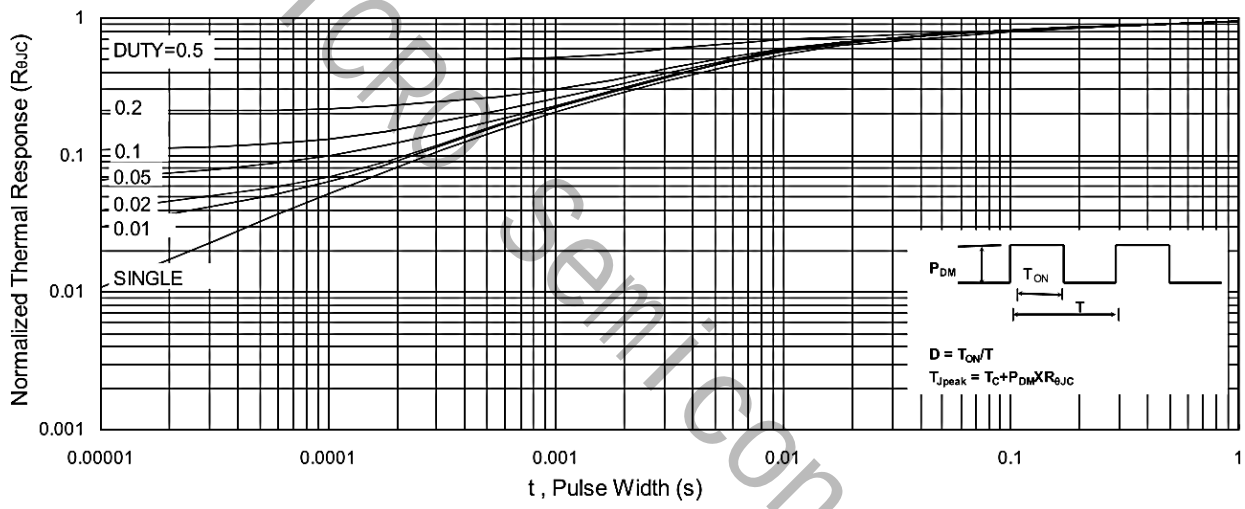


Fig.9 Normalized Maximum Transient Thermal Impedance

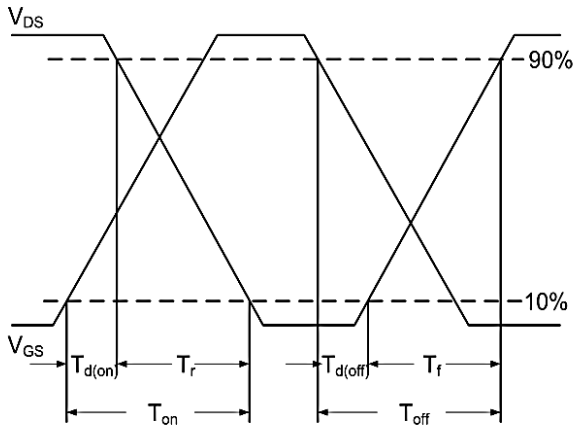


Fig.10 Switching Time Waveform

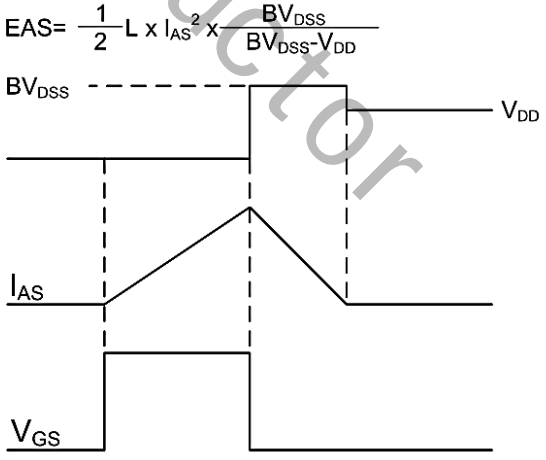


Fig.11 Unclamped Inductive Switching Waveform