40V N-Channel Enhancement Mode MOSFET

Description

The SX160N04T uses advanced 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} = 40V I_D =160A

$R_{DS(ON)}$ < 2.2mΩ @ V_{GS}=10V

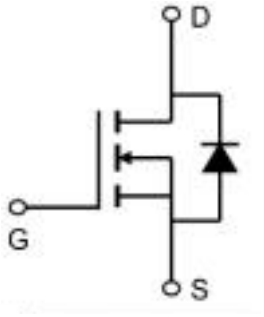
Application

BMS

BLDC

UPS

ble power supply



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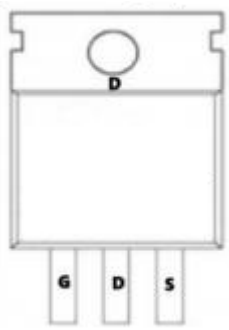


Absolute Maximum Ratings (T_C=25℃unless otherwise noted)

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	40	V
VGS	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1,6]	160	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1,6]	142	A
IDM	Pulsed Drain Current[2]	400	A
EAS	Single Pulse Avalanche Energy[3]	400	mJ
IAS	Avalanche Current	40	A
P_D@T_C=25℃	Total Power Dissipation[4]	178	W
TSTG	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
$R_{\theta}JA$	Thermal Resistance Junction-Ambient [1]	50	℃/W
$R_{\theta}JC$	Thermal Resistance Junction-Case[1]	0.7	℃/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	40	---	---	V
RDS(ON)	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=20A	---	1.6	2.2	mΩ
		V_{GS}=4.5V , I_D=20A	---	2.3	3.5	
VGS(th)	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.2	1.6	2.2	V
IDSS	Drain-Source Leakage Current	V_{DS}=32V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=32V , 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=20A	---	53	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	1.0	---	Ω
Q_g	Total Gate Charge (4.5V)	V_{DS}=15V , V_{GS}=10V , I_D=20A	---	45	---	nC
Qgs	Gate-Source Charge		---	12	---	
Qgd	Gate-Drain Charge		---	18.5	---	
Td(on)	Turn-On Delay Time	V_{DD}=15V , V_{GS}=10V , R_G=3.3Ω, I_D=20A	---	18.5	---	ns
T_r	Rise Time		---	9	---	
Td(off)	Turn-Off Delay Time		---	58.5	---	
T_f	Fall Time		---	32	---	
Ciss	Input Capacitance	V_{DS}=20V , V_{GS}=0V , f=1MHz	---	3972	---	pF
Coss	Output Capacitance		---	1119	---	
Crss	Reverse Transfer Capacitance		---	82	---	
I_S	Continuous Source Current[1,6]	V_G=V_D=0V , Force Current	---	---	150	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1.2	V

Note :

1、The data tested by surface mounted on a 1 inch 2 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 =25V,V GS =10V,L=0.5mH,I AS =40A

4、The power dissipation is limited by 150℃junction temperature

5、The data is theoretically the same as I D and I DM , in real applications , should be limited by total power dissipation.

6、Package limitation current is 180A

Typical Characteristics

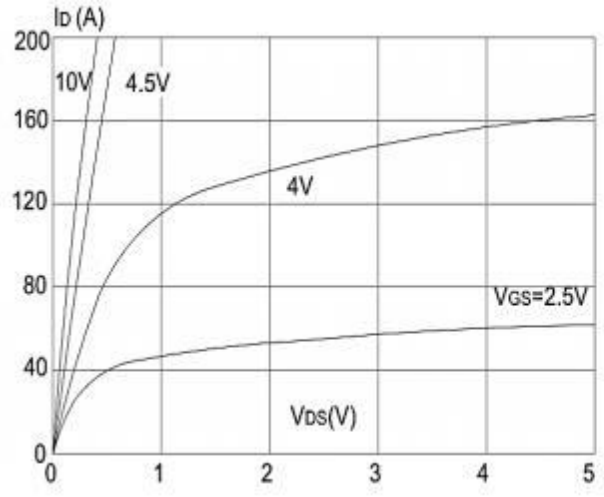


Figure1: Output Characteristics

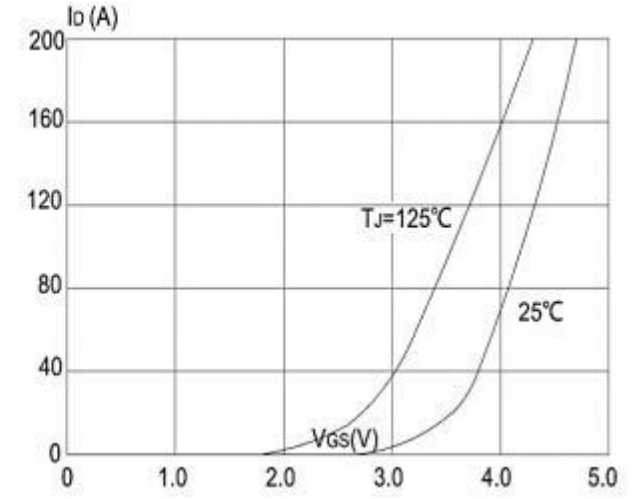


Figure 2: Typical Transfer Characteristics

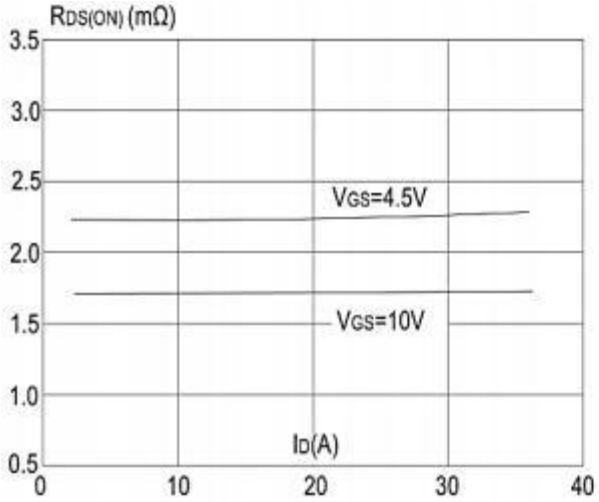


Figure 3:On-resistance vs. Drain Current

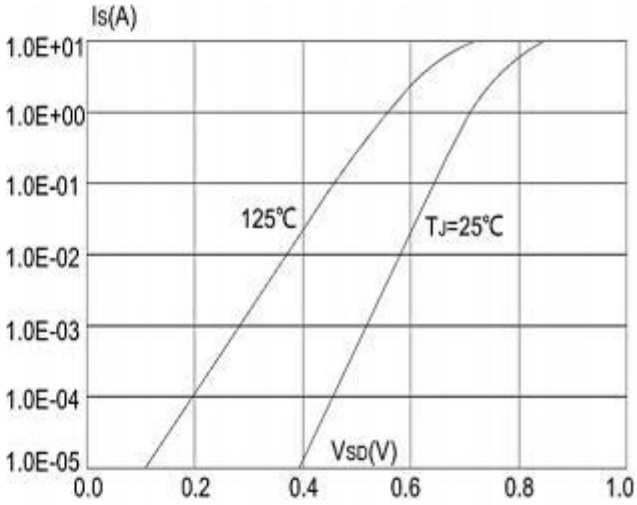


Figure 4: Body Diode Characteristics

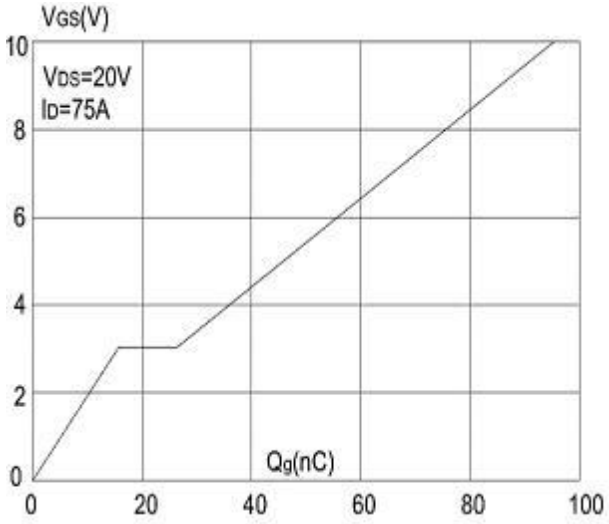


Figure 5: Gate Charge Characteristics

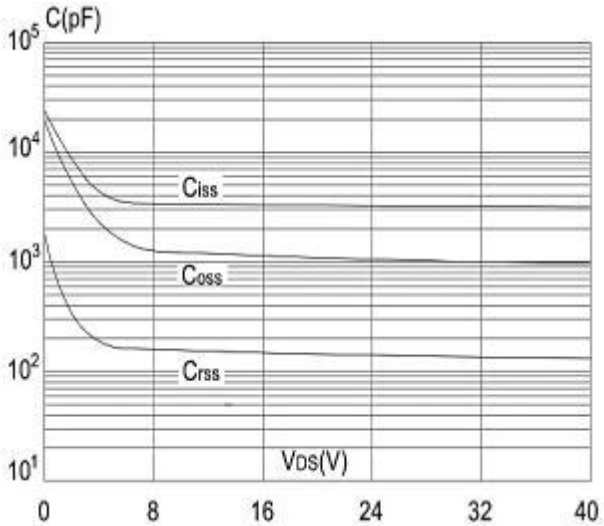


Figure 6: Capacitance Characteristics

Typical Characteristics

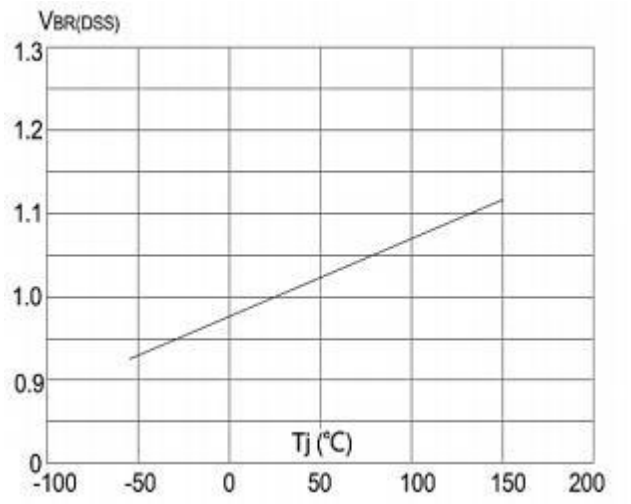


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

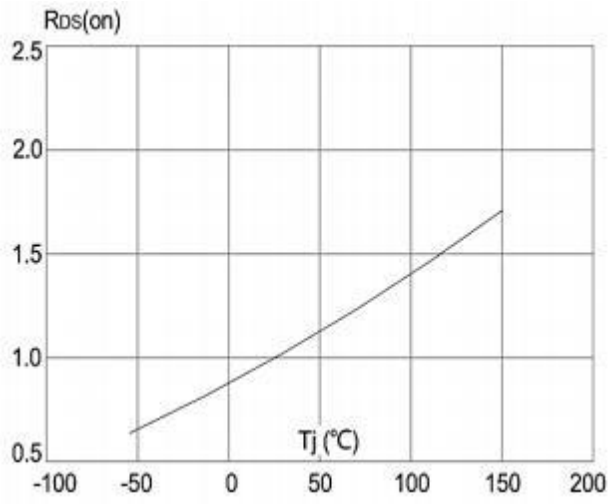


Figure 8: Normalized on Resistance vs Junction Temperature

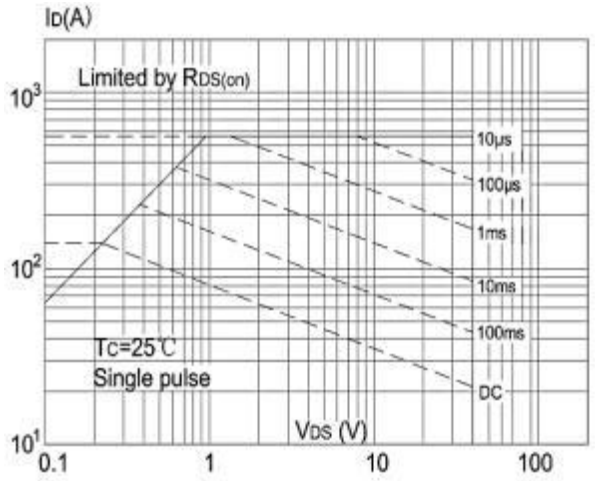


Figure 9: Maximum Safe Operating Area

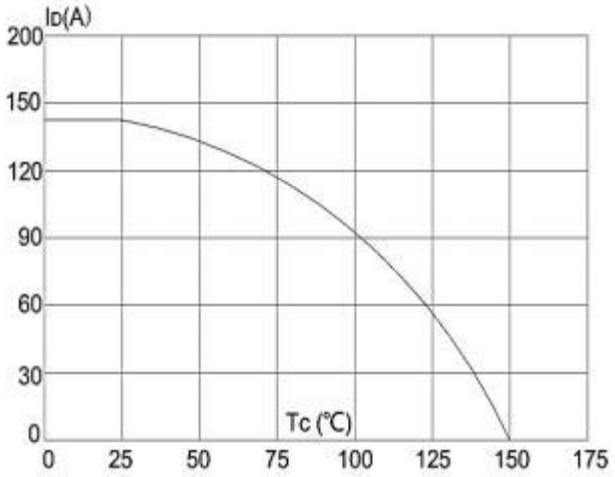


Figure 10: Maximum Continuous Drain Currentvs. Case Temperature

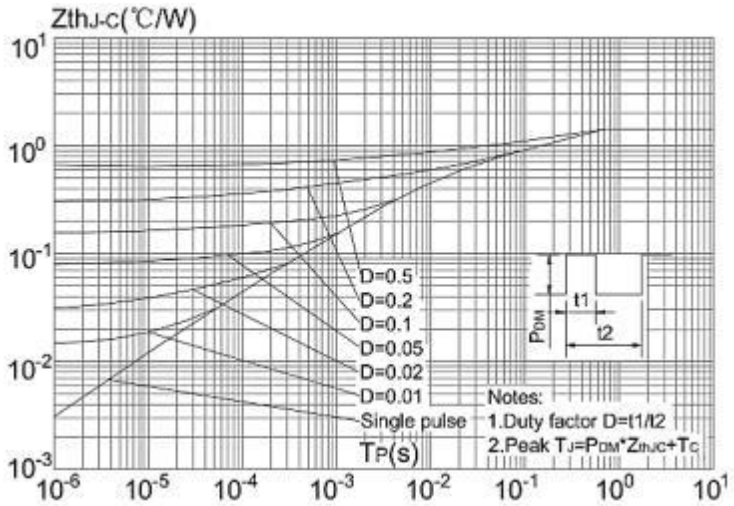
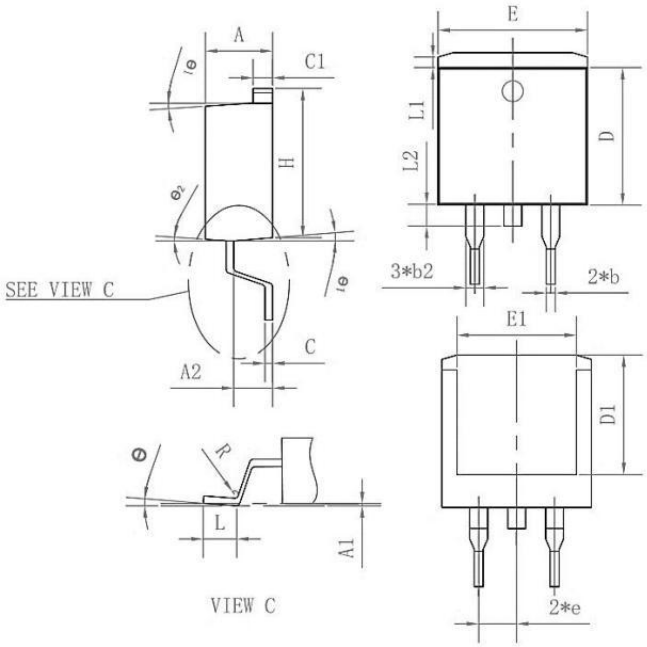


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Cas

MOSFET Package Mechanical Data-TO-263-3L



Symbol	Common		
	mm		
	Mim	Nom	Max
A	4.35	4.47	4.60
A1	0.09	0.10	0.11
A2	2.30	2.40	2.70
b	0.70	0.80	1.00
b2	1.25	1.36	1.50
C	0.45	0.50	0.65
C1	1.29	1.30	9.40
D	9.10	9.20	9.30
D1	7.90	8.00	8.10
E	9.85	10.00	10.20
E1	7.90	8.00	8.10
H	15.30	15.50	15.70
e	-	2.54	-
L	2.34	2.54	2.74
L1	1.00	1.10	1.20
L2	1.30	1.40	1.50
R	0.24	0.25	0.26
θ	0°	4°	8°
Θ1	4°	7°	10°
Θ2	0°	3°	6°

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
TAPING	TO-263-3L		800