

Description

The SX150N04T uses 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

$V_{DS} = 40V$ $I_D = 150A$

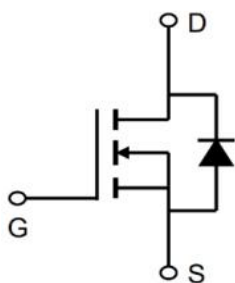
$R_{DS(ON)} < 2.9m\Omega$ @ $V_{GS}=10V$

Application

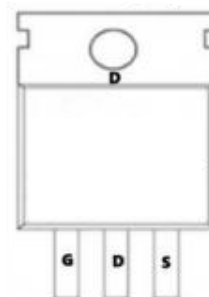
Battery protection

Load switch

Uninterruptible power supply



TO-263-3L



Absolute Maximum Ratings ($T_c=25^\circ C$ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_c=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	150	A
$I_D @ T_c=100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	102	A
I_{DM}	Pulsed Drain Current ²	576	A
EAS	Single Pulse Avalanche Energy ³	576	mJ
I_{AS}	Avalanche Current	40	A
$P_D @ T_c=25^\circ C$	Total Power Dissipation ⁴	57	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$
$R_{\theta JA}$	Thermal Resistance Junction-ambient (Steady State) ¹	62	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	1.3	$^\circ C/W$

Electrical Characteristics (T_J=25°C, unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
BVDSS	Drain-Source Breakdown Voltage	V _{GS} =0V ID=250μA	40	44		V
IDSS	Zero Gate Voltage Drain Current	V _{DS} =40V, V _{GS} =0V			1	μA
IGSS	Gate-Body Leakage Current	V _{GS} =±20V, V _{DS} =0V			±100	nA
VGS(th)	Gate Threshold Voltage	V _{DS} =V _{GS} , ID=250μA	1.0	1.8	2.5	V
gFS	Forward Transconductance	V _{DS} =5V, I _D =20A		38		S
RDS(ON)	Drain-Source On-State Resistance	V _{GS} =10V, I _D =20A		2.4	2.9	mΩ
		V _{GS} =4.5V, I _D =20A		3.5	4.5	mΩ
Ciss	Input Capacitance	V _{DS} =20V, V _{GS} =0V, f=1.0MHz		6460		pF
Coss	Output Capacitance			455		pF
Crss	Reverse Transfer Capacitance			276		pF
Rg	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1.0MHz		0.67		Ω
td(on)	Turn-on Delay Time	V _{GS} =10V, V _{DS} =20V, RL=1Ω, RGEN=3Ω		18		nS
tr	Turn-on Rise Time			4.4		nS
td(off)	Turn-Off Delay Time			67		nS
tr	Turn-Off Fall Time			9.5		nS
Qg	Total Gate Charge	V _{GS} =10V, V _{DS} =20V, I _D =20A		112		nC
Qgs	Gate-Source Charge			16.7		nC
Qgd	Gate-Drain Charge			26.5		nC
ISD	Source-Drain Current (Body Diode)				144	A
VSD	Forward on Voltage (Note 3)	V _{GS} =0V, I _S =20A			1.2	V
trr	Reverse Recovery Time	I _F =20A, dI/dt=500A/ s		6		ns
Qrr	Reverse Recovery Charge	I _F =20A, dI/dt=500A/ s		14		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 V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=20A
- 4、 The power dissipation is limited by 150°C 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.

Typical Characteristics

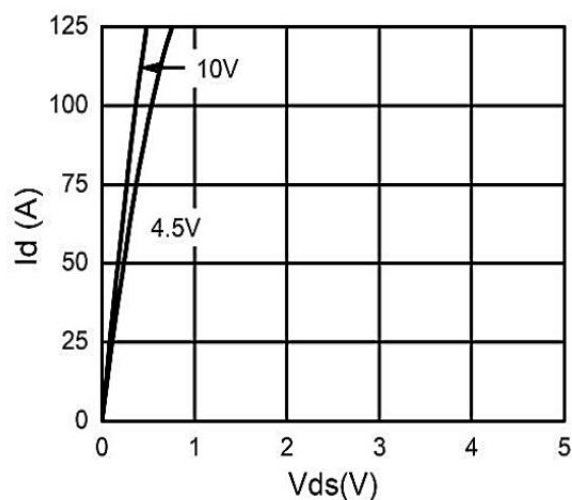


Figure 1. Output Characteristics

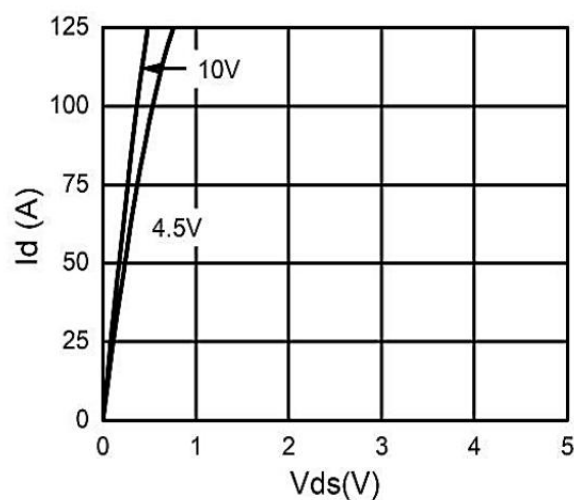


Figure 2. Transfer Characteristics

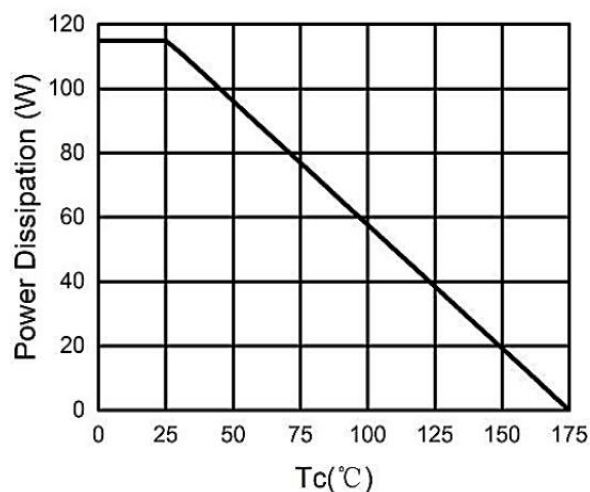


Figure 3. Power Dissipation

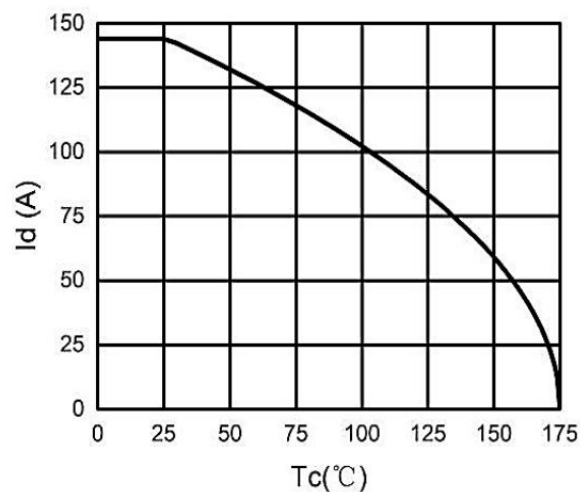


Figure 4. Drain Current

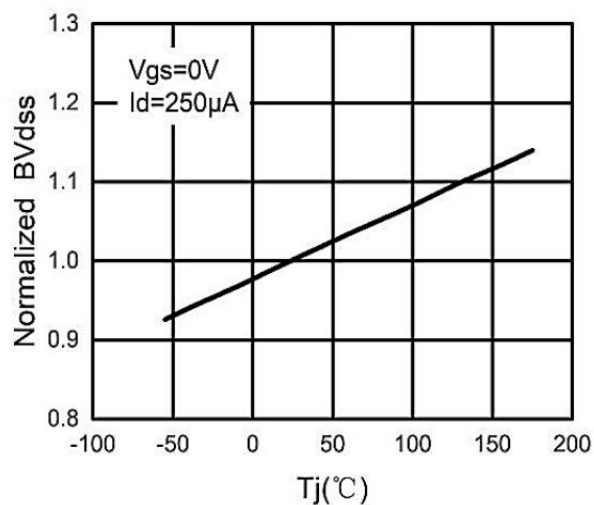


Figure 5. BV_{DSS} vs Junction Temperature

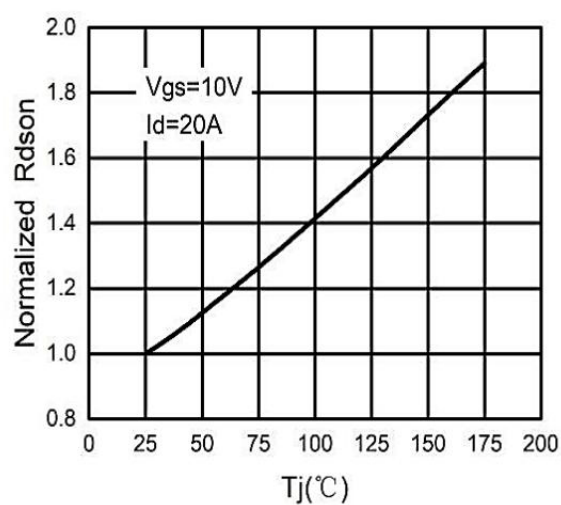


Figure 6. $R_{DS(ON)}$ vs Junction Temperature

Typical Characteristics

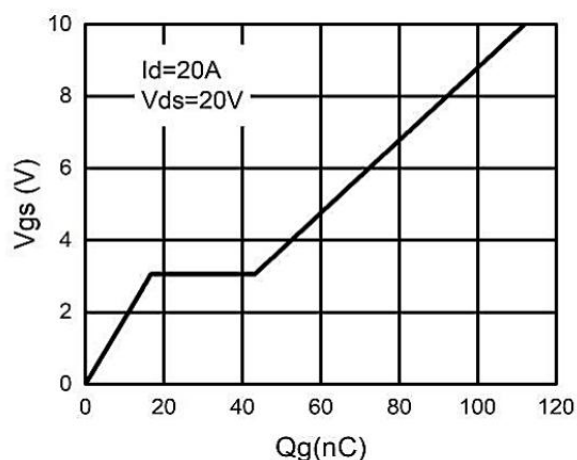


Figure 7. Gate Charge Waveforms

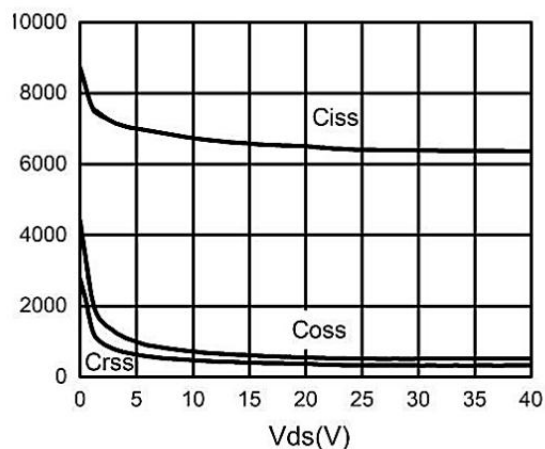


Figure 8. Capacitance

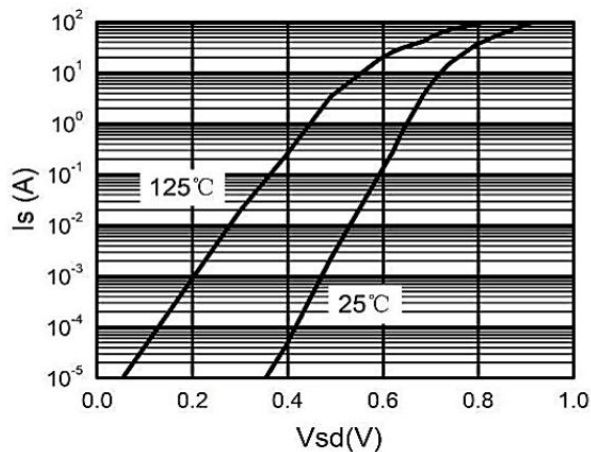


Figure 9. Body-Diode Characteristics

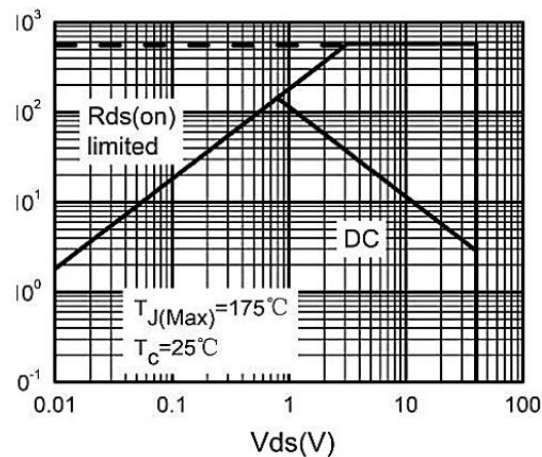


Figure 10. Maximum Safe Operating Area

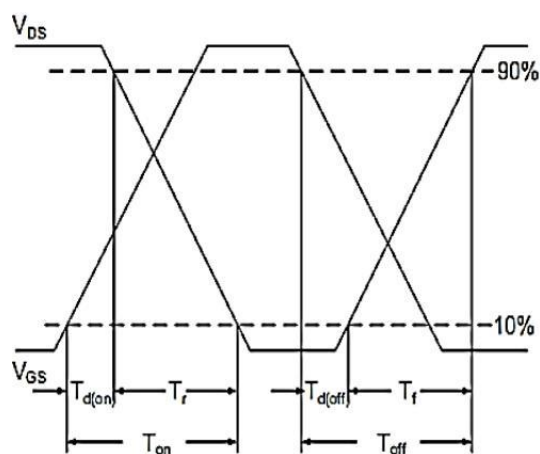


Figure 11. Switching Time Waveform

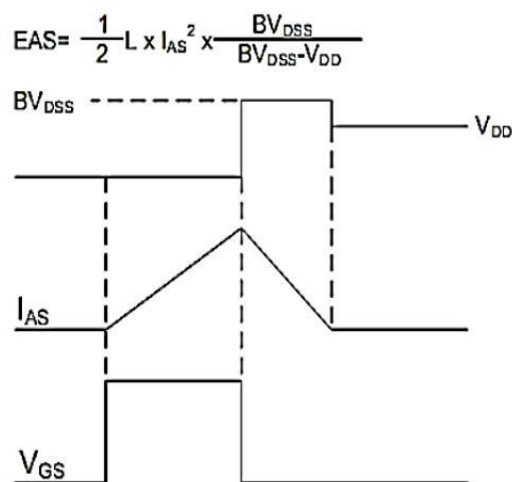
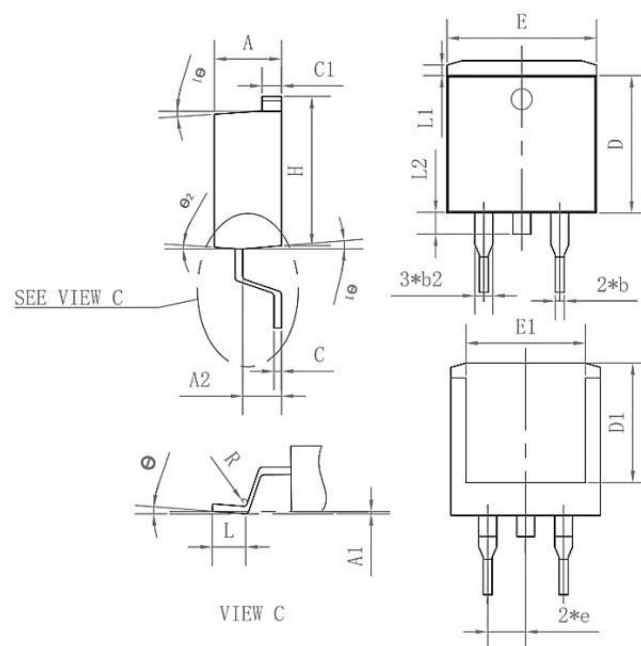


Figure 12. Unclamped Inductive Switching wave

$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$

Package Mechanical Data-TO-263-3L-SLK


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