Description

The SX15G10GD 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} =100V I_D =17.8A

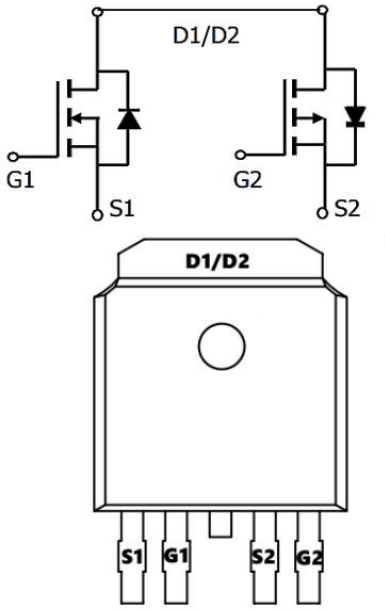
$R_{DS(ON)}$ < 120mΩ @ V_{GS}=10V

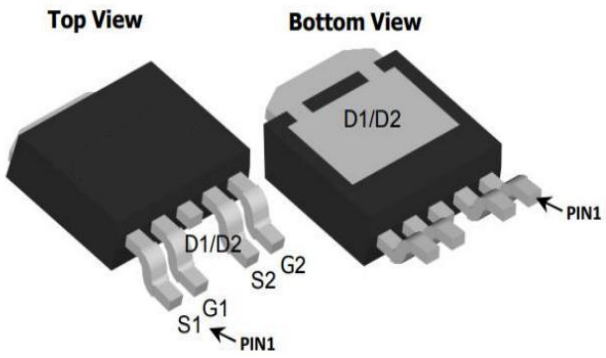
V_{DS} = -100V I_D =-12.8A

$R_{DS(ON)}$ < 290mΩ @ V_{GS}=-10V

Application

BLDC





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

Symbol	Parameter	N-Ch	P-Ch	Units
V_{DS}	Drain-Source Voltage	100	-100	V
V_{GS}	Gate-Source Voltage	±20	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	17.8	12.8	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	8.9	-7.5	A
I_{DM}	Pulsed Drain Current[2]	52.5	-38.4	A
EAS	Single Pulse Avalanche Energy[3]	28	18	mJ
I_{AS}	Avalanche Current	7	6	A
P_D@T_C=25℃	Total Power Dissipation[4]	23	21.3	W
T_{STG}	Storage Temperature Range	-55 to 150		℃
T_J	Operating Junction Temperature Range	-55 to 150		℃
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	62.5		℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	5.4		℃/W

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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
V(BR)DSS	Drain-Source Breakdown Voltage	VGS=0V, ID=250μA	100	113	-	V
IDSS	Zero Gate Voltage Drain Current	VDS=100V, VGS=0V,	-	-	1.0	μA
IGSS	Gate to Body Leakage Current	VDS=0V, VGS=±20V	-	-	±100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS, ID=250μA	1.2	2.0	2.5	V
RDS(on)	Static Drain-Source on-Resistance note3	VGS=10V, ID=5A	-	85	120	mΩ
		VGS=4.5V, ID=3A	-	95	150	mΩ
g fs	Forward Transconductance	V DS =5V , I D =5A		14		S
RG	Gate Resistance	VDS = 0V, VGS =0V,f =1MHz		3		Ω
Ciss	Input Capacitance	VDS=15V, VGS=0V, f=1.0MHz	-	1100	-	pF
Coss	Output Capacitance		-	55	-	pF
Crss	Reverse Transfer Capacitance		-	40	-	pF
Qg	Total Gate Charge	VDS=50V, ID=5A, VGS=10V	-	11.9	-	nC
Qgs	Gate-Source Charge		-	2.8	-	nC
Qgd	Gate-Drain("Miller") Charge		-	1.7	-	nC
td(on)	Turn-on Delay Time	VDS=30V, ID=5A, RG=1.8Ω, VGS=10V	-	3.8	-	ns
tr	Turn-on Rise Time		-	25.8	-	ns
td(off)	Turn-off Delay Time		-	16	-	ns
tf	Turn-off Fall Time		-	8.8	-	ns
IS	Continuous Source Current1,5	VG=VD=0V , Force Current	-	-	14.6	A
ISM	Pulsed Source Current2,5		-	-	25	A
VSD	Diode Forward Voltage2	VGS=0V, IS=10A	-	-	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 power dissipation is limited by 150℃ junction temperature

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

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

Symbol	Parameter	Test Condition	Min.	Typ	Max.	Units
BVDSS	Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = -250μA	-100	-117	-	V
IDSS	Zero Gate Voltage Drain Current	V_{DS} = -100V, V_{GS} = 0V	-	-	1	μA
IGSS	Gate to Body Leakage Current	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
VGS(th)	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = -250μA	-1.2	-1.85	-2.5	V
RDS(on)	Static Drain-Source On-Resistance note1	V_{GS} = -10V, I_D = -5A	-	235	290	mΩ
		V_{GS} = -4.5V, I_D = -3A	-	260	340	
Ciss	Input Capacitance	V_{DS} = -50V, V_{GS} = 0V, f = 1.0MHz	-	760	-	pF
Coss	Output Capacitance		-	25	-	pF
Crss	Reverse Transfer Capacitance		-	12	-	pF
Q_g	Total Gate Charge	V_{DD} = -50V, I_D = -5A, V_{GS} = -10V	-	11.5	-	nC
Q_{gs}	Gate-Source Charge		-	1.3	-	nC
Q_{gd}	Gate-Drain(“Miller”) Charge		-	2.9	-	nC
td(on)	Turn-On Delay Time	V_{DS} = -50V, I_D = -5A R_G=4.5Ω, R_L=25Ω V_{GEN} = - 10 V	-	12	-	ns
t_r	Turn-On Rise Time		-	5	-	ns
td(off)	Turn-Off Delay Time		-	35	-	ns
t_f	Turn-Off Fall Time		-	20	-	ns
IS	Maximum Continuous Drain to Source Diode Forward Current		-	-	-12.8	A
VSD	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_S =-1A	-	-	-1.3	V
t_{rr}	Reverse Recovery Time	V_{GS} = 0V, I_{sd}= -3A, di/dt =100A/μs	-	25	-	nS
Q_{rr}	Reverse Recovery Charge		-	20	-	nC

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 .The EAS data shows Max. rating .

3、The power dissipation is limited by 175℃ junction temperature

4、EAS condition: TJ=25℃, VDD= -24V, VG= -10V, RG=7Ω, L=0.1mH, IAS= -29.5A

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

N-Typical Characteristics

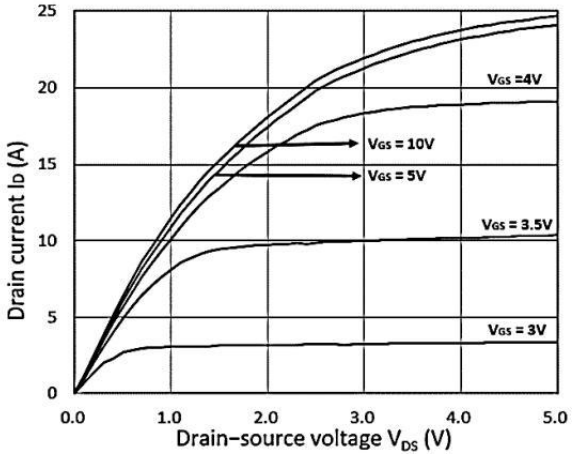


Figure 1. Output Characteristics

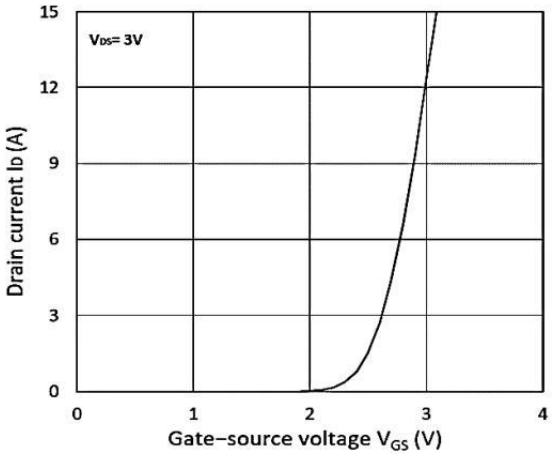


Figure 2. Transfer Characteristics

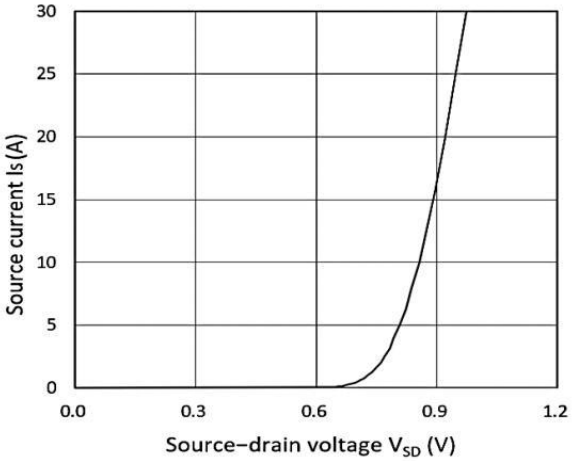


Figure 3. Forward Characteristics of Reverse

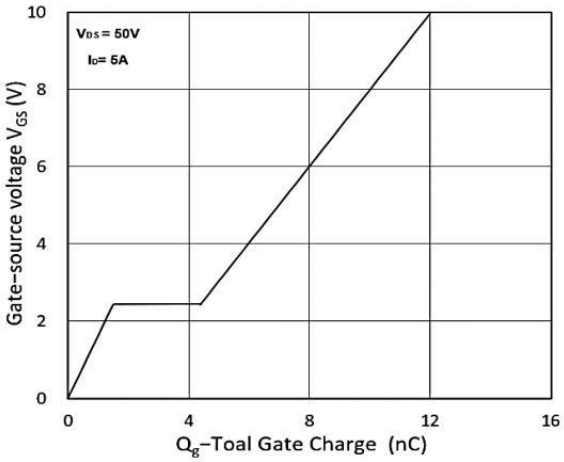


Figure 4. Gate Charge Characteristics

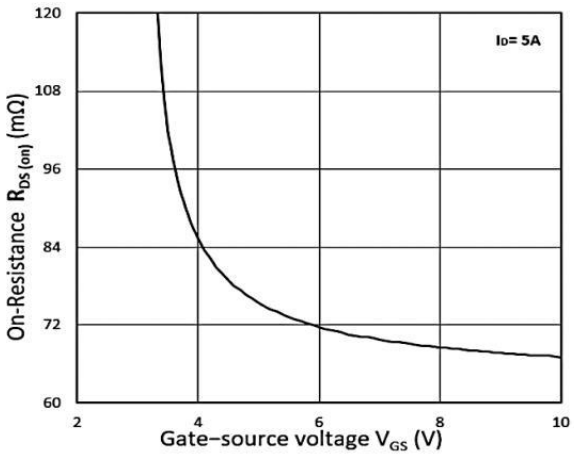


Figure 5. R DS(on) vs. V GS

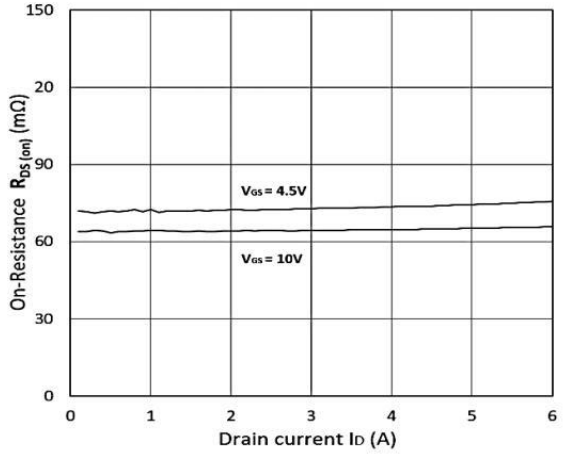


Figure 6. R DS(on) vs. ID

N-Typical Characteristics

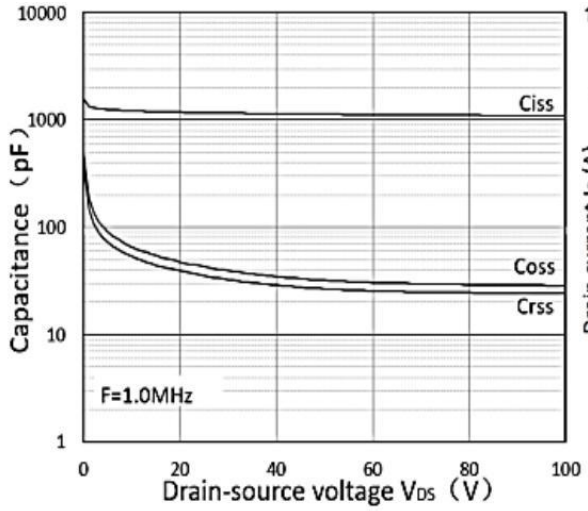


Figure 7. Capacitance Characteristics

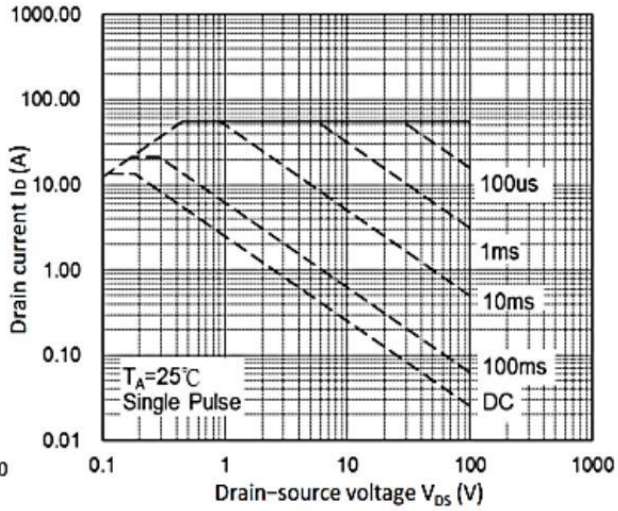


Figure 8. Safe Operating Area

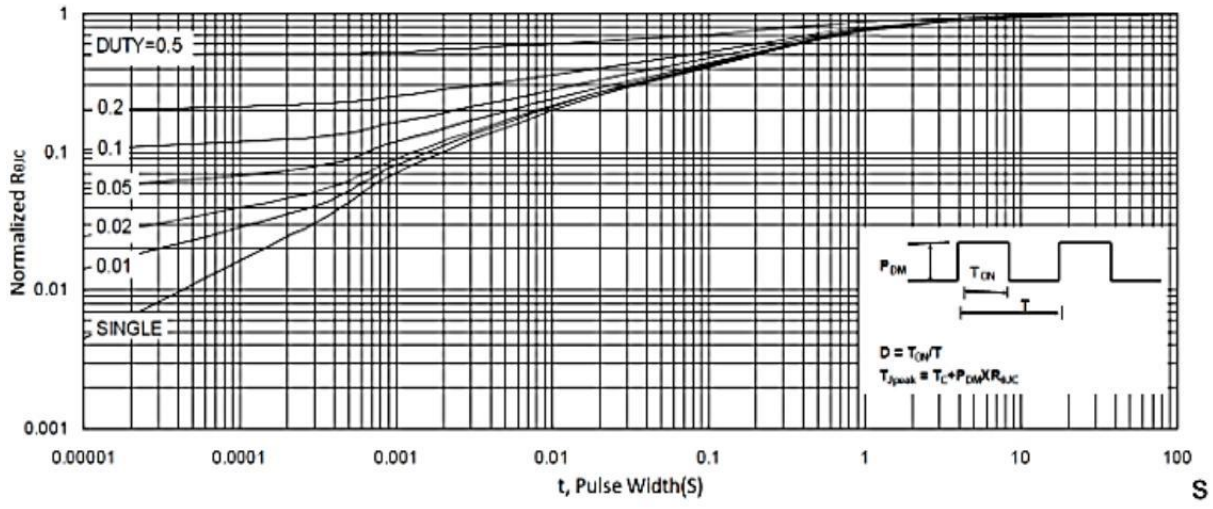


Figure 9. Normalized Maximum Transient Thermal Impedance

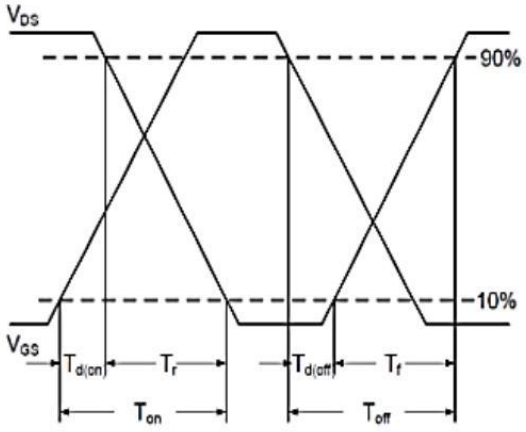


Figure 10. Switching Time Waveform

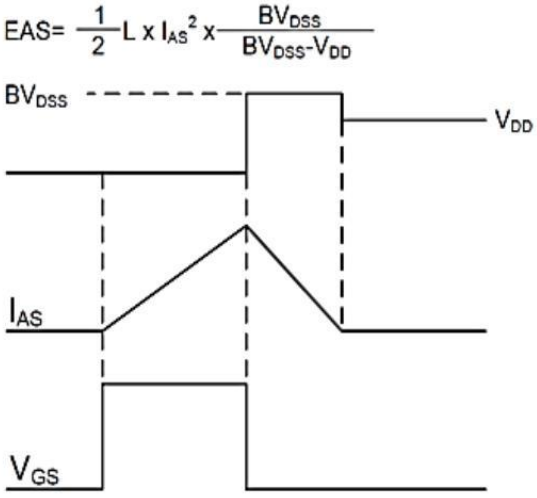


Figure 11. Unclamped Inductive Switching Waveform

P-Typical Characteristics

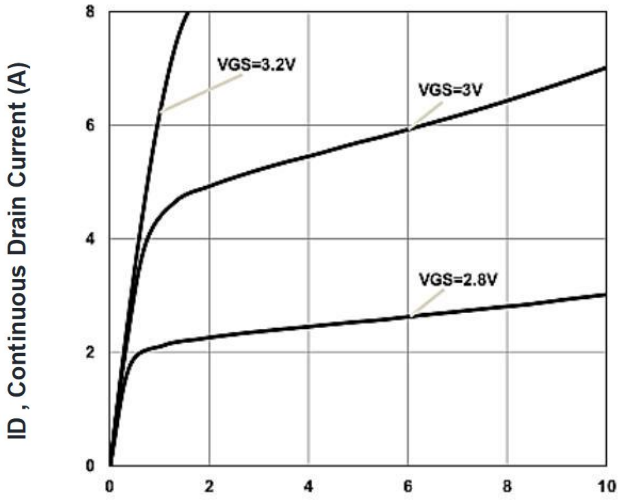


Figure 1. Typical Output Characteristics

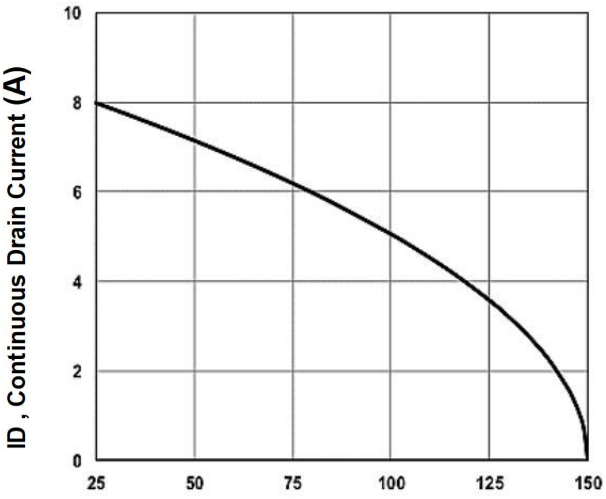


Figure 2. Continuous Drain Current vs. TC

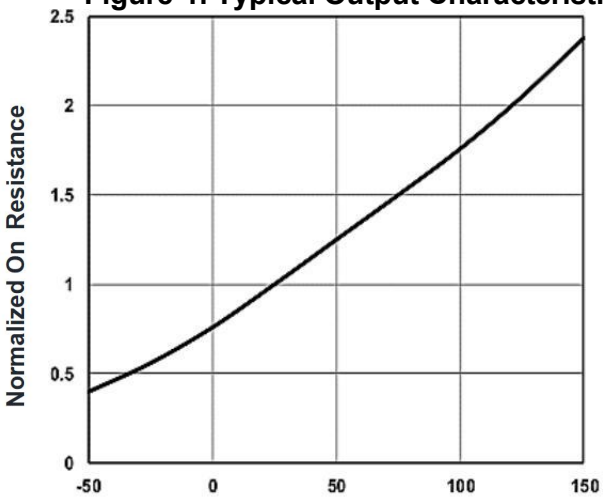


Figure 3.Normalized RDSON vs. TJ

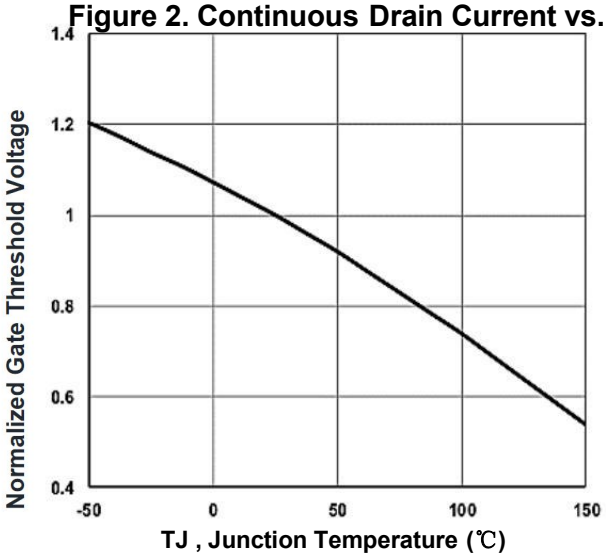


Figure 5.Normalized V th vs. T

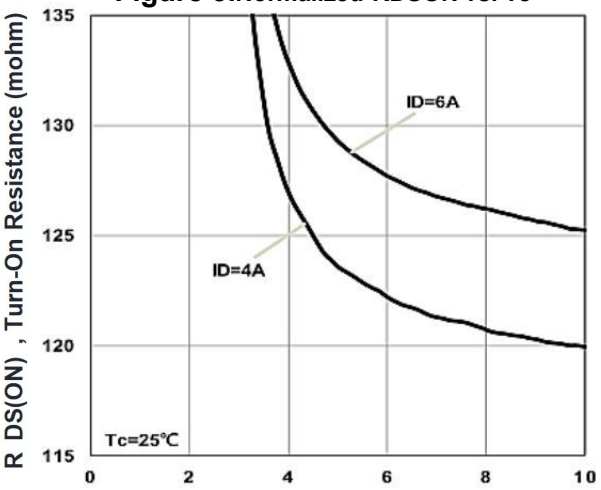


Figure 6. Turn-On Resistance vs. VGS

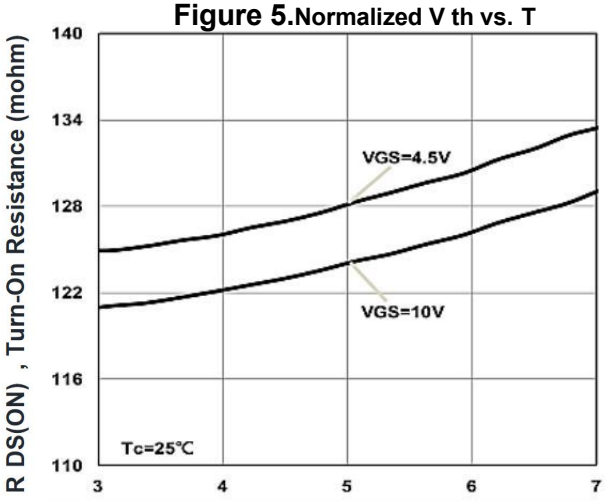


Figure 7.Turn-On Resistance vs. I D

P-Typical Characteristics

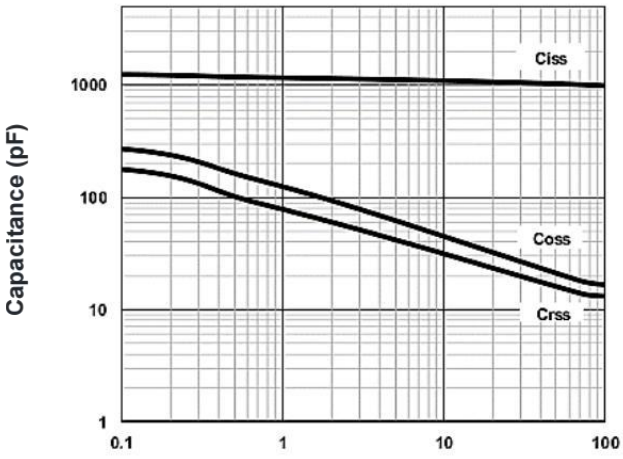


Figure 8. Capacitance Characteristics

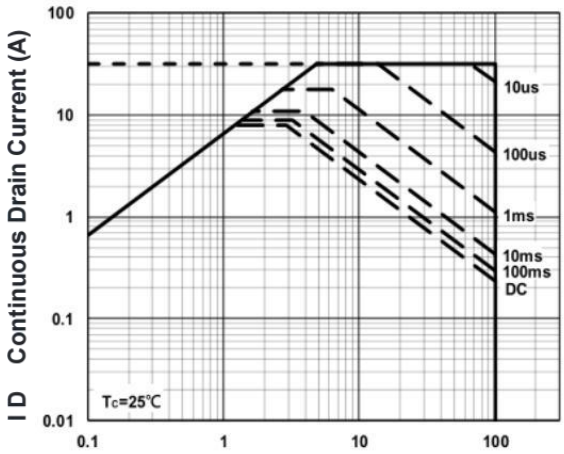


Figure 9. Maximum Safe Operation Area

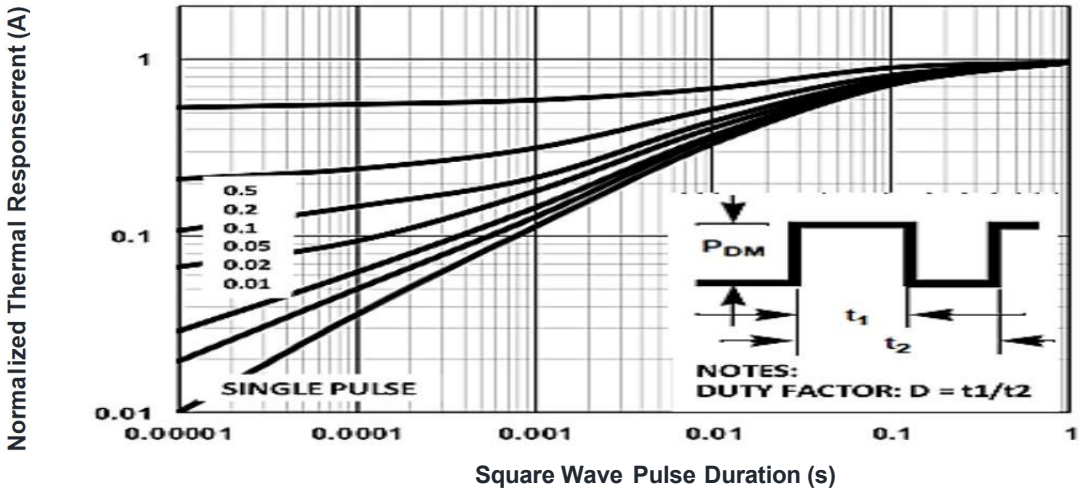


Figure 10. Normalized Transient Impedance

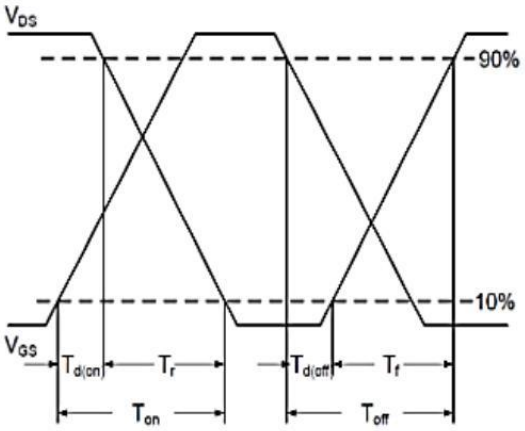


Figure 10. Switching Time Waveform

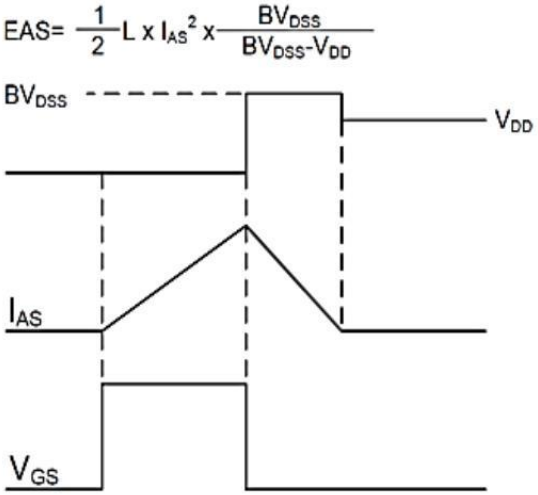
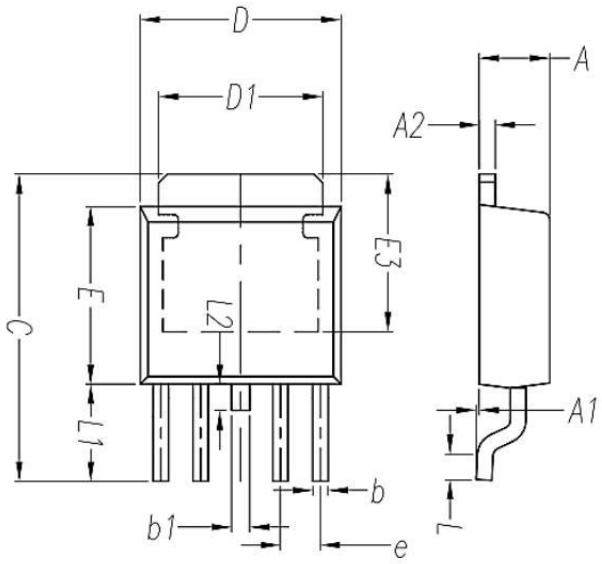


Figure 11. Unclamped Inductive Switching Waveform

Package Mechanical Data-TO-252-4L-Duble-DX



Symbol	Common		
	mm		
	Mim	Nom	Max
D	6.30	6.55	6.80
D1	4.80	5.35	5.90
C	9.70	10.00	10.30
E	5.90	6.10	6.30
E3	4.50	5.15	5.80
L	0.90	1.35	1.80
L1	2.60	2.85	3.05
L2	0.50	0.85	1.20
b	0.30	0.50	0.70
b1	0.40	0.60	0.80
A	2.10	2.30	2.50
A2	0.40	0.53	0.65
A1	0.00	0.10	0.20
e	1.17	1.27	1.37

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
TAPING	TO-252-4L		2500