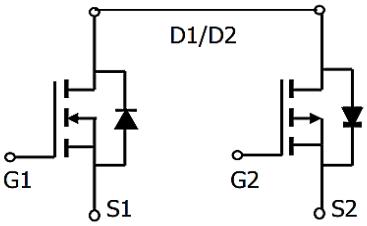
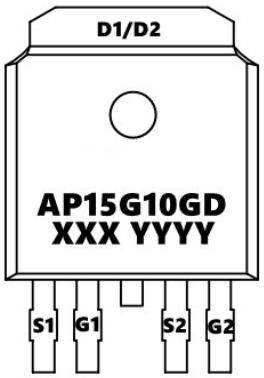
AP15G10GD

100V N+P-Channel Enhancement Mode MOSFET

Description

The AP15G10GD 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

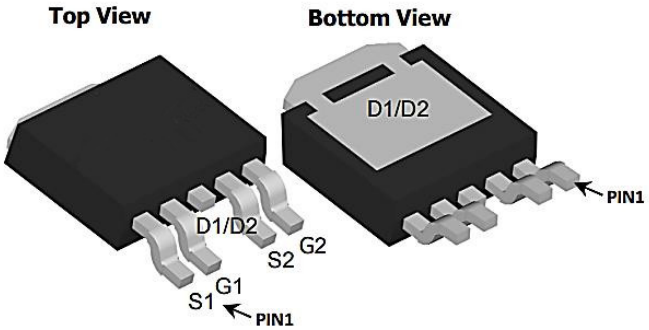
$R_{DS(ON)}$ < 120mΩ @ V_{GS}=10V （**Type：85mΩ**）

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

$R_{DS(ON)}$ < 290mΩ @ V_{GS}=-10V （**Type：235mΩ**）

Application

BLDC



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP15G10GD	TO-252-4L	AP15G10GD XXX YYYY	2500

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	-	250	300	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

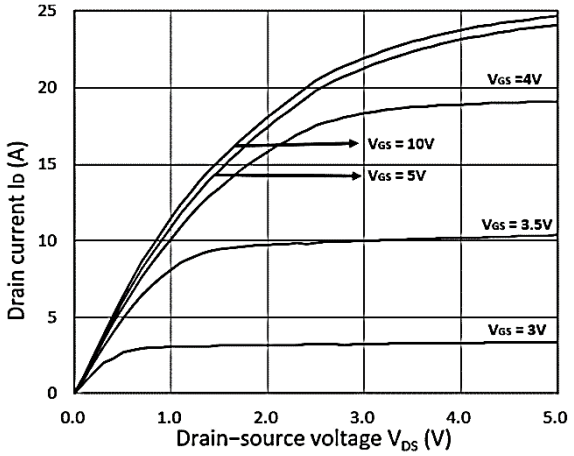


Figure 1. Output Characteristics

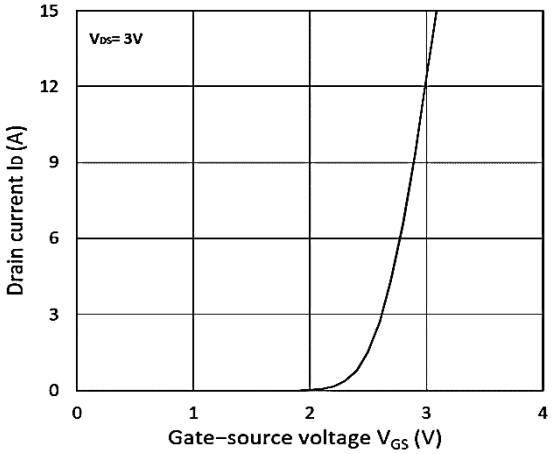


Figure 2. Transfer Characteristics

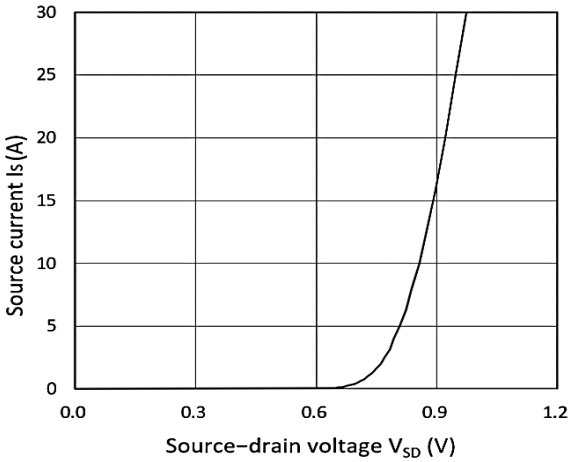


Figure 3. Forward Characteristics of Reverse

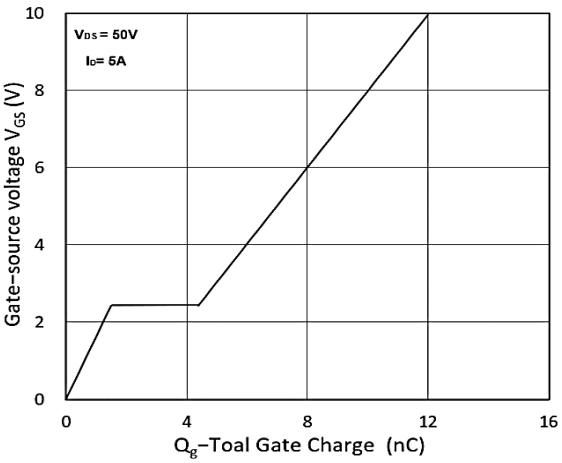


Figure 4. Gate Charge Characteristics

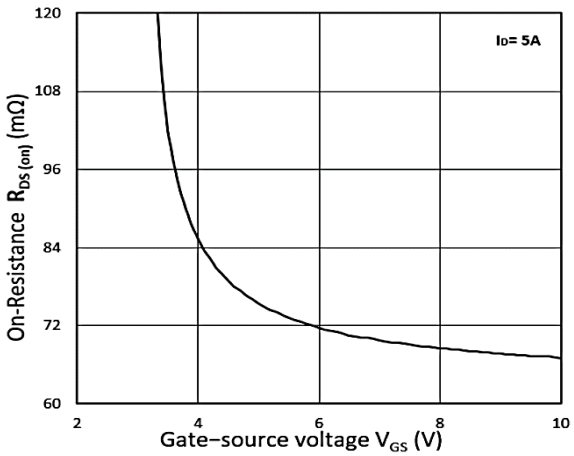


Figure 5. R DS(on) vs. V GS

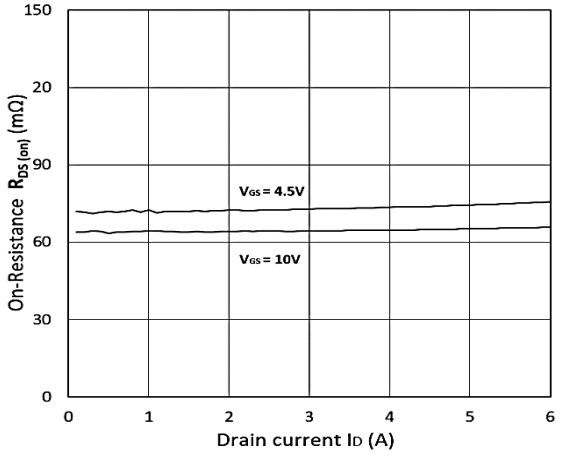


Figure 6. R DS(on) vs. ID

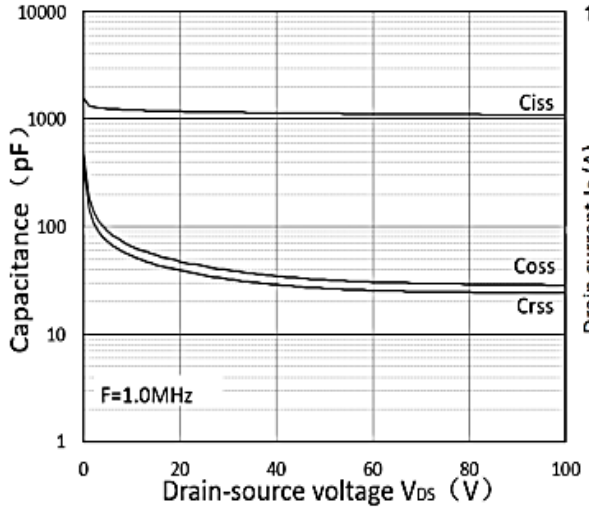


Figure 7. Capacitance Characteristics

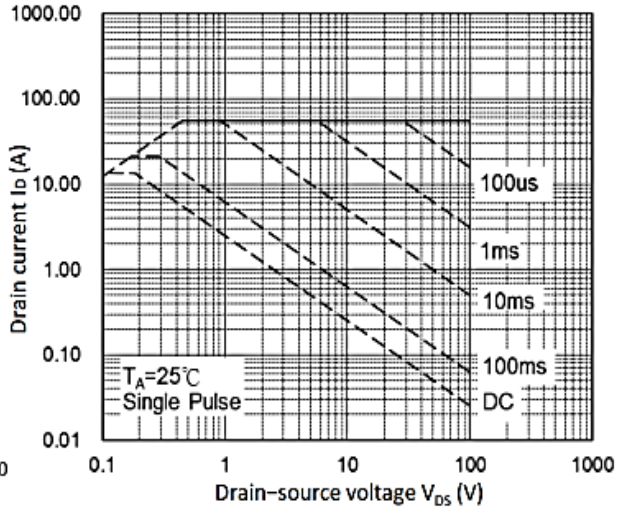


Figure 8. Safe Operating Area

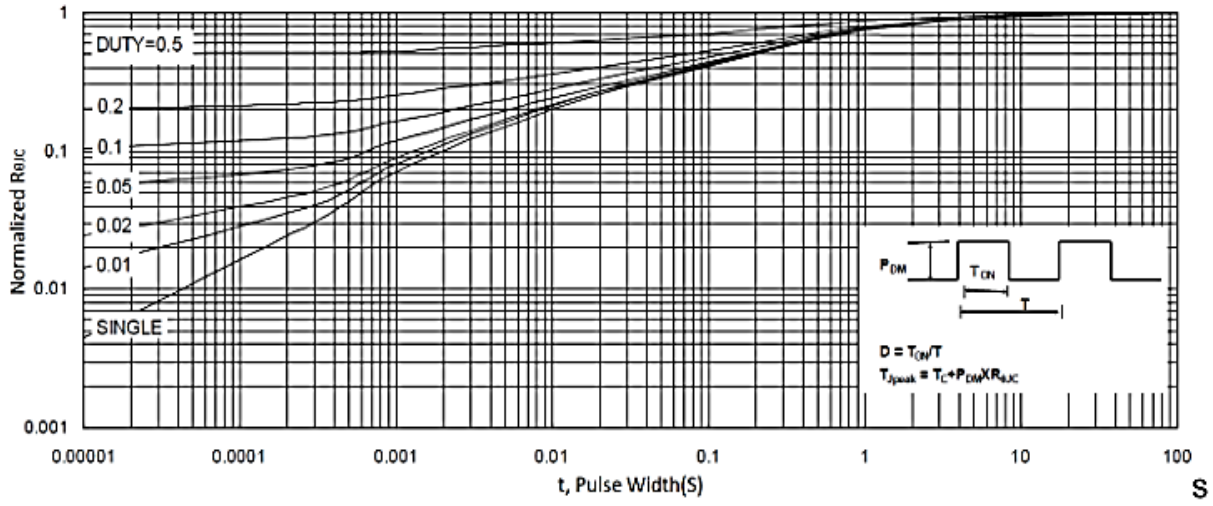


Figure 9. Normalized Maximum Transient Thermal Impedance

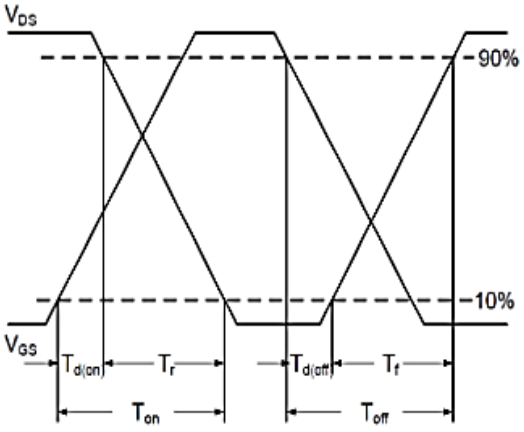


Figure 10. Switching Time Waveform

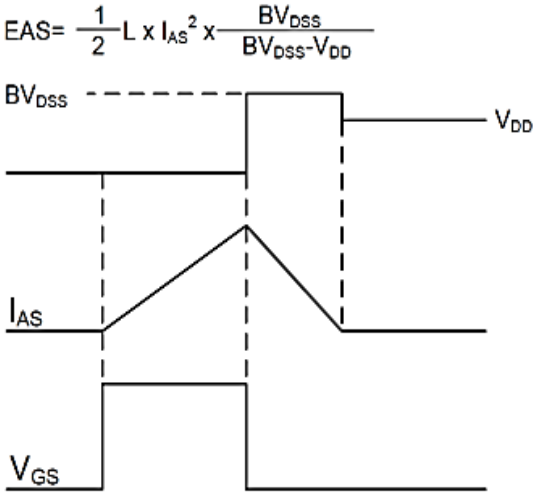


Figure 11. Unclamped Inductive Switching Waveform

P-Typical Characteristics

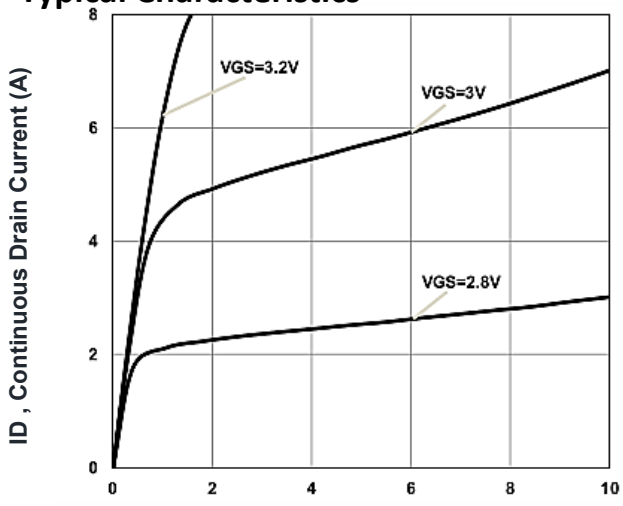


Figure 1. Typical Output Characteristics

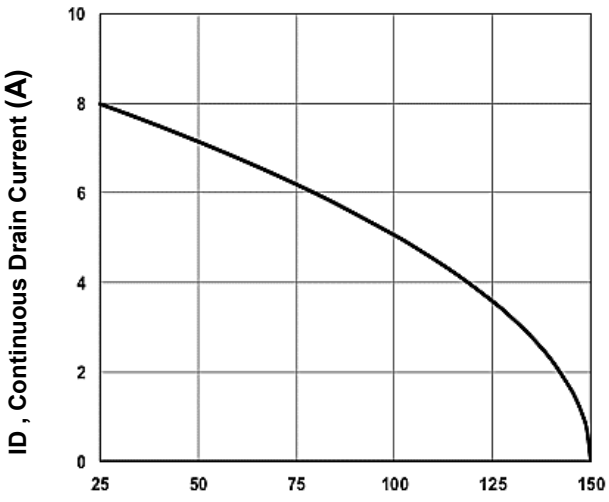


Figure 2. Continuous Drain Current vs. TC

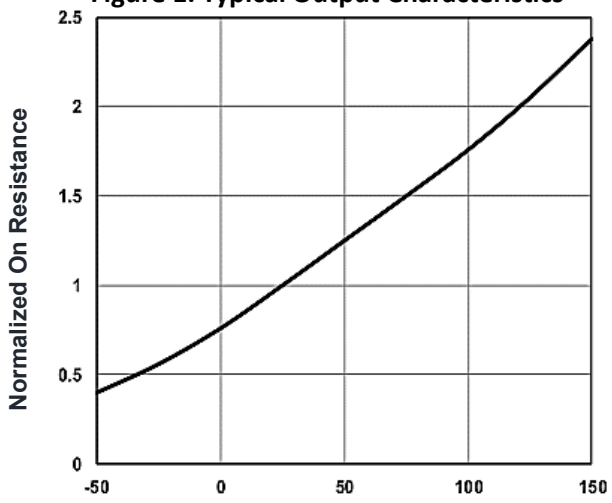


Figure 3.Normalized RDSON vs. TJ

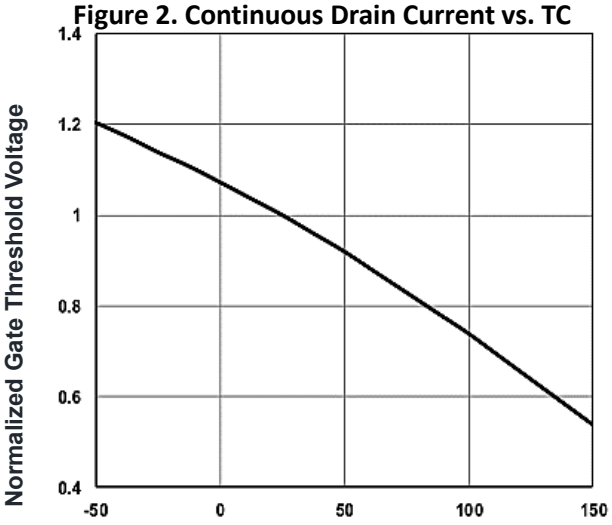


Figure 5.Normalized V th vs. T

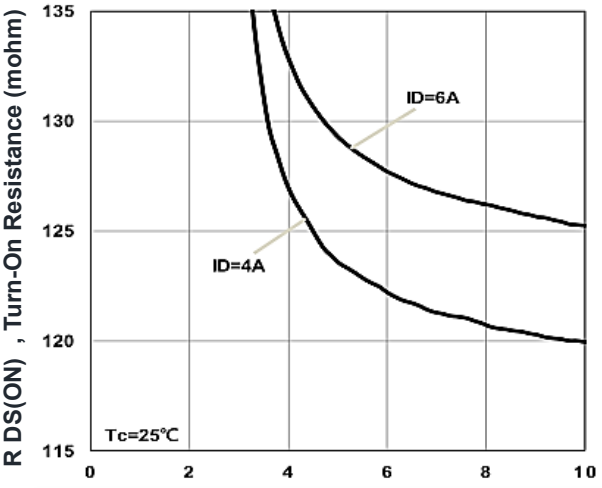


Figure 6. Turn-On Resistance vs. VGS

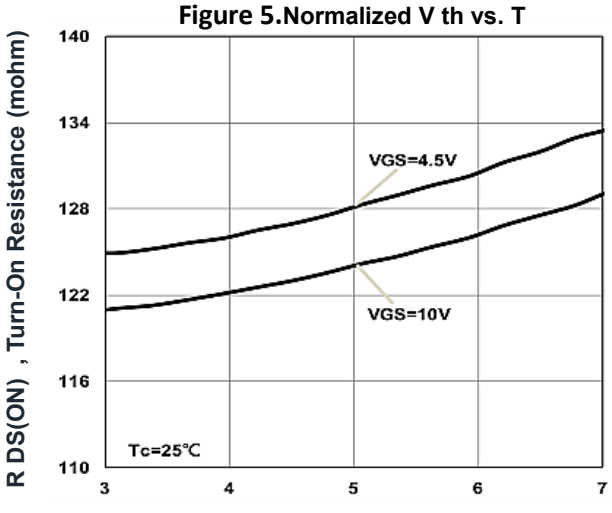


Figure 7.Turn-On Resistance vs. I D

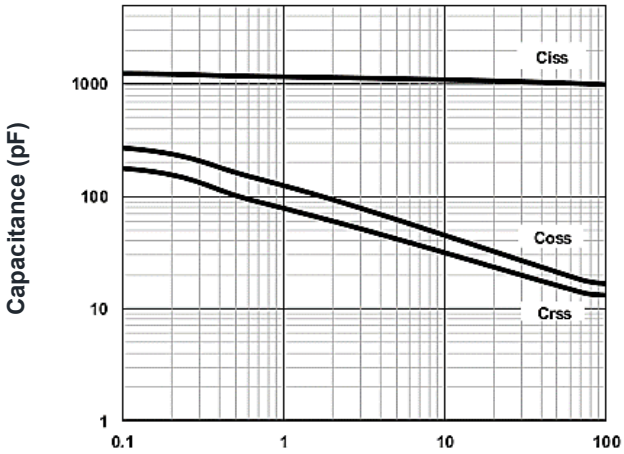


Figure 8.Capacitance Characteristics

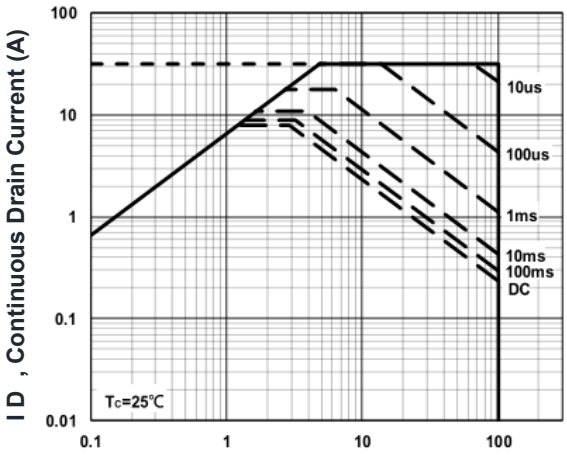


Figure 9.Maximum Safe Operation Area

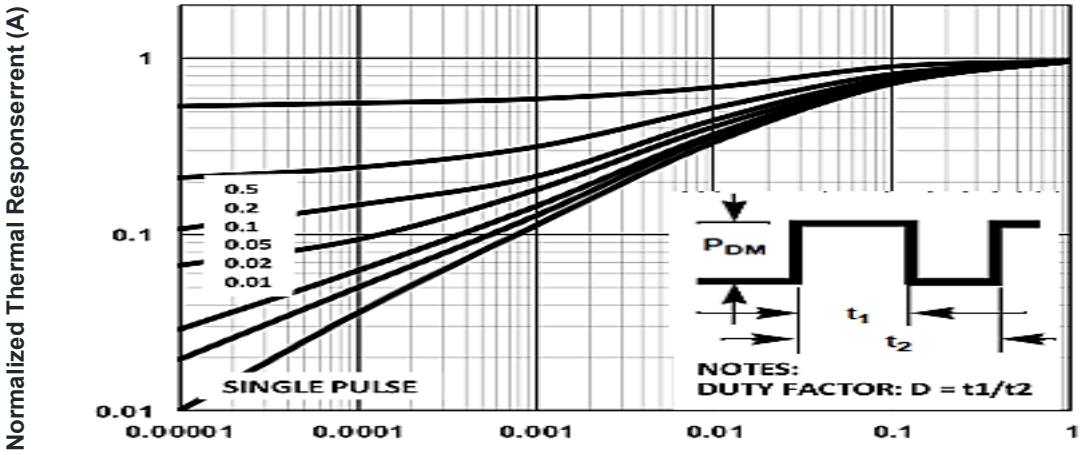


Figure 10.Normalized Transient Impedance

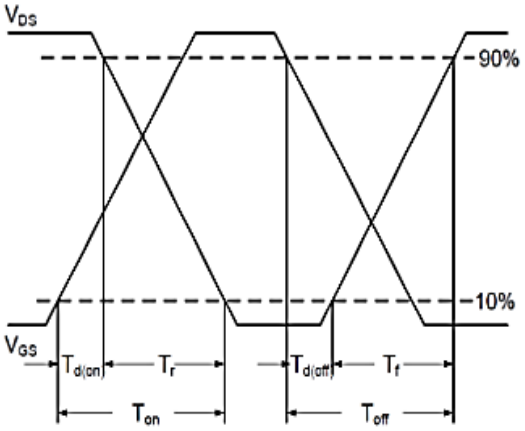


Figure 10. Switching Time Waveform

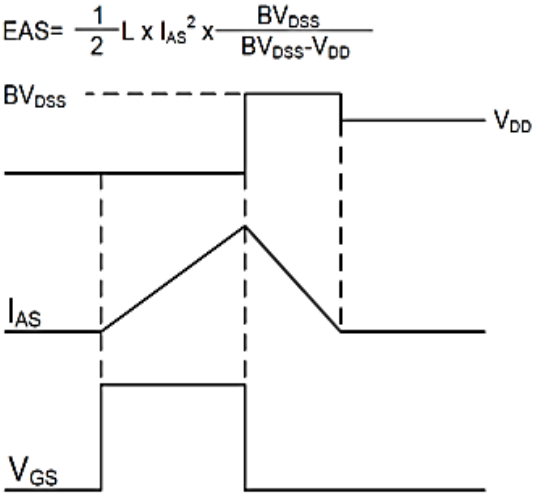
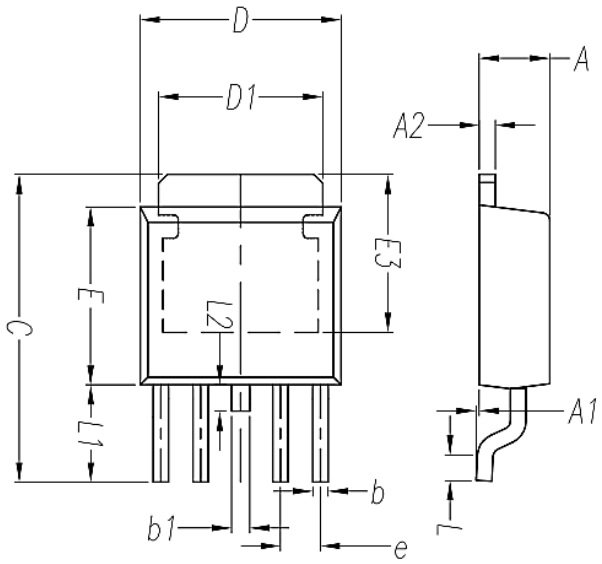


Figure 11. Unclamped Inductive Switching Waveform

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