AUK Semiconductor

SMK1625F

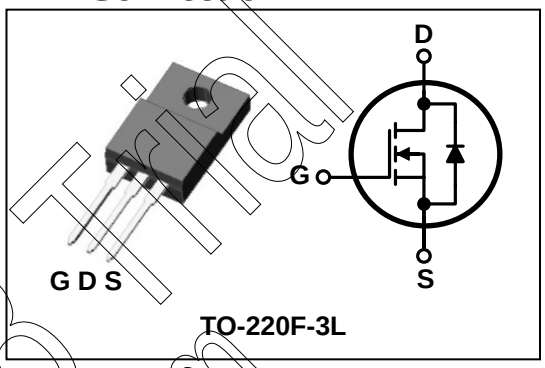
Advanced Power MOSFET

DC-DC CONVERTER APPLICATION
HIGH VOLTAGE SWITCHING APPLICATIONS

Features

- High Voltage: BV_{DSS}=250V(Min.)
- Low C_{rss} : C_{rss}=49pF(Typ.)
- Low gate charge : Q_g=22nC(Typ.)
- Low $R_{DS(on)}$:$R_{DS(on)}$=0.27Ω(Max.)

PIN Connection



Ordering Information

Type NO.	Marking	Package Code
SMK1625F	SMK1625	TO-220F-3L

Absolute maximum ratings (T_C=25°C unless otherwise noted)

Characteristic Symbol			Rating	Unit
Drain-source voltage		V_{DSS}	250	V
Gate-source voltage		V_{GSS}	±30	V
Drain current (DC) *	I_D	(T_C=25℃)	16	A
		(T_C=100℃)	7.2	A
Drain current (Pulsed) *		I_{DM}	64	A
Drain power dissipation		P_D	35	W
Avalanche current (Single) ②		I_{AS} 16		A
Single pulsed avalanche energy ②		E_{AS} 480		mJ
Avalanche current (Repetitive) ①		I_{AR} 16		A
Repetitive avalanche energy ①		E_{AR} 13.9		mJ
Junction temperature		T_J	150	℃
Storage temperature range		T_{stg}	-55~150	

* Limited by maximum junction temperature

Characteristic Symbol			Typ.	Max	Unit
Thermal resistance	Junction-case R	$_{th(J-C)}$ -		3.57	℃/W
	Junction-ambient	$R_{th(J-A)}$	-	62.5	

Electrical Characteristics (T_C=25°C unless otherwise noted)

Characteristic Symbol		Test Condition	Min.	Typ.	Max.	Unit
Drain-source breakdown voltage	BV_{DSS}	I_D=250μA, V_{GS}=0	250 -		-	V
Gate threshold voltage	$V_{GS(th)}$	I_D=250μA, V_{DS}= V_{GS}	2.0 -		4.0	V
Drain-source cut-off current	I_{DSS} V	$_{DS}$=250V, V_{GS}=0V -		-	1	μA
Gate leakage current	I_{GSS}	V_{DS}=0V, V_{GS}=±30V	- -		±100	nA
Drain-source on-resistance ④	$R_{DS(ON)}$ V	$_{GS}$=10V, I_D=8.0A -		0.22	0.27	Ω
Forward transfer conductance ④	g_{fs} V	$_{DS}$=10V, I_D=8.0A -		10.5	-	S
Input capacitance	Ciss -	V_{GS}=0V, V_{DS}=25V, f=1MHz		968	1275	pF
Output capacitance	Coss		-	204	278	
Reverse transfer capacitance	Crss		- 49		64	
Turn-on delay time	$t_{d(on)}$ -	V_{DD}=125V, I_D=16A R_G=25Ω ③④		15	-	ns
Rise time	t_r -			130	-	
Turn-off delay time	$t_{d(off)}$ -			135	-	
Fall time	t_f			105	-	
Total gate charge	Q_g -	V_{DS}=200V, V_{GS}=10V I_D=16A ③④		22	28	nC
Gate-source charge	Q_{gs} -			7.1	-	
Gate-drain charge	Q_{gd}		- 5.	9	-	

Source-Drain Diode Ratings and Characteristics (T_C=25°C unless otherwise noted)

Characteristic Symbol		Test Condition	Min	Typ	Max	Unit
Source current	I_S	Integral reverse diode in the MOSFET	-	-	16	A
Source current(Plused) ①	I_{SM}		- -		64	
Forward voltage ④	V_{SD} V	$_{GS}$=0V, I_S=16A -		-	1.4	V
Reverse recovery time	t_{rr} -	I_s=16A, V_{GS}=0, di_S/dt=100A/us		208	-	ns
Reverse recovery charge	Q_{rr}		- 1.	63	-	uC

Note ;

① Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature

② L=3.0mH, I_{AS}=16A, V_{DD}=50V, R_G=27Ω

③ Pulse Test : Pulse Width＜ 30 0us, Duty cycle≤ 2%

④ Essentially independent of operating temperature

Electrical Characteristic Curves

Fig. 1 I_D - V_{DS}

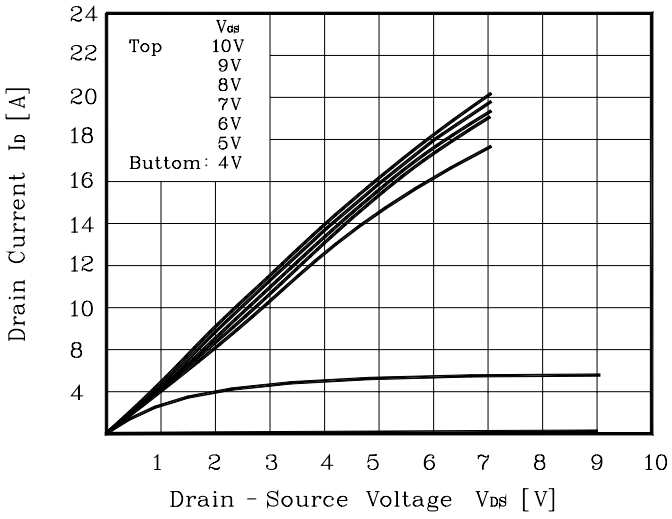


Fig. 2 I_D - V_{GS}

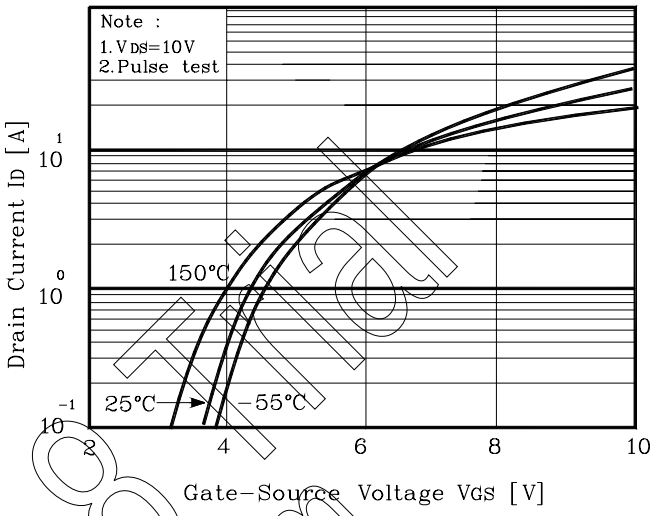


Fig. 3 $R_{DS(on)}$ - I_D

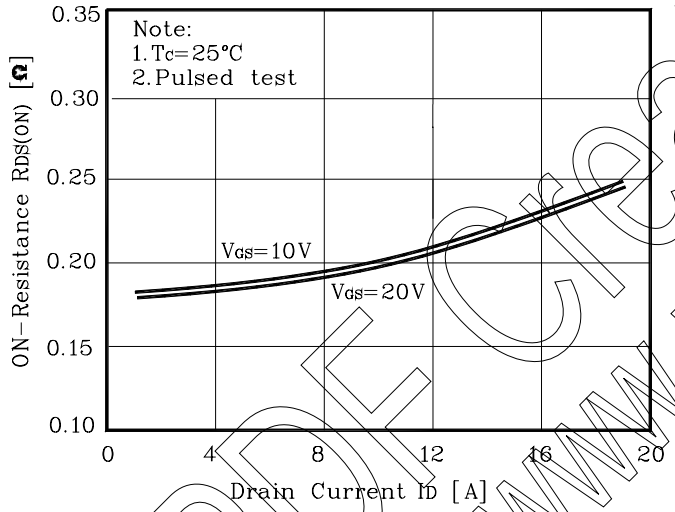


Fig. 4 I_S - V_{SD}

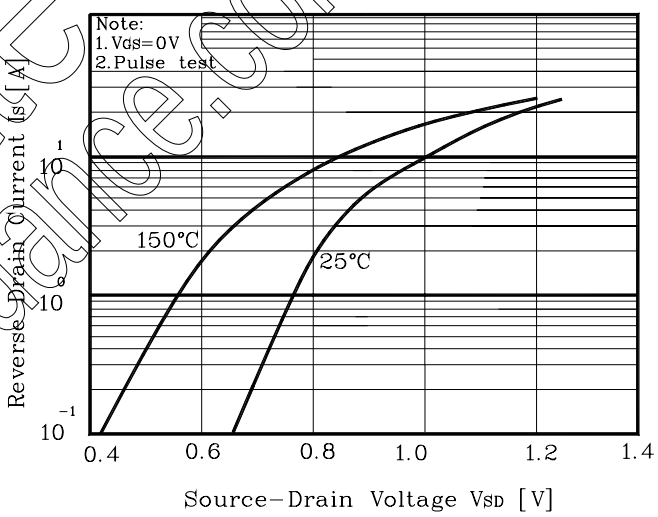


Fig. 5 Capacitance - V_{DS}

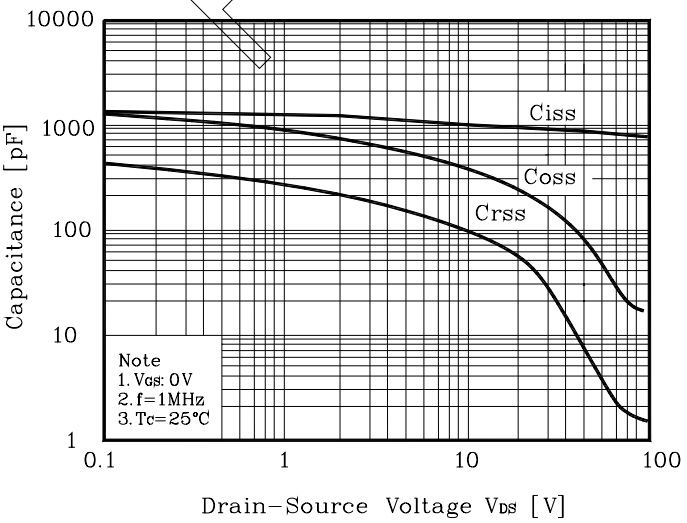


Fig. 6 V_{GS} - Q_G

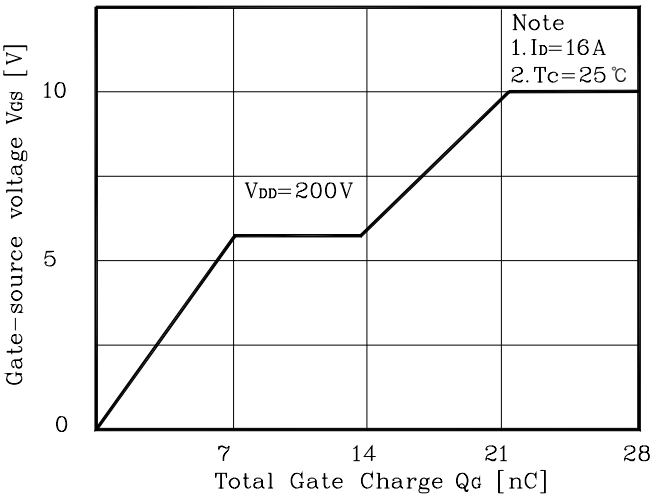


Fig. 7 V_{DSS} - T_J

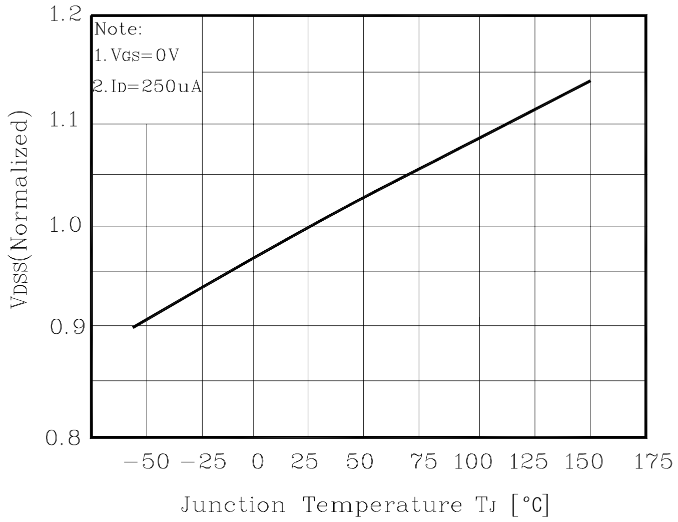


Fig. 8 $R_{DS(on)}$ - T_J

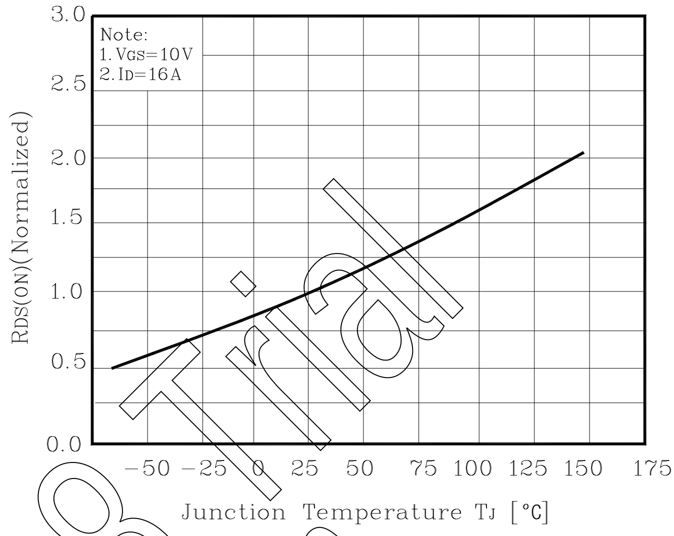


Fig. 9 I_D - T_C

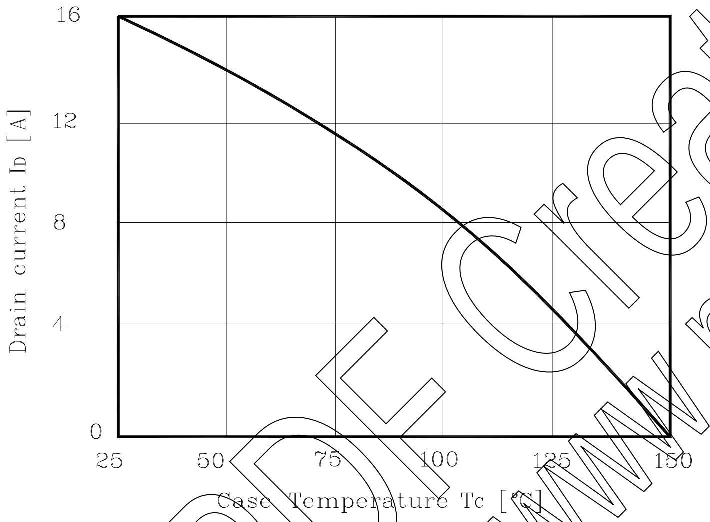


Fig. 10 Safe Operating Area

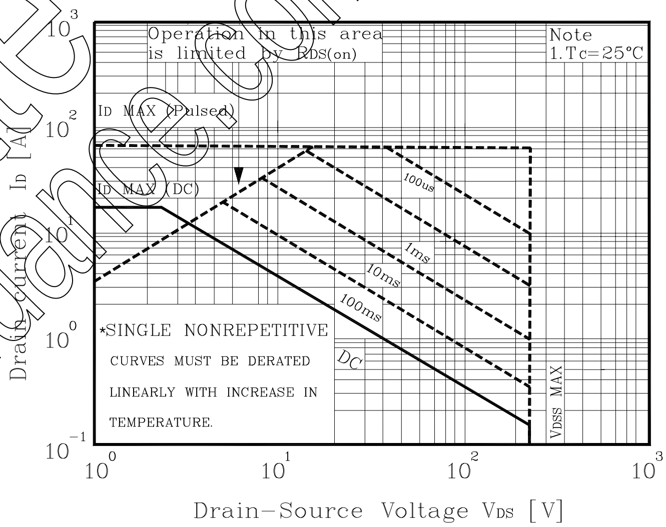


Fig. 11 Gate Charge Test Circuit & Waveform

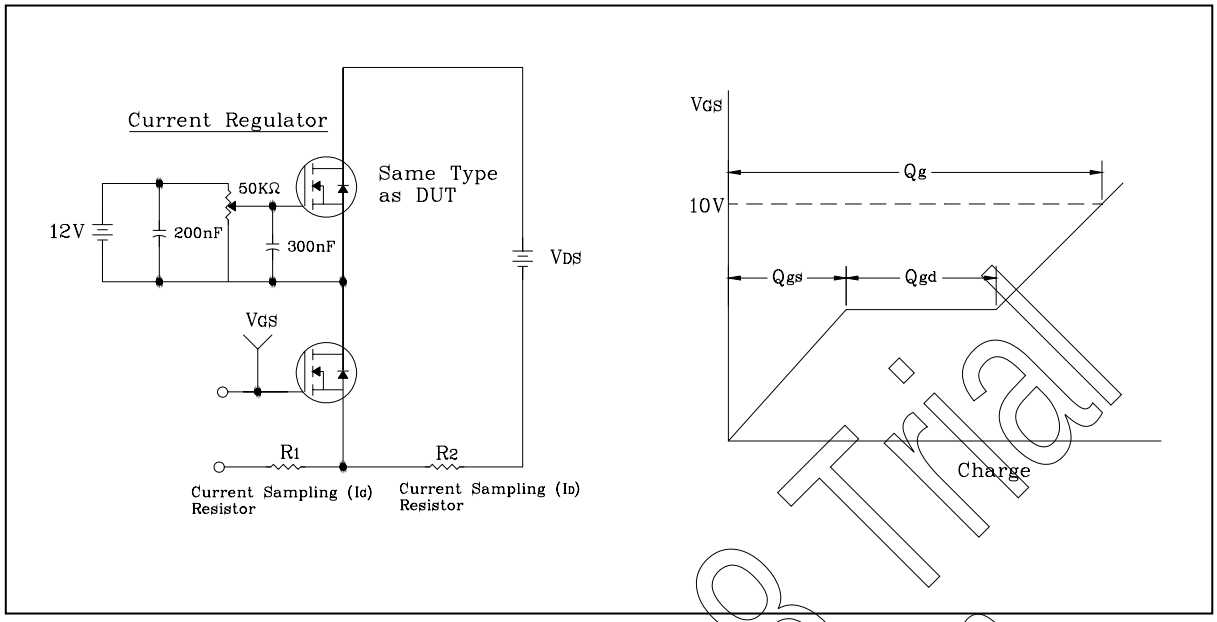


Fig. 12 Resistive Switching Test Circuit & Waveform

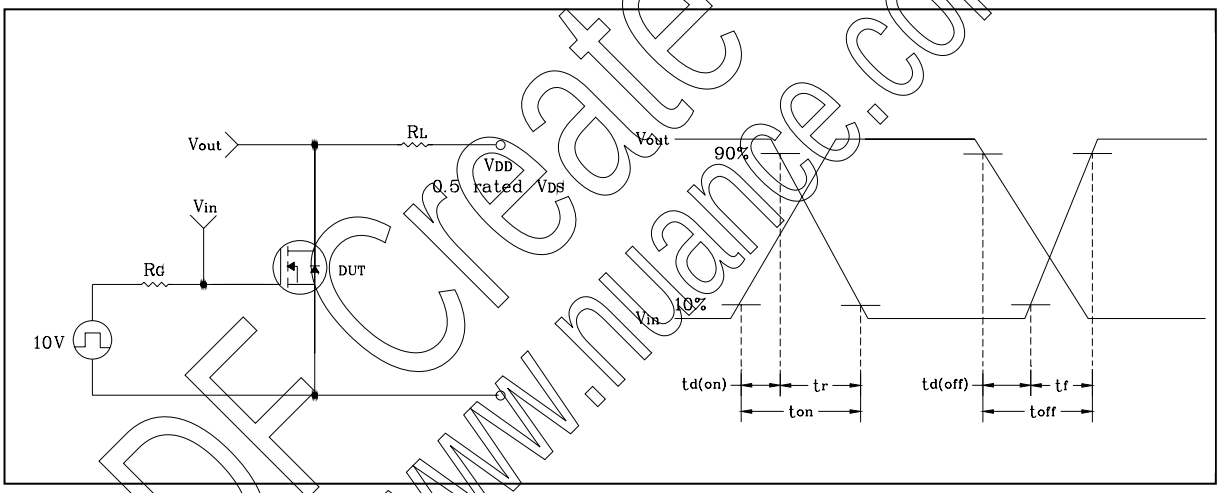


Fig. 13 E_{AS} Test Circuit & Waveform

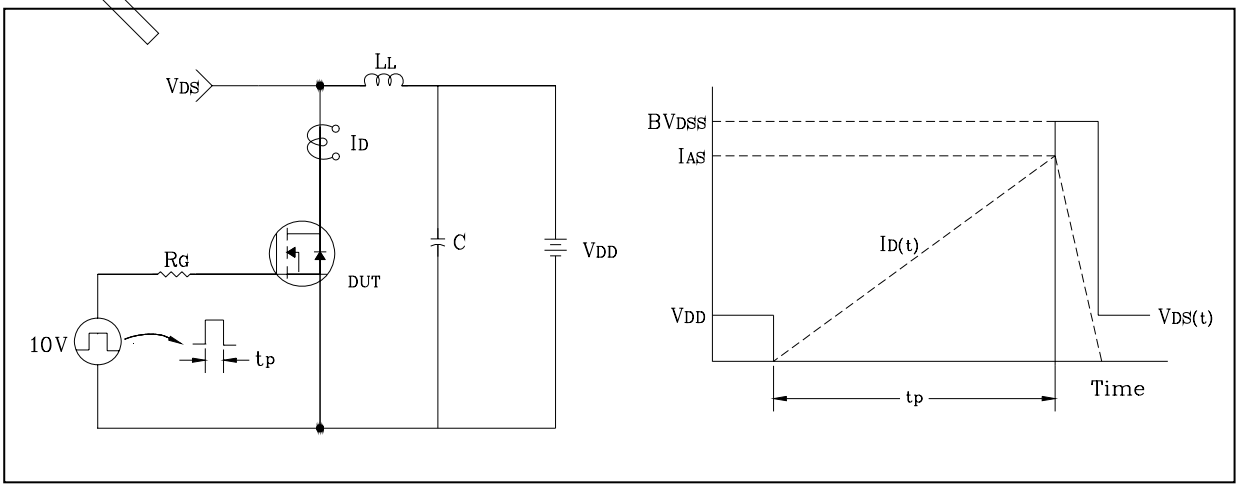
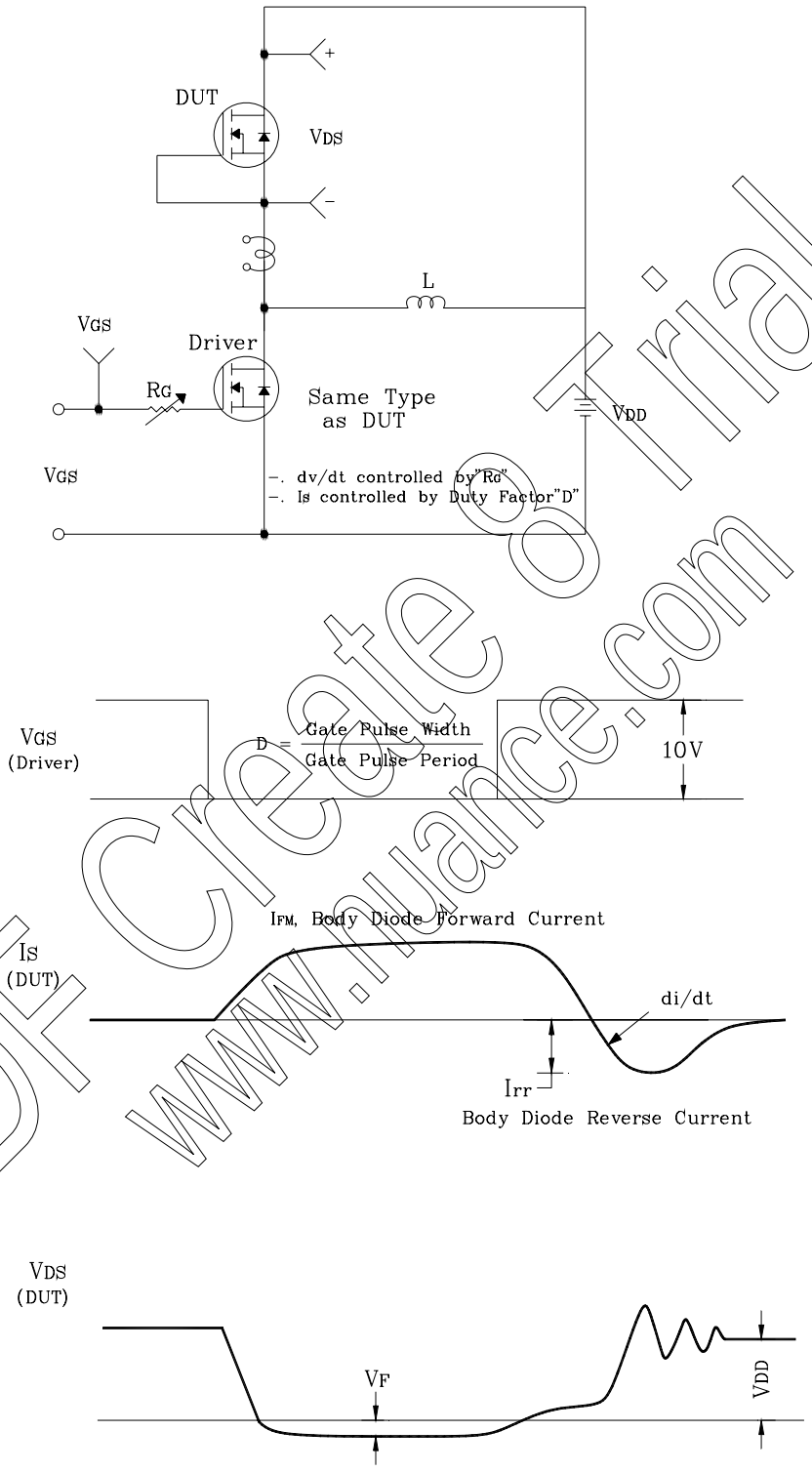
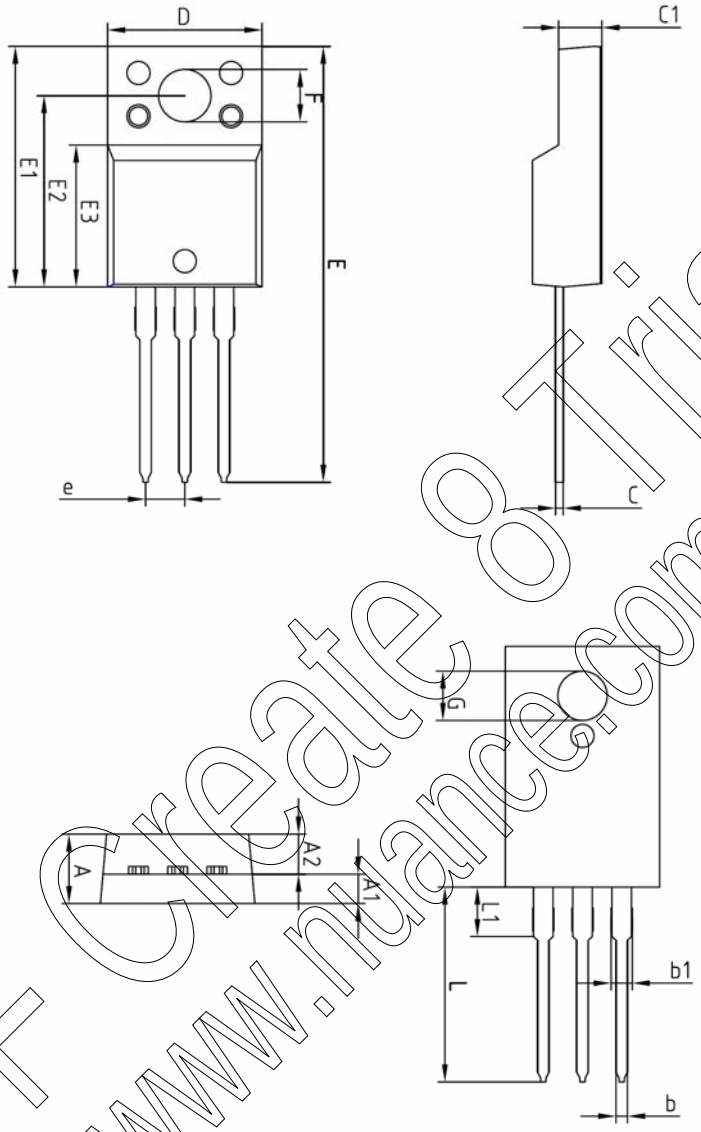


Fig. 14 Diode Reverse Recovery Time Test Circuit & Waveform



Outline Dimension



SYMBOL	MILLIMETERS			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
A	–	–	4.60	
A1	2.45	2.50	2.55	
A2	1.95	2.00	2.05	
b	0.65	0.75	0.85	
b1	1.07	1.27	1.47	
C	0.40	0.50	0.60	
C1	2.70	2.80	2.90	
D	9.90	10.00	10.10	
E	28.00	–	28.60	
E1	15.50	15.60	15.70	
E2	12.30	12.40	12.50	
E3	9.15	9.20	9.25	
F	3.30	3.40	3.50	
G	3.10	3.20	3.30	
e	2.54 BSC			
L	12.40	–	13.00	
L1	3.46 BSC			

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AUK Semiconductor

SMK1260F

Advanced Power MOSFET

SWITCHING REGULATOR APPLICATIONS

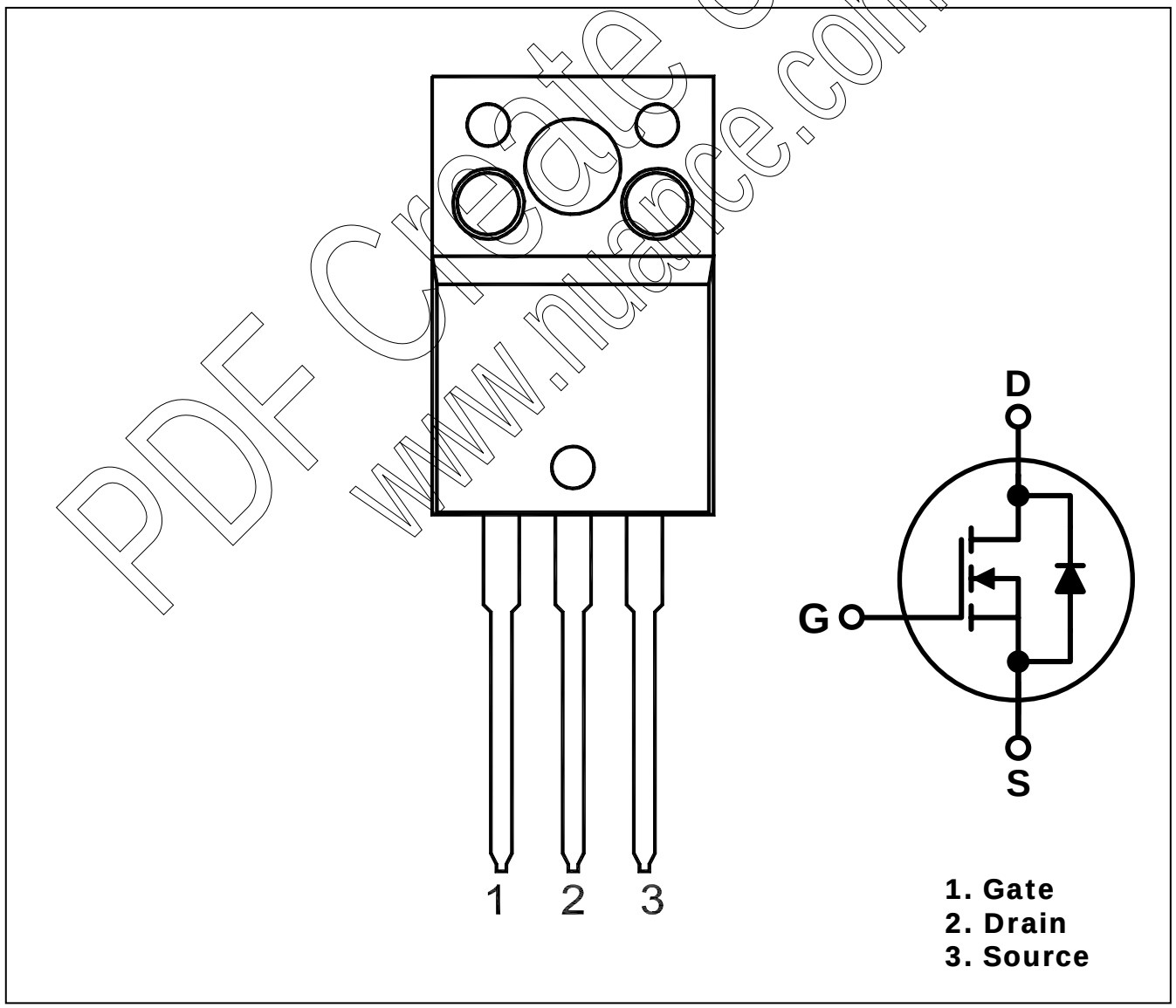
Features

- High Voltage: BV_{DSS}=600V(Min.)
- Low C_{rss} : C_{rss}=13.8pF(Typ.)
- Low gate charge : Qg=41nC(Typ.)
- Low $R_{DS(on)}$:$R_{DS(on)}$=0.65Ω(Max.)

Ordering Information

Type NO.	Marking	Package Code
SMK1260F SMK1260		TO-220F-3L

PIN Connections



Absolute maximum ratings

(Tc=25°C)

Characteristic Symbol			Rating	Unit
Drain-source voltage	V_{DSS} 600			V
Gate-source voltage	V_{GSS}		±30	V
Drain current (DC)*	I_D	(Tc=25℃)	12	A
		(Tc=100℃)	7.1	A
Drain current (Pulsed)*	I_{DM}		48	A
Drain power dissipation	P_D		45	W
Avalanche current (Single) ②	I_{AS}		12	A
Single pulsed avalanche energy ②	E_{AS}		700	mJ
Avalanche current (Repetitive) ①	I_{AR}		12	A
Repetitive avalanche energy ①	E_{AR}		11.6	mJ
Junction temperature	T_J		150	℃
Storage temperature range	T_{stg} -55~150			

* Limited by maximum junction temperature

Characteristic Symbol			Typ.	Max	Unit
Thermal resistance	Junction-case	$R_{th(J-C)}$	-	2.7	℃/W
	Junction-ambient	$R_{th(J-a)}$	-	62.5	

Electrical Characteristics

(Tc=25°C)

Characteristic Symbol		Test Condition	Min.	Typ.	Max.	Unit
Drain-source breakdown voltage	BV_{DSS}	I_D=250μA, V_{GS}=0	600	-	-	V
Gate threshold voltage	$V_{GS(th)}$	I_D=250μA, V_{DS}= V_{GS}	2.0	-	4.0	V
Drain-source cut-off current	I_{DSS}	V_{DS}=600V, V_{GS}=0V	-	-	1	μA
Gate leakage current	I_{GSS}	V_{DS}=0V, V_{GS}=±30V	- -		±100	nA
Drain-source on-resistance ④	$R_{DS(ON)}$	V_{GS}=10V, I_D=6.0A	-	0.55	0.65	Ω
Forward transfer conductance ④	g_{fs}	V_{DS}=10V, I_D=6.0A	-	10	-	S
Input capacitance	Ciss	V_{GS}=0V, V_{DS}=25V f=1MHz	-	2213	2951	pF
Output capacitance	Coss		-	170	226	
Reverse transfer capacitance	Crss		- 13.	8	18.4	
Turn-on delay time	$t_{d(on)}$ -	V_{DD}=300V, I_D=12A R_G=25Ω ③④		30	-	ns
Rise time	t_r		-	85	-	
Turn-off delay time	$t_{d(off)}$		-	140	-	
Fall time	t_f		-	90	-	
Total gate charge	Q_g -	V_{DS}=480V, V_{GS}=10V I_D=12A ③④		41	63	nC
Gate-source charge	Q_{gs}		-	13	-	
Gate-drain charge	Q_{gd}		-	10.5	-	

Source-Drain Diode Ratings and Characteristics

(Tc=25°C)

Characteristic Symbol		Test Condition	Min	Typ	Max	Unit
Source current (DC)	I_S	Integral reverse diode in the MOSFET	-	-	12	A
Source current (Pulsed) ①	I_{SM}		- -		48	
Forward voltage ④	V_{SD} V	$_{GS}$=0V, I_S=12A -		-	1.4	V
Reverse recovery time	t_{rr} -	I_s=12A, V_{GS}=0, di_S/dt=100A/ us		500	-	ns
Reverse recovery charge	Q_{rr}		- 4.	3	-	uC

Note ;

① Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature

② L=20mH, I_{AS}=8A, V_{DD}=50V, R_G=25Ω , Starting T_J = 25℃

③ Pulse Test : Pulse Width＜ 30 0us, Duty cycle≤ 2%

④ Essentially independent of operating temperature

Electrical Characteristic Curves

Fig. 1 I_D - V_{DS}

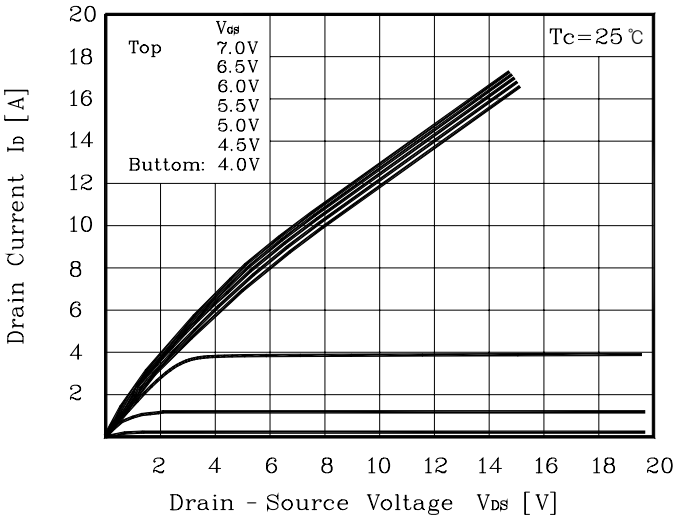


Fig. 2 I_D - V_{GS}

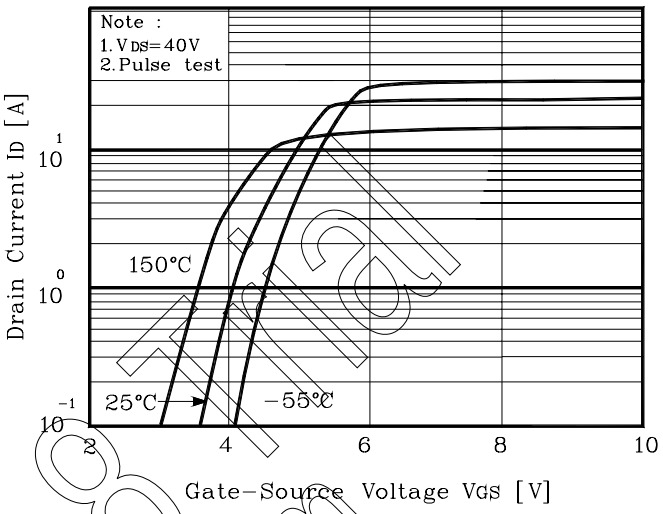


Fig. 3 $R_{DS(on)}$ - I_D

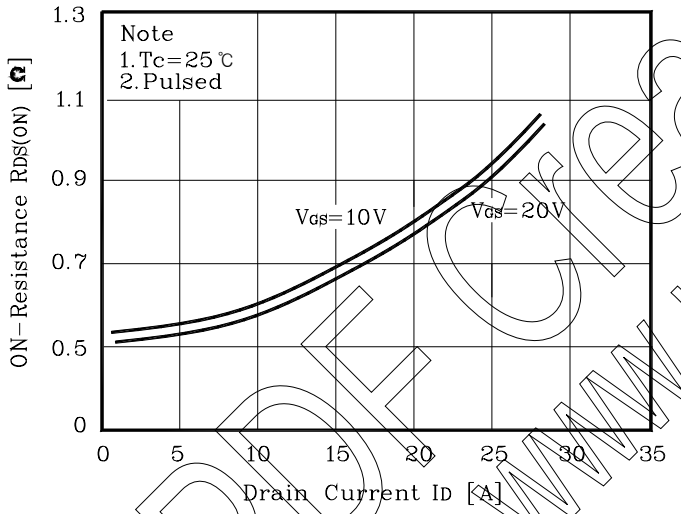


Fig. 4 I_S - V_{SD}

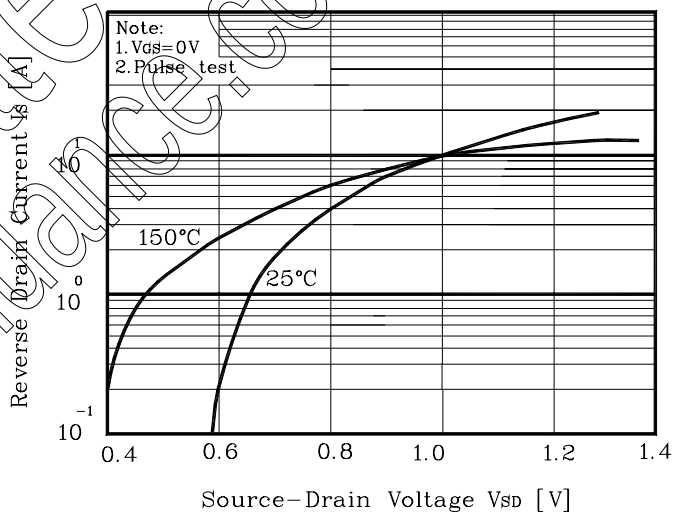


Fig. 5 Capacitance - V_{DS}

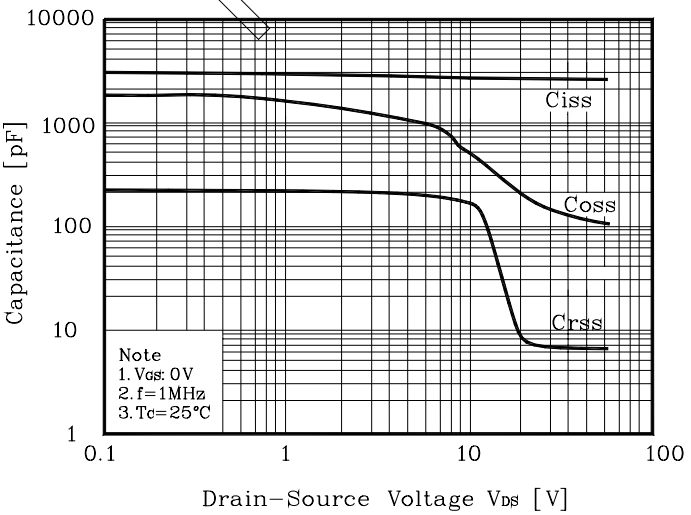
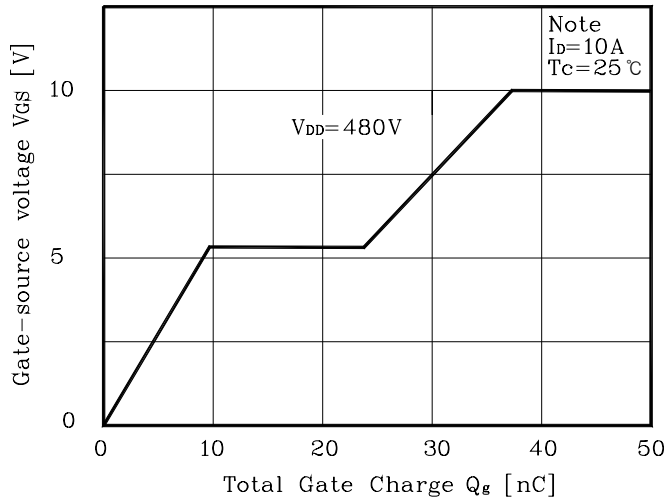


Fig.6 V_{GS} - Q_G



Electrical Characteristic Curves

Fig. 7 V_{DSS} - T_J

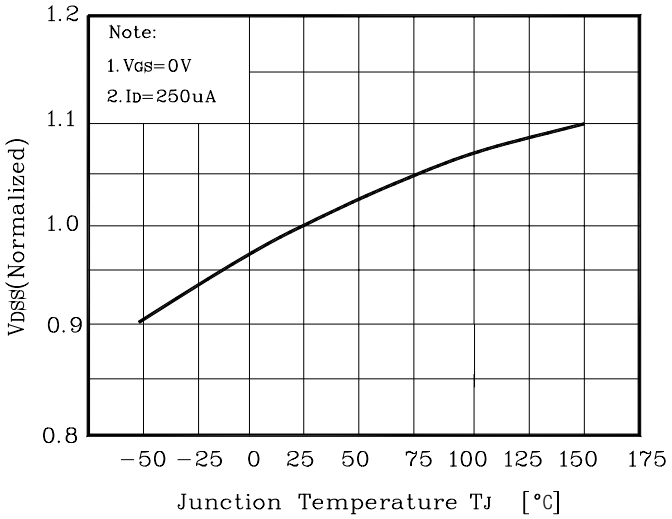
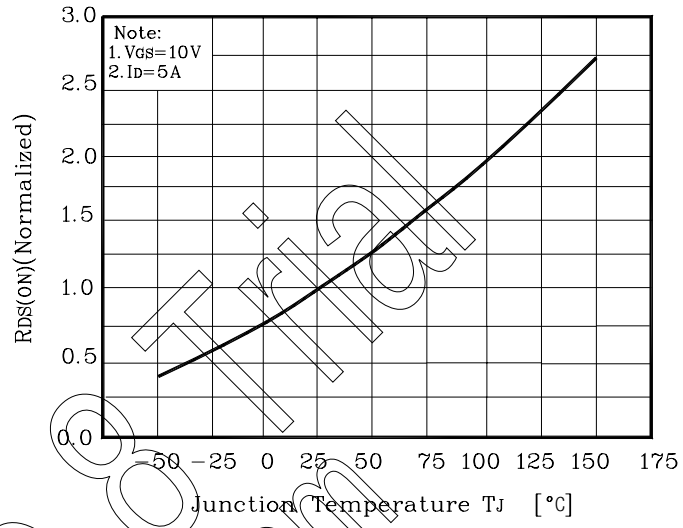
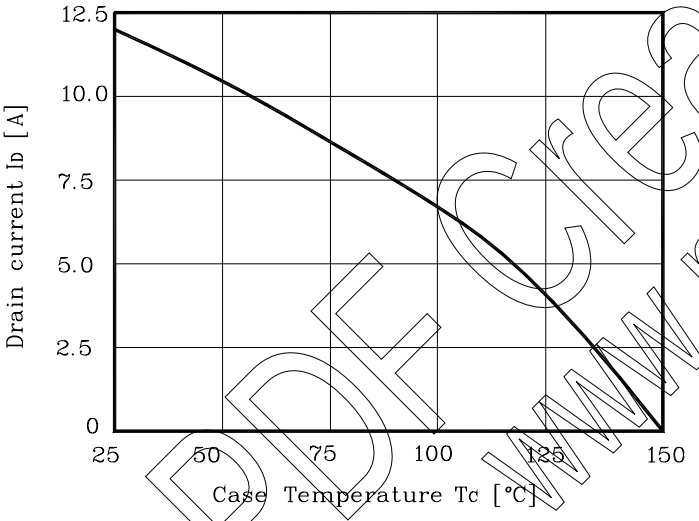


Fig.8 $R_{DS(on)}$ - T_J



Fi g. 9 I_D - T_C



Fi g. 10 Safe Operating Area

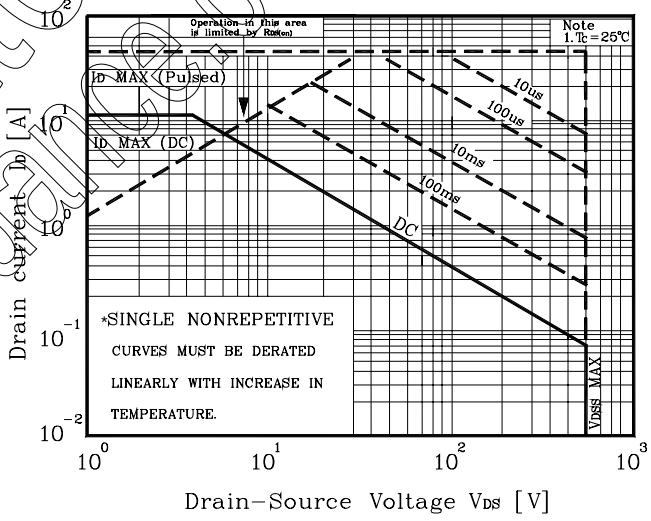


Fig. 10 Gate Charge Test Circuit & Waveform

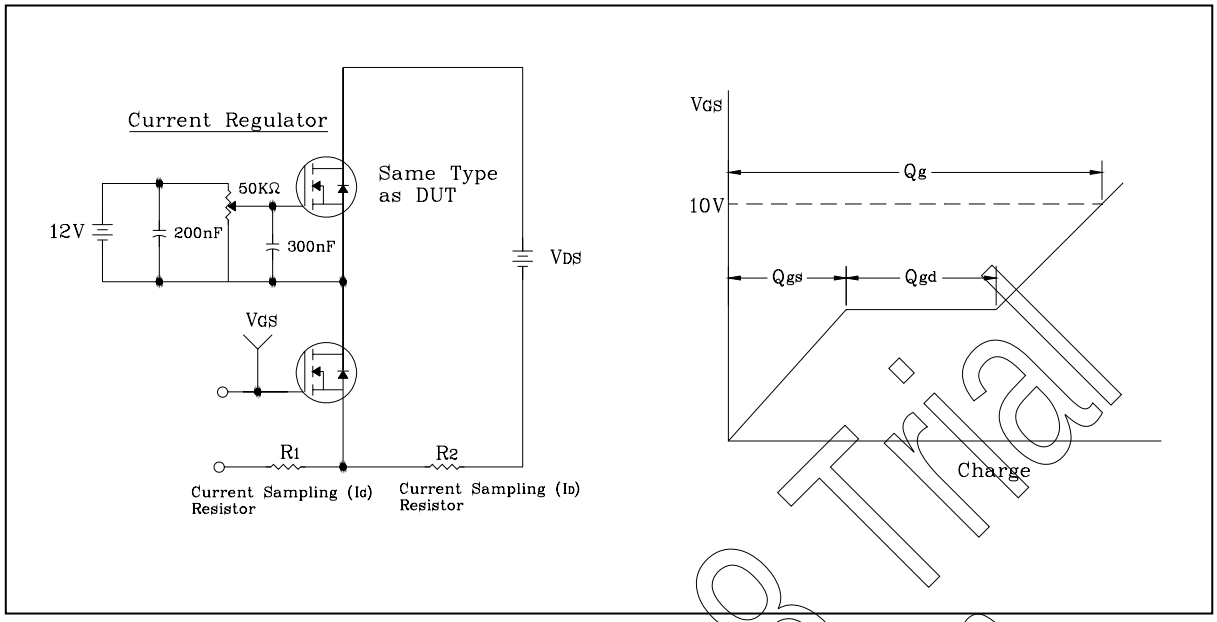


Fig. 11 Resistive Switching Test Circuit & Waveform

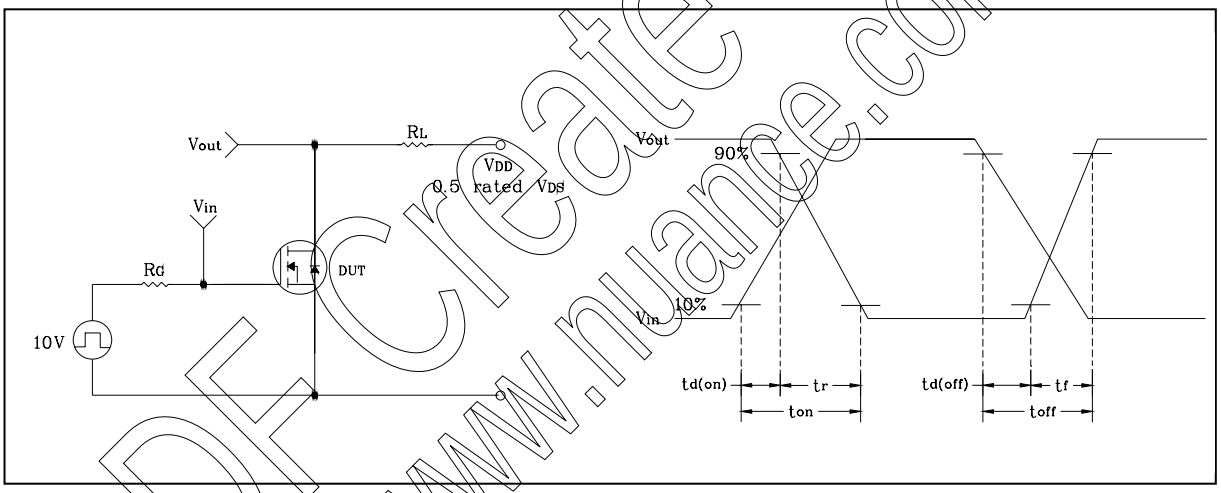


Fig. 12 E_{AS} Test Circuit & Waveform

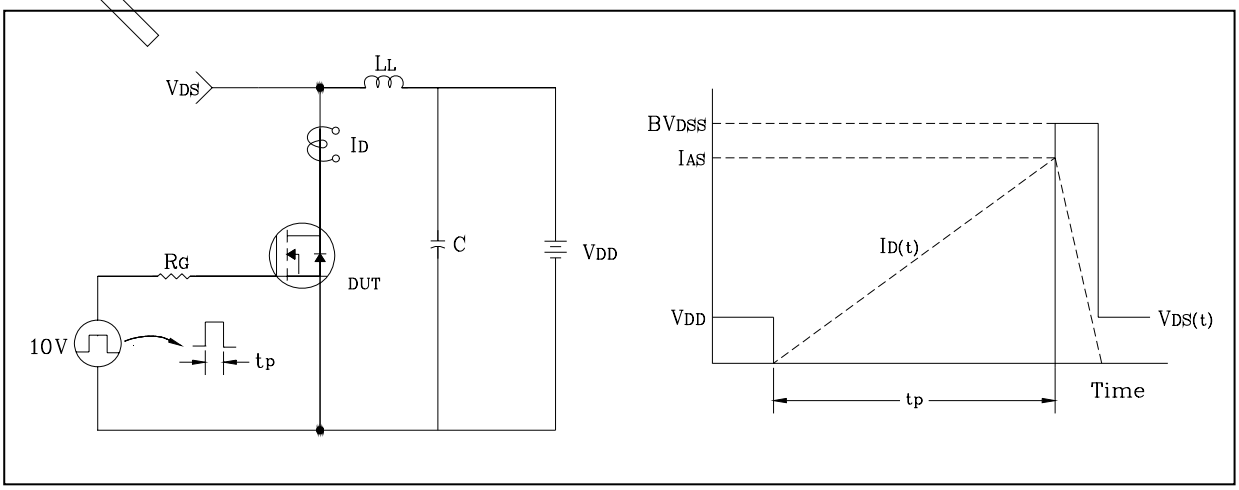
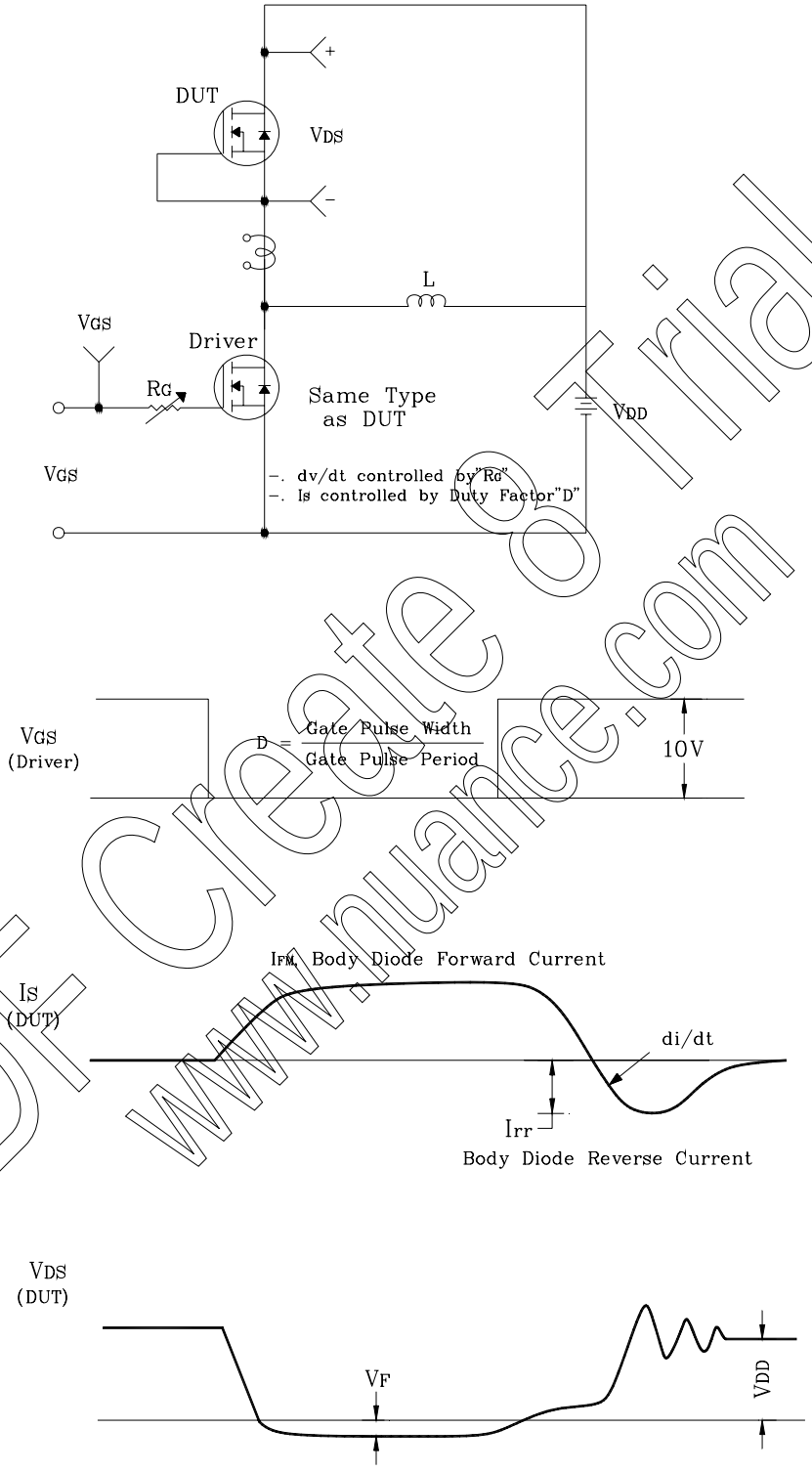
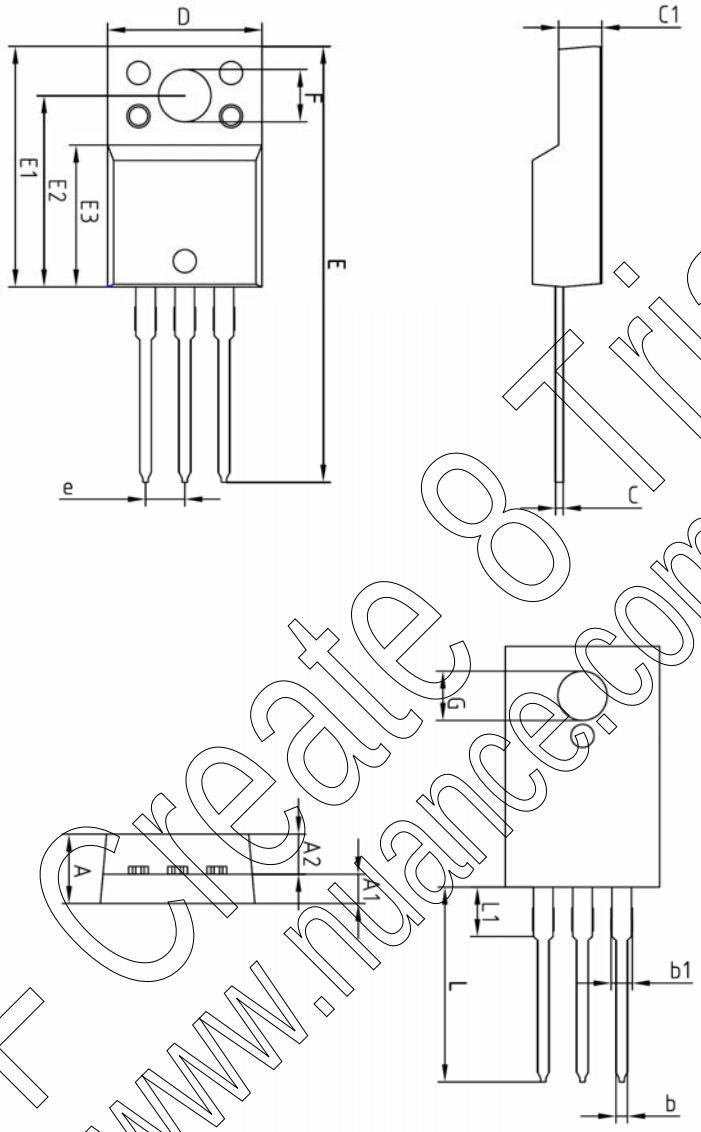


Fig. 13 Diode Reverse Recovery Time Test Circuit & Waveform





SYMBOL	MILLIMETERS			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
A	–	–	4.60	
A1	2.45	2.50	2.55	
A2	1.95	2.00	2.05	
b	0.65	0.75	0.85	
b1	1.07	1.27	1.47	
C	0.40	0.50	0.60	
C1	2.70	2.80	2.90	
D	9.90	10.00	10.10	
E	28.00	–	28.60	
E1	15.50	15.60	15.70	
E2	12.30	12.40	12.50	
E3	9.15	9.20	9.25	
F	3.30	3.40	3.50	
G	3.10	3.20	3.30	
e	2.54 BSC			
L	12.40	–	13.00	
L1	3.46 BSC			

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SMK1265F

Advanced Power MOSFET

SWITCHING REGULATOR APPLICATIONS

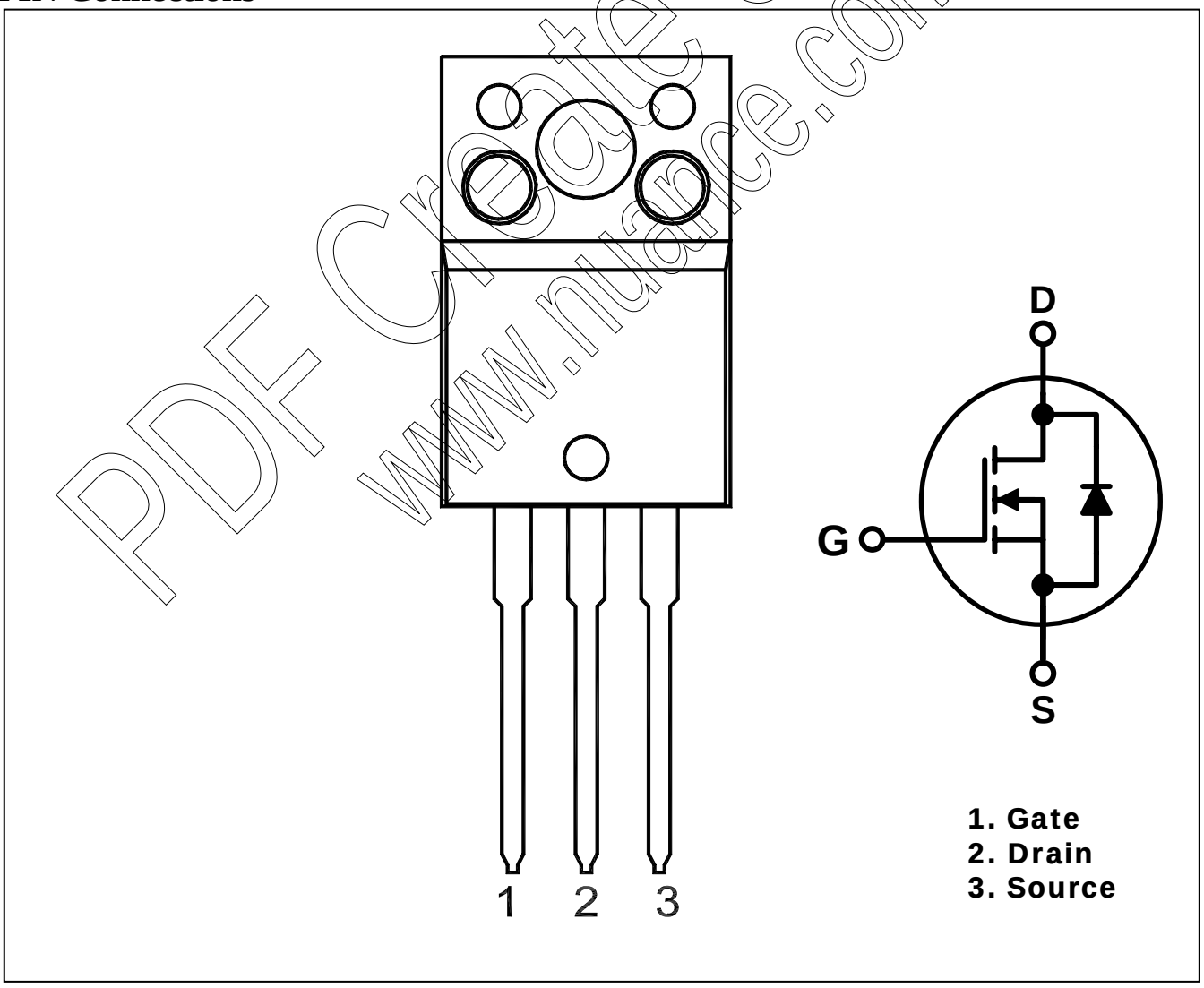
Features

- High Voltage: BV_{DSS}=650V(Min.)
- Low C_{rss} : C_{rss}=14.6pF(Typ.)
- Low gate charge : Qg=41nC(Typ.)
- Low $R_{DS(on)}$:$R_{DS(on)}$=0.8Ω(Max.)

Ordering Information

Type NO.	Marking	Package Code
SMK1265F SMK1265		TO-220F-3L

PIN Connections



Absolute maximum ratings

(Tc=25°C)

Characteristic Symbol			Rating	Unit
Drain-source voltage	V_{DSS} 650			V
Gate-source voltage	V_{GSS}		±30	V
Drain current (DC)*	I_D	(Tc=25℃)	12	A
		(Tc=100℃)	4.5	A
Drain current (Pulsed)*	I_{DM}		48	A
Drain power dissipation	P_D		45	W
Avalanche current (Single) ②	I_{AS}		12	A
Single pulsed avalanche energy ②	E_{AS}		273	mJ
Avalanche current (Repetitive) ①	I_{AR}		12	A
Repetitive avalanche energy ①	E_{AR}		7.6	mJ
Junction temperature	T_J		150	℃
Storage temperature range	T_{stg} -55~150			

* Limited by maximum junction temperature

Characteristic Symbol			Typ.	Max	Unit
Thermal resistance	Junction-case	$R_{th(J-C)}$	-	2.7	℃/W
	Junction-ambient	$R_{th(J-a)}$	-	62.5	

Electrical Characteristics

(Tc=25°C)

Characteristic Symbol		Test Condition	Min.	Typ.	Max.	Unit
Drain-source breakdown voltage	BV_{DSS}	I_D=250μA, V_{GS}=0	650	-	-	V
Gate threshold voltage	$V_{GS(th)}$	I_D=250μA, V_{DS}= V_{GS}	2.0	-	4.0	V
Drain-source cut-off current	I_{DSS}	V_{DS}=650V, V_{GS}=0V	-	-	1	μA
Gate leakage current	I_{GSS}	V_{DS}=0V, V_{GS}=±30V	- -		±100	nA
Drain-source on-resistance ④	$R_{DS(ON)}$	V_{GS}=10V, I_D=6.0A	-	0.68	0.80	Ω
Forward transfer conductance ④	g_{fs}	V_{DS}=10V, I_D=6.0A	-	10	-	S
Input capacitance	Ciss	V_{GS}=0V, V_{DS}=25V f=1MHz	-	2162	2882	pF
Output capacitance	Coss		-	183	244	
Reverse transfer capacitance	Crss		- 14.	6	19.4	
Turn-on delay time	$t_{d(on)}$ -	V_{DD}=300V, I_D=12A R_G=25Ω ③④		30	-	ns
Rise time	t_r		-	85	-	
Turn-off delay time	$t_{d(off)}$		-	140	-	
Fall time	t_f		-	90	-	
Total gate charge	Q_g -	V_{DS}=480V, V_{GS}=10V I_D=12A ③④		41	63	nC
Gate-source charge	Q_{gs}		-	13	-	
Gate-drain charge	Q_{gd}		-	10.5	-	

Source-Drain Diode Ratings and Characteristics

(Tc=25°C)

Characteristic Symbol		Test Condition	Min	Typ	Max	Unit
Source current (DC)	I_S	Integral reverse diode in the MOSFET	-	-	12	A
Source current (Pulsed) ①	I_{SM}		- -		48	
Forward voltage ④	V_{SD} V	GS=0V, I_S=12A -		-	1.4	V
Reverse recovery time	t_{rr} -	I_s=12A, V_{GS}=0, dI_S/dt=100A/ us		510	-	ns
Reverse recovery charge	Q_{rr}		- 4.	3	-	uC

Note ;

① Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature

② L=3.5mH, I_{AS}=12A, V_{DD}=50V, R_G=25Ω , Starting T_J = 25℃

③ Pulse Test : Pulse Width < 30 0us, Duty cycle≤ 2%

④ Essentially independent of operating temperature

Electrical Characteristic Curves

Fig. 1 I_D - V_{DS}

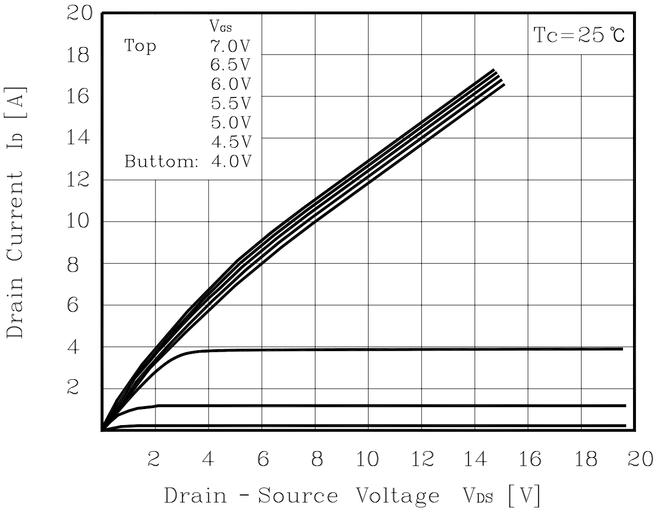


Fig. 2 I_D - V_{GS}

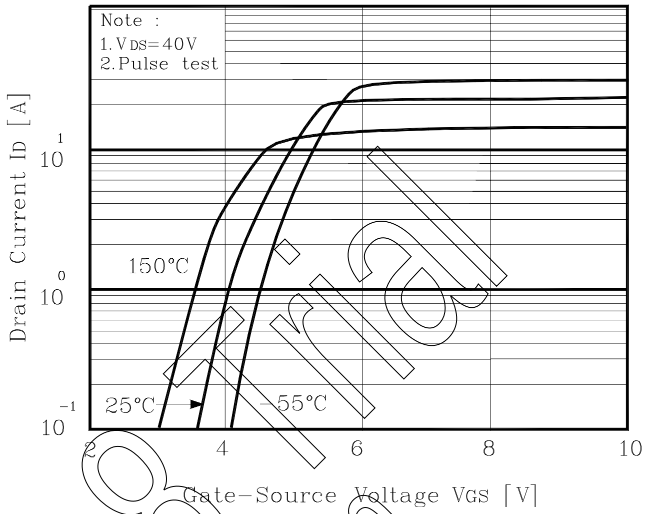


Fig. 3 $R_{DS(on)}$ - I_D

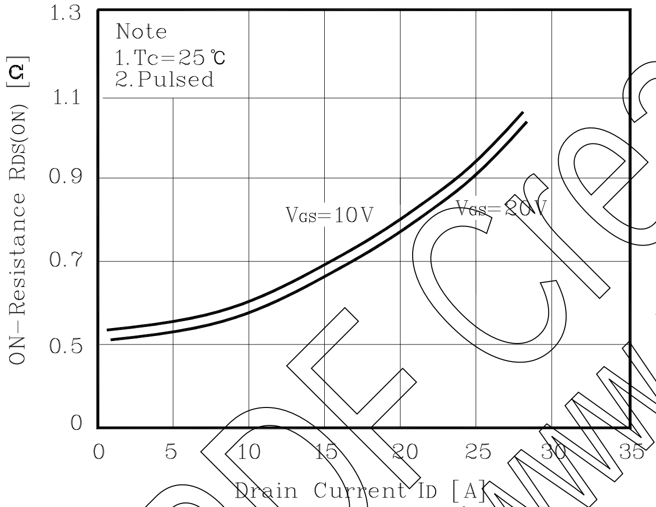


Fig. 4 I_S - V_{SD}

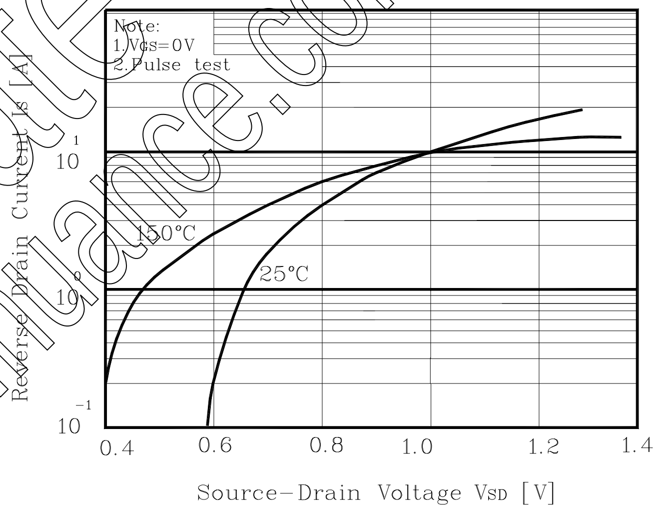


Fig. 5 Capacitance - V_{DS}

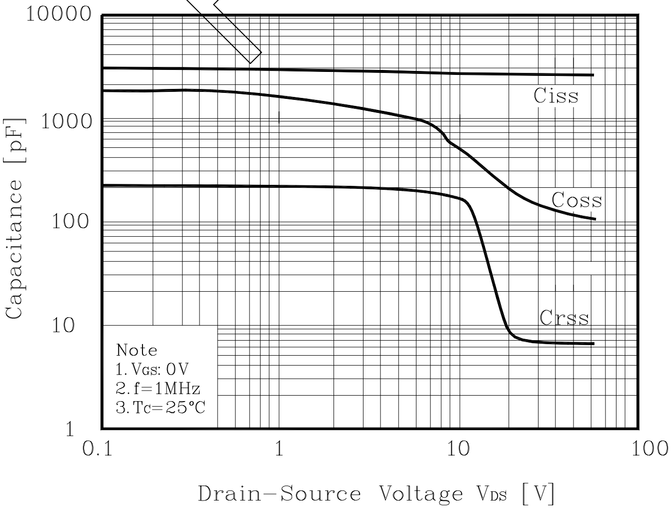
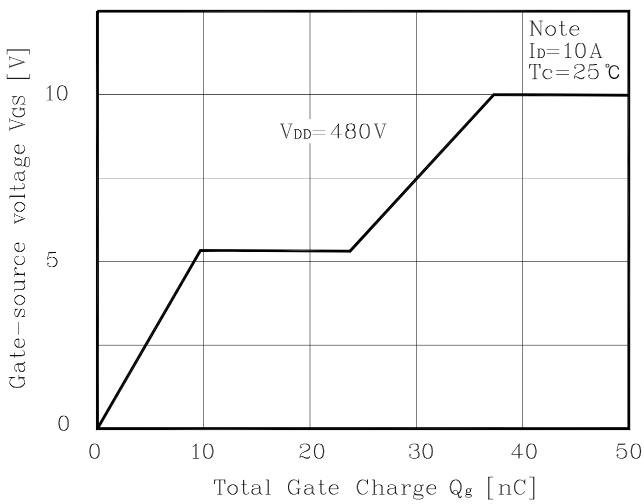


Fig.6 V_{GS} - Q_G



Electrical Characteristic Curves

Fig. 7 V_{DSS} - T_J

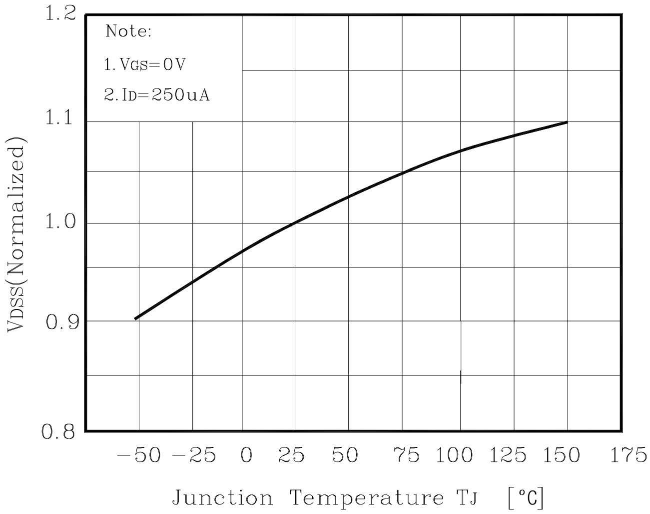
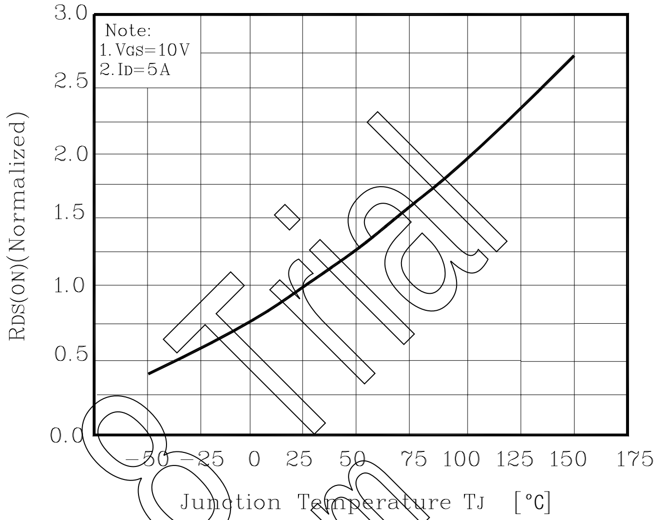
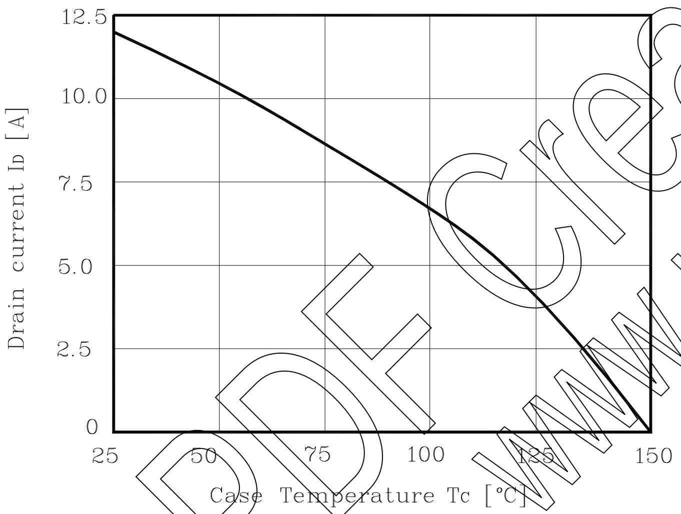


Fig.8 $R_{DS(on)}$ - T_J



Fi g. 9 I_D - T_C



Fi g. 10 Safe Operating Area

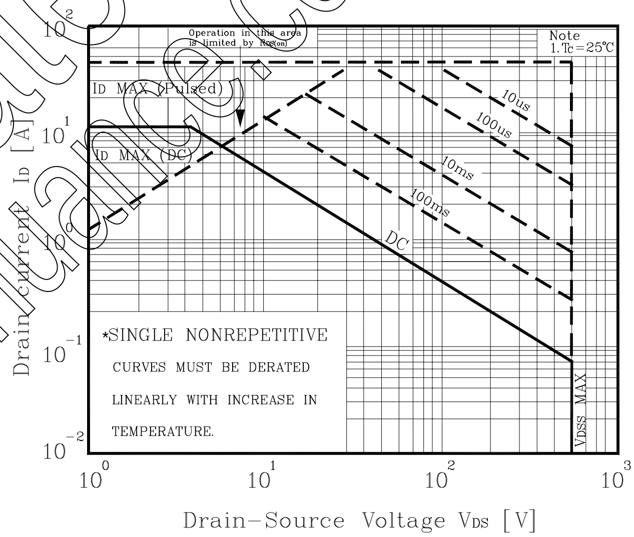


Fig. 11 Gate Charge Test Circuit & Waveform

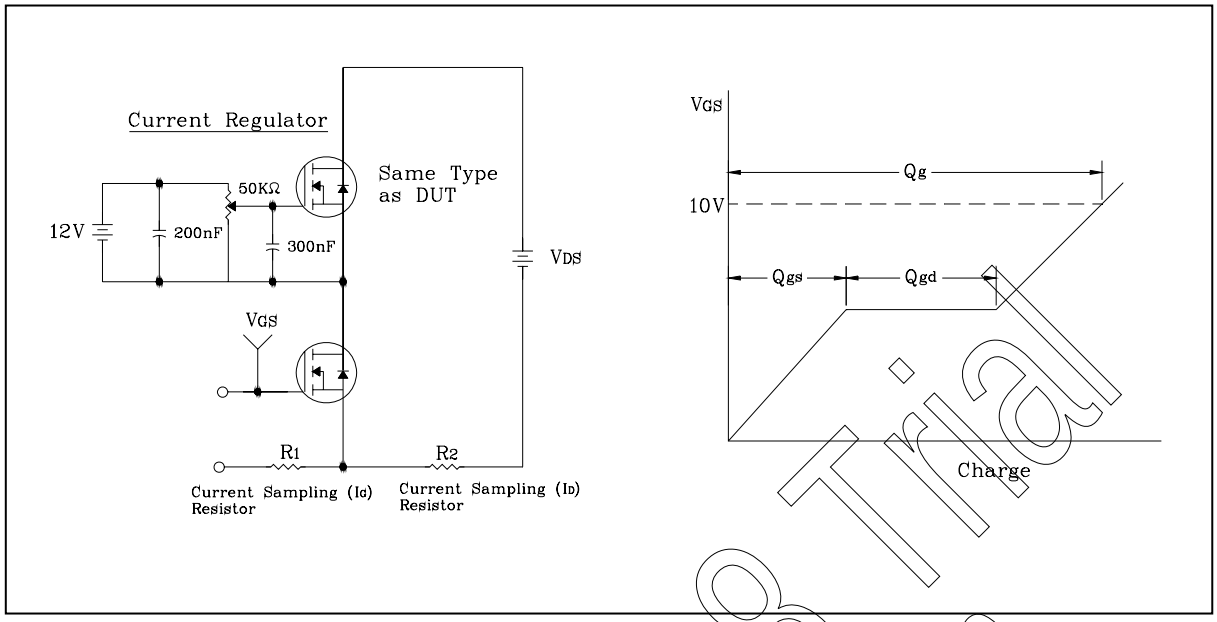


Fig. 12 Resistive Switching Test Circuit & Waveform

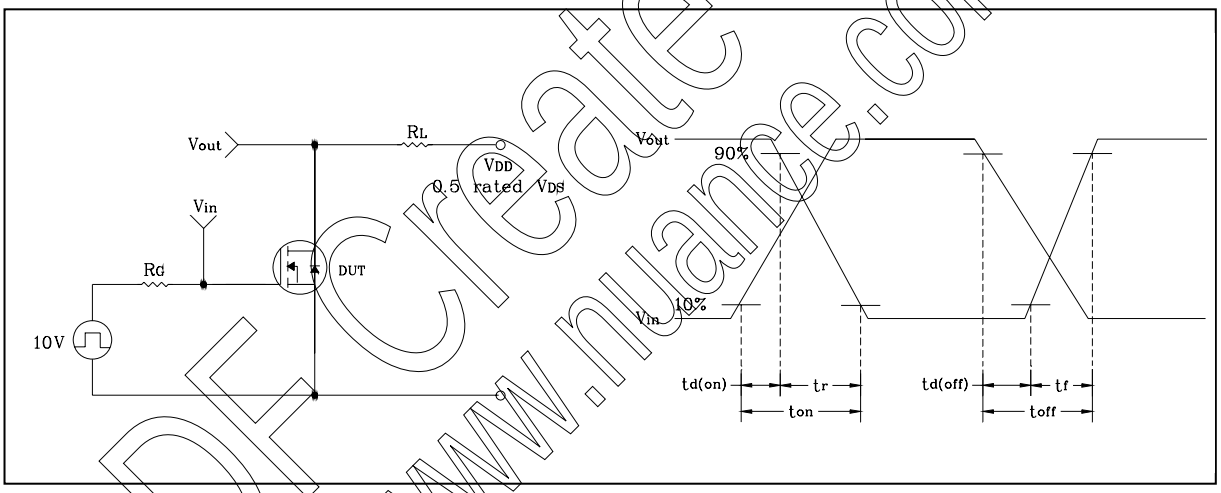


Fig. 13 E_{AS} Test Circuit & Waveform

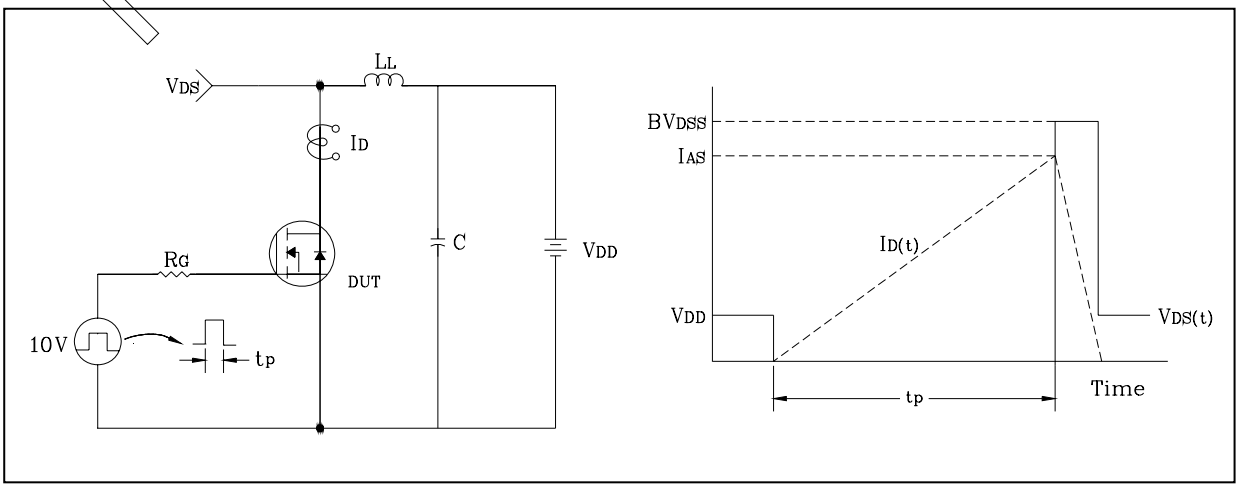
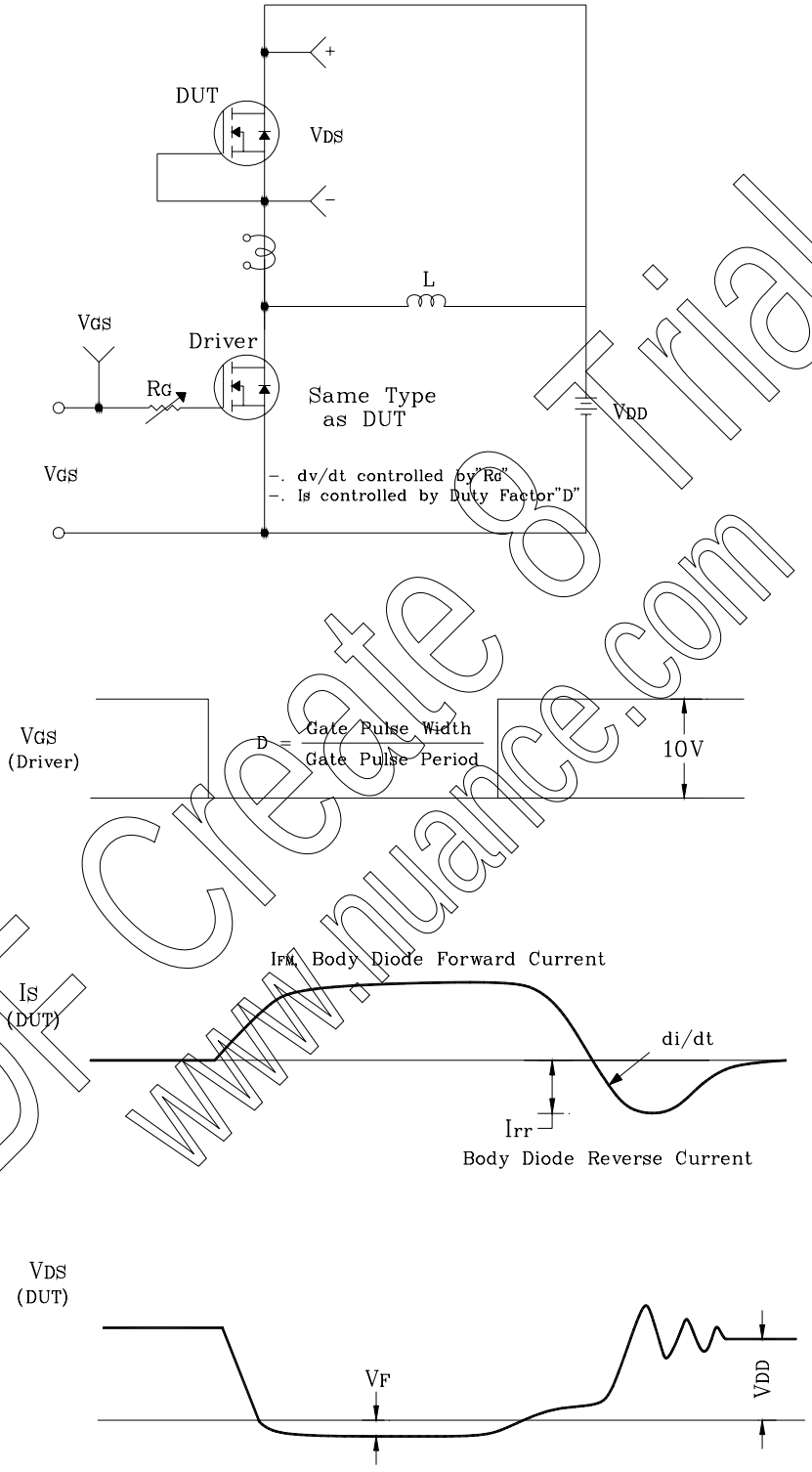
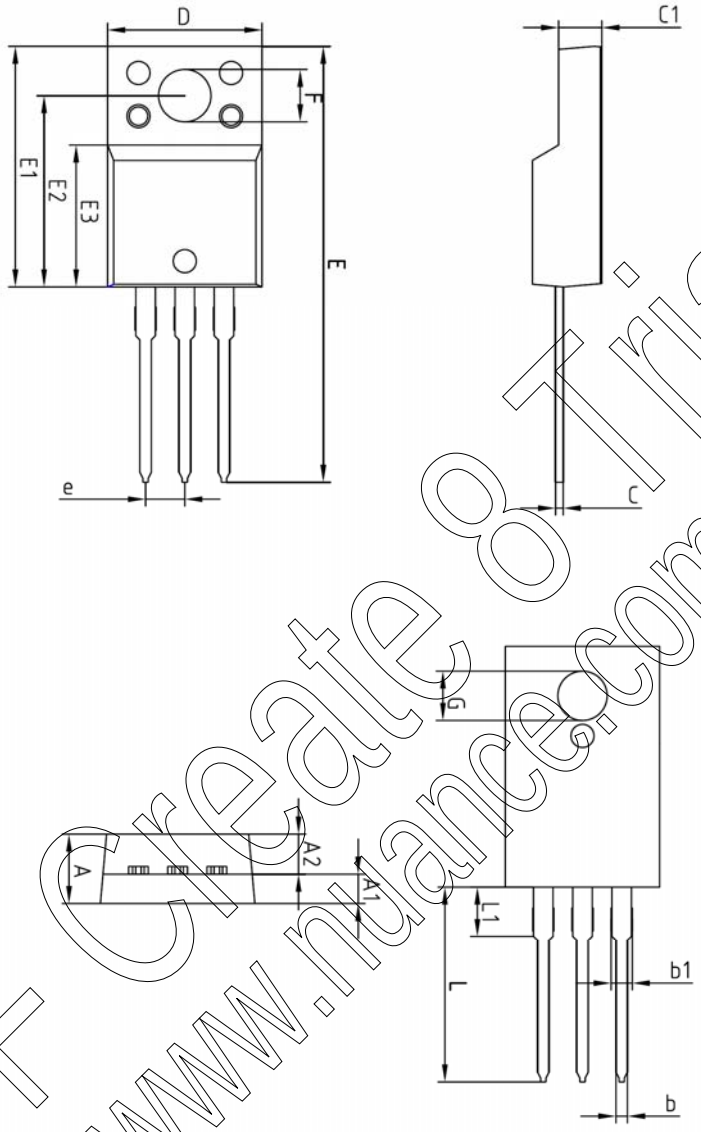


Fig. 14 Diode Reverse Recovery Time Test Circuit & Waveform



Outline Dimension



SYMBOL	MILLIMETERS			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
A	–	–	4.60	
A1	2.45	2.50	2.55	
A2	1.95	2.00	2.05	
b	0.65	0.75	0.85	
b1	1.07	1.27	1.47	
C	0.40	0.50	0.60	
C1	2.70	2.80	2.90	
D	9.90	10.00	10.10	
E	28.00	–	28.60	
E1	15.50	15.60	15.70	
E2	12.30	12.40	12.50	
E3	9.15	9.20	9.25	
F	3.30	3.40	3.50	
G	3.10	3.20	3.30	
e	2.54 BSC			
L	12.40	–	13.00	
L1	3.46 BSC			

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AUK Semiconductor

SMK1430DI

Advanced Power MOSFET

SWITCHING REGULATOR APPLICATIONS

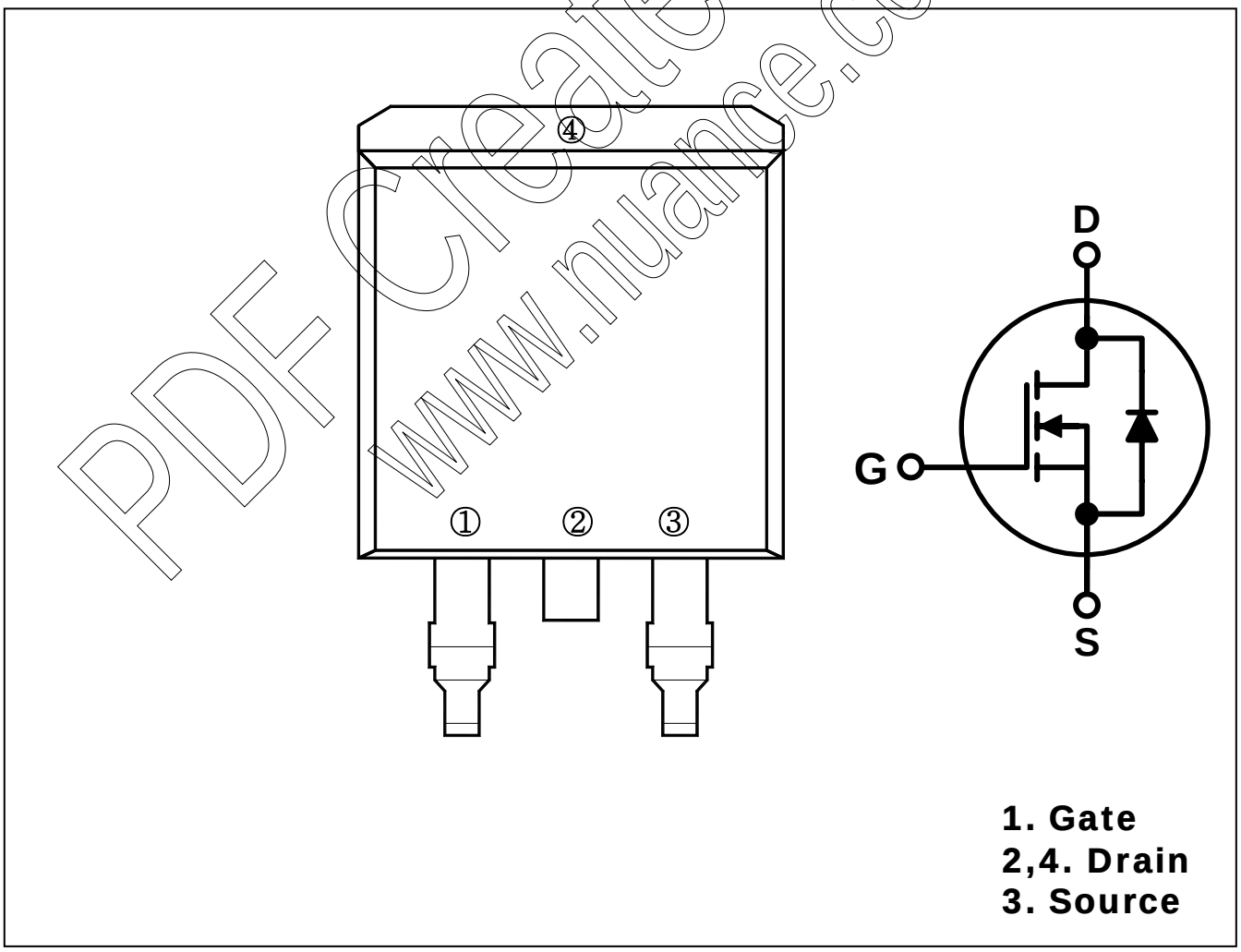
Features

- High Voltage: BV_{DSS}=300V(Min.)
- Low C_{rss} : C_{rss}=19pF(Typ.)
- Low gate charge : Qg= 24nc(Typ.)
- Low $R_{DS(on)}$:$R_{DS(on)}$=0.29Ω(Max.)

Ordering Information

Type NO.	Marking	Package Code
SMK1430DI SMK1430		D2-PAK

PIN Connections



Absolute maximum ratings (Tc=25°C)

Characteristic Symbol			Rating	Unit
Drain-source voltage	V_{DSS} 300			V
Gate-source voltage	V_{GSS}		±30	V
Drain current (DC) *	I_D	(Tc=25℃)	14	A
		(Tc=100℃)	8.4	A
Drain current (Pulsed) * ⑤	I_{DM}		90	A
Drain power dissipation	P_D		140	W
Avalanche current (Single) ②	I_{AS}		14	A
Single pulsed avalanche energy ②	E_{AS}		800	mJ
Avalanche current (Repetitive) ①	I_{AR}		14	A
Repetitive avalanche energy ①	E_{AR}		25	mJ
Junction temperature	T_J		150	℃
Storage temperature range	T_{stg}		-55~150	

* Limited by maximum junction temperature

Characteristic Symbol			Typ.	Max	Unit
Thermal resistance	Junction-case	$R_{th(J-C)}$	-	0.89	℃/W
	Junction-ambient	$R_{th(J-a)}$	-	62.5	

Electrical Characteristics

(Tc=25°C)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Drain-source breakdown voltage	BV_{DSS}	I_D=250μA, V_{GS}=0	300 -		-	V
Gate threshold voltage	$V_{GS(th)}$	I_D=250μA, V_{DS}= V_{GS}	3.0 -		5.0	V
Drain-source cut-off current	I_{DSS}	V_{DS}=300V, V_{GS}=0V -		-	1	μA
		V_{DS}=300V, V_{GS}=0V, TC=125℃			200	μA
Gate leakage current	I_{GSS}	V_{DS}=0V, V_{GS}=±30V	- -		±100	nA
Drain-source on-resistance ④	$R_{DS(ON)}$	V_{GS}=10V, I_D=7A -		0.24	0.29	Ω
Forward transfer conductance ④	g_{fs}	V_{DS}=5V, I_D=7A -		7.8	-	S
Input capacitance	Ciss -	V_{GS}=0V, V_{DS}=25V f=1MHz		1075	1344	pF
Output capacitance	Coss		-	182	228	
Reverse transfer capacitance	Crss		- 19		23.8	
Turn-on delay time	$t_{d(on)}$ -	V_{DD}=150V, I_D=14A R_G=25Ω ③④		22	-	ns
Rise time	t_r -			145	-	
Turn-off delay time	$t_{d(off)}$ -			45	-	
Fall time	t_f		-	70	-	
Total gate charge	Q_g -	V_{DS}=240V, V_{GS}=10V I_D=14A ③④		24	30	nC
Gate-source charge	Q_{gs} -			8.5	-	
Gate-drain charge	Q_{gd}		-	9.5	-	

Source-Drain Diode Ratings and Characteristics

(Tc=25°C)

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Source current (DC)	I_S	Integral reverse diode in the MOSFET	-	-	14	A
Source current (Pulsed) ①	I_{SM}		- -		56	
Forward voltage ④	V_{SD} V	$_{GS}$=0V, I_S=14A -		-	1.4	V
Reverse recovery time	t_{rr} -	I_s=14A, V_{GS}=0, dI_S/dt=100A/ us		235	-	ns
Reverse recovery charge	Q_{rr}		- 1.	6	-	uC

Note ;

① Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature

② L=6.8mH, I_{AS}=14A, V_{DD}=50V, R_G=25Ω

③ Pulse Test : Pulse Width < 30 0us, Duty cycle≤ 2%

④ Essentially independent of operating temperature

⑤ Pulse Width : 300us

Electrical Characteristic Curves

Fig. 1 I_D - V_{DS}

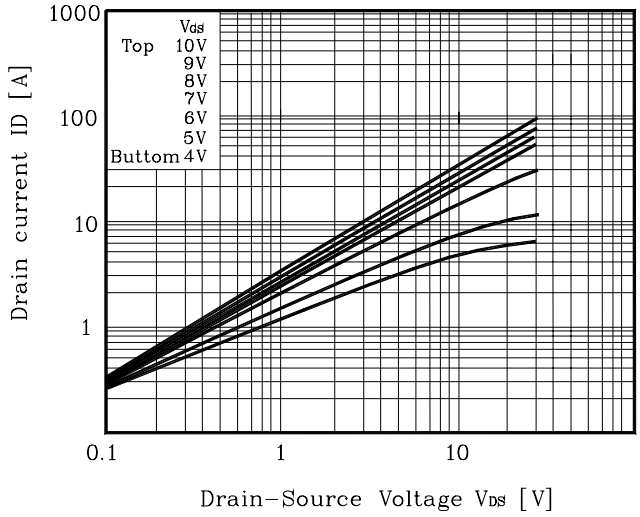


Fig. 2 I_D - V_{GS}

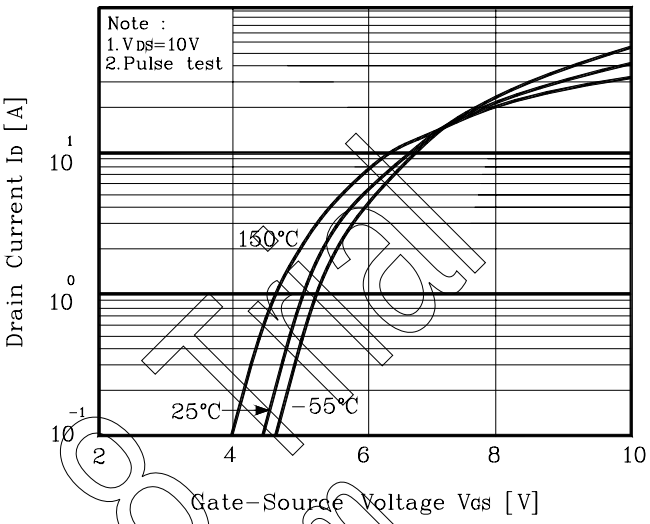


Fig. 3 $R_{DS(on)}$ - I_D

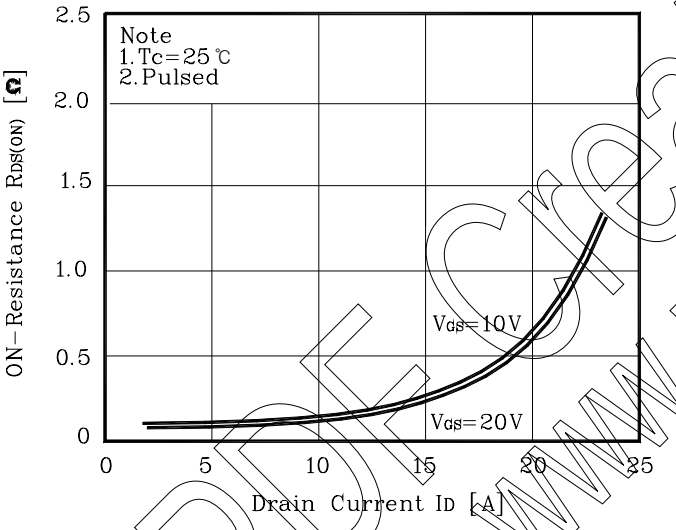


Fig. 4 I_S - V_{SD}

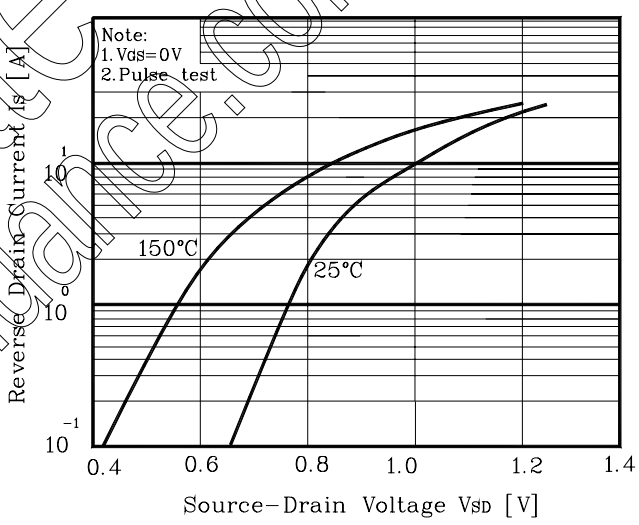


Fig. 5 Capacitance - V_{DS}

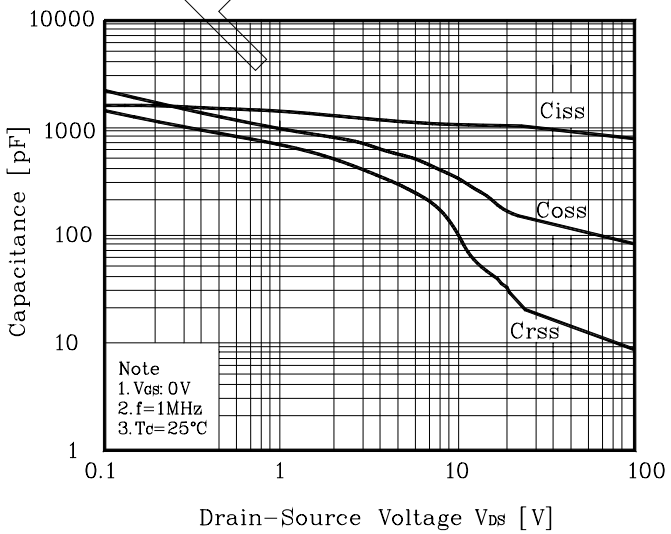


Fig. 6 V_{GS} - Q_G

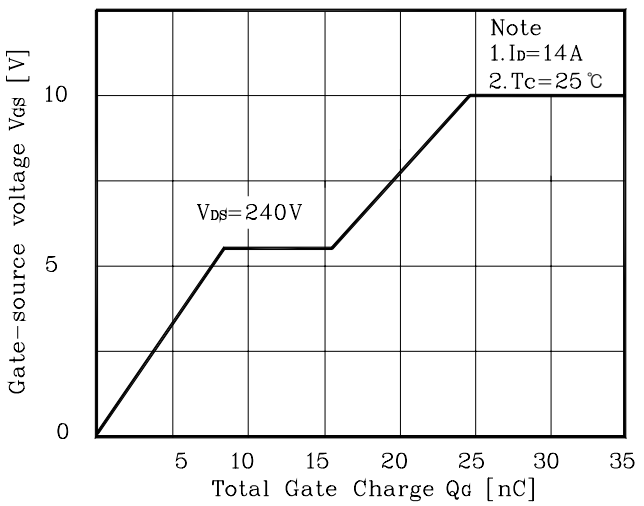


Fig. 7 V_{DSS} - T_J

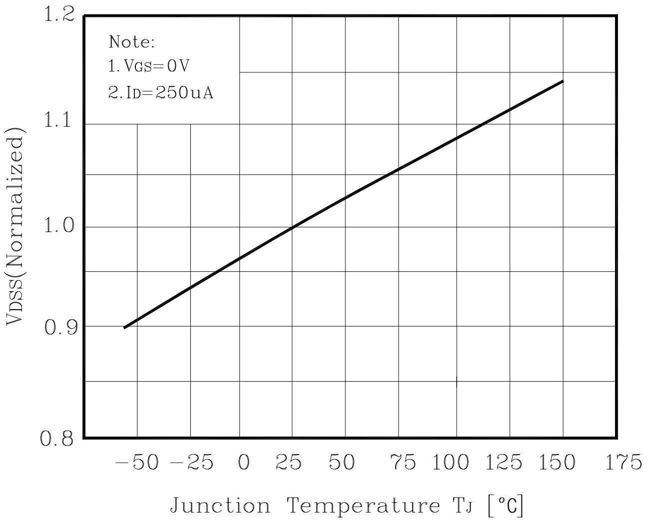


Fig. 8 $R_{DS(on)}$ - T_J

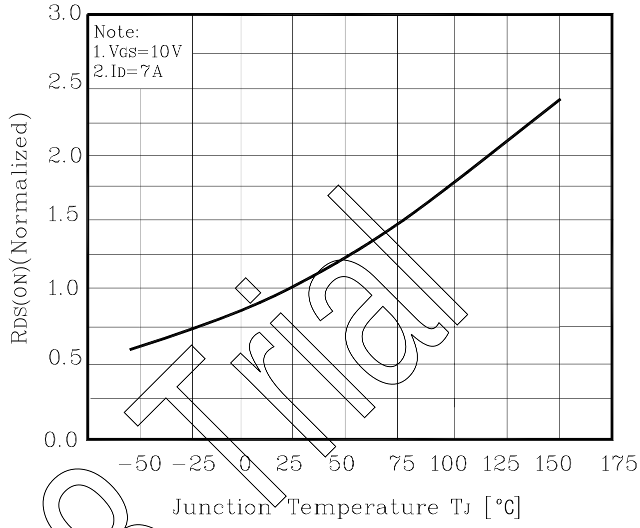


Fig. 9 I_D - T_C

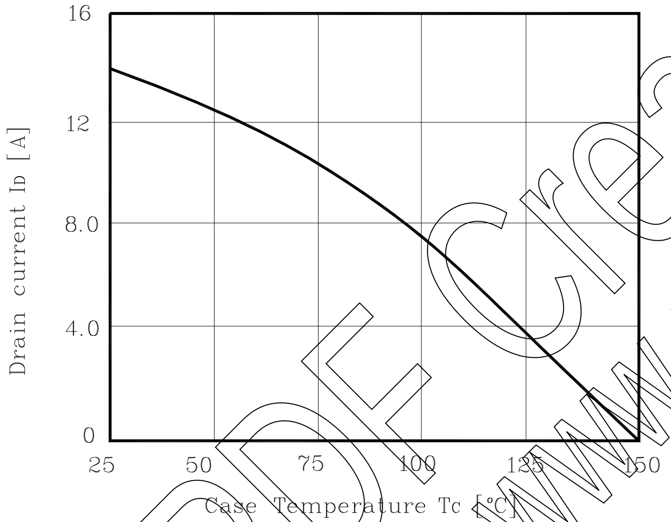


Fig. 10 Safe Operating Area

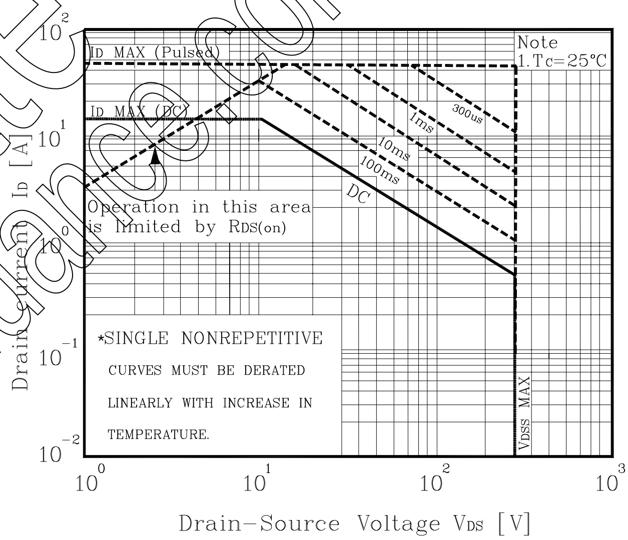


Fig. 11 Transient Thermal Impedance

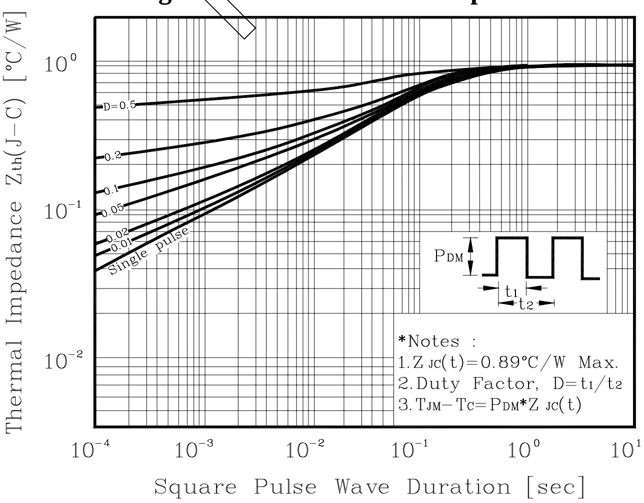


Fig. 11 Gate Charge Test Circuit & Waveform

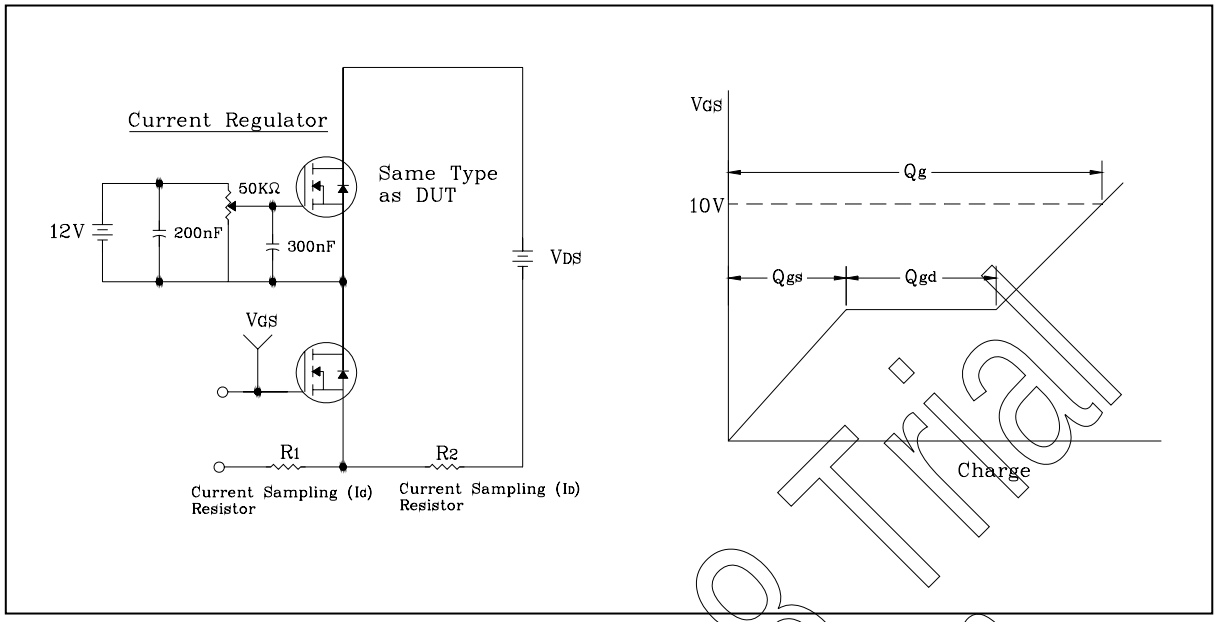


Fig. 12 Resistive Switching Test Circuit & Waveform

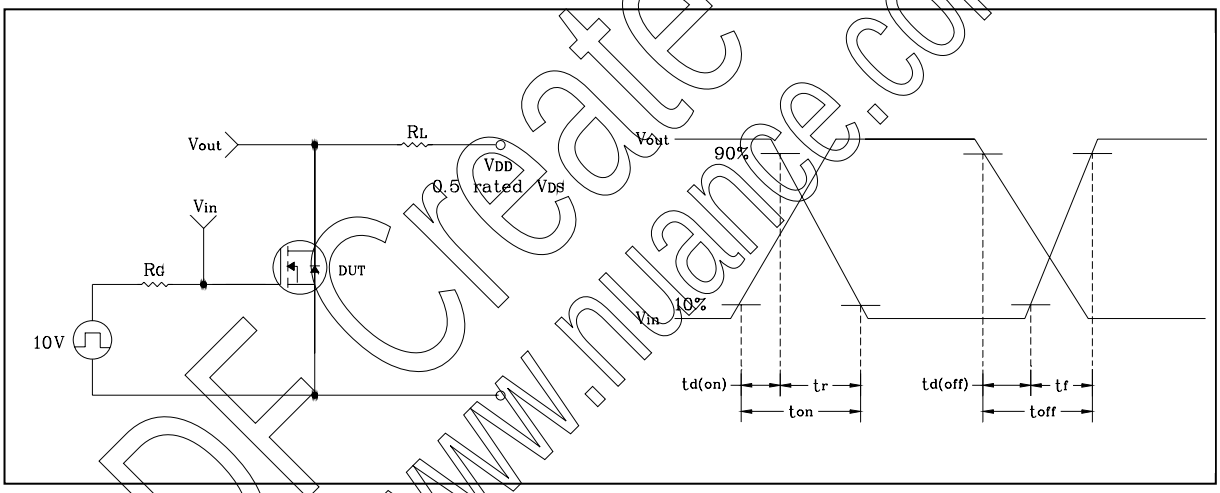


Fig. 13 E_{AS} Test Circuit & Waveform

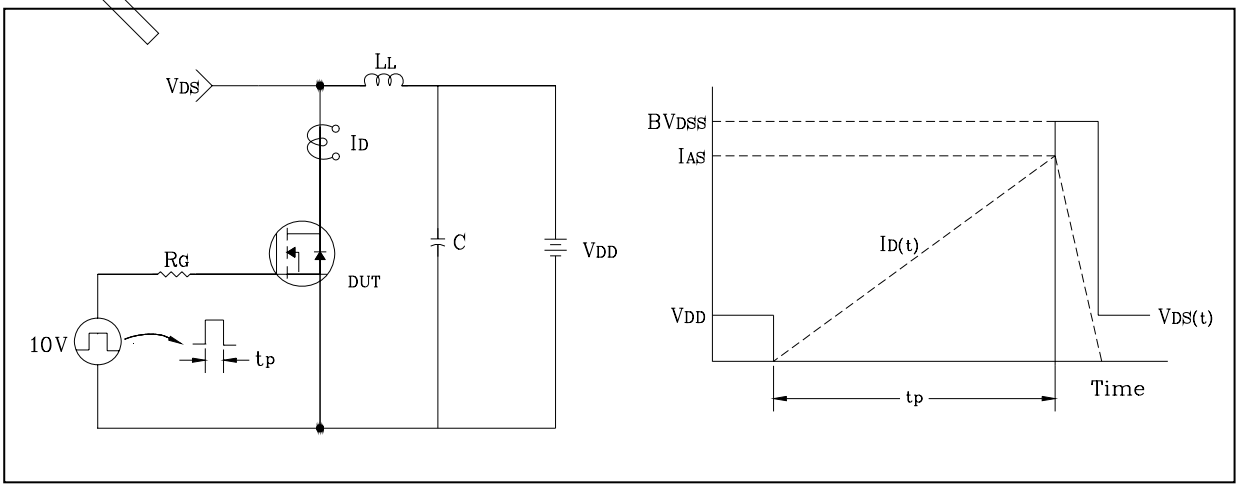
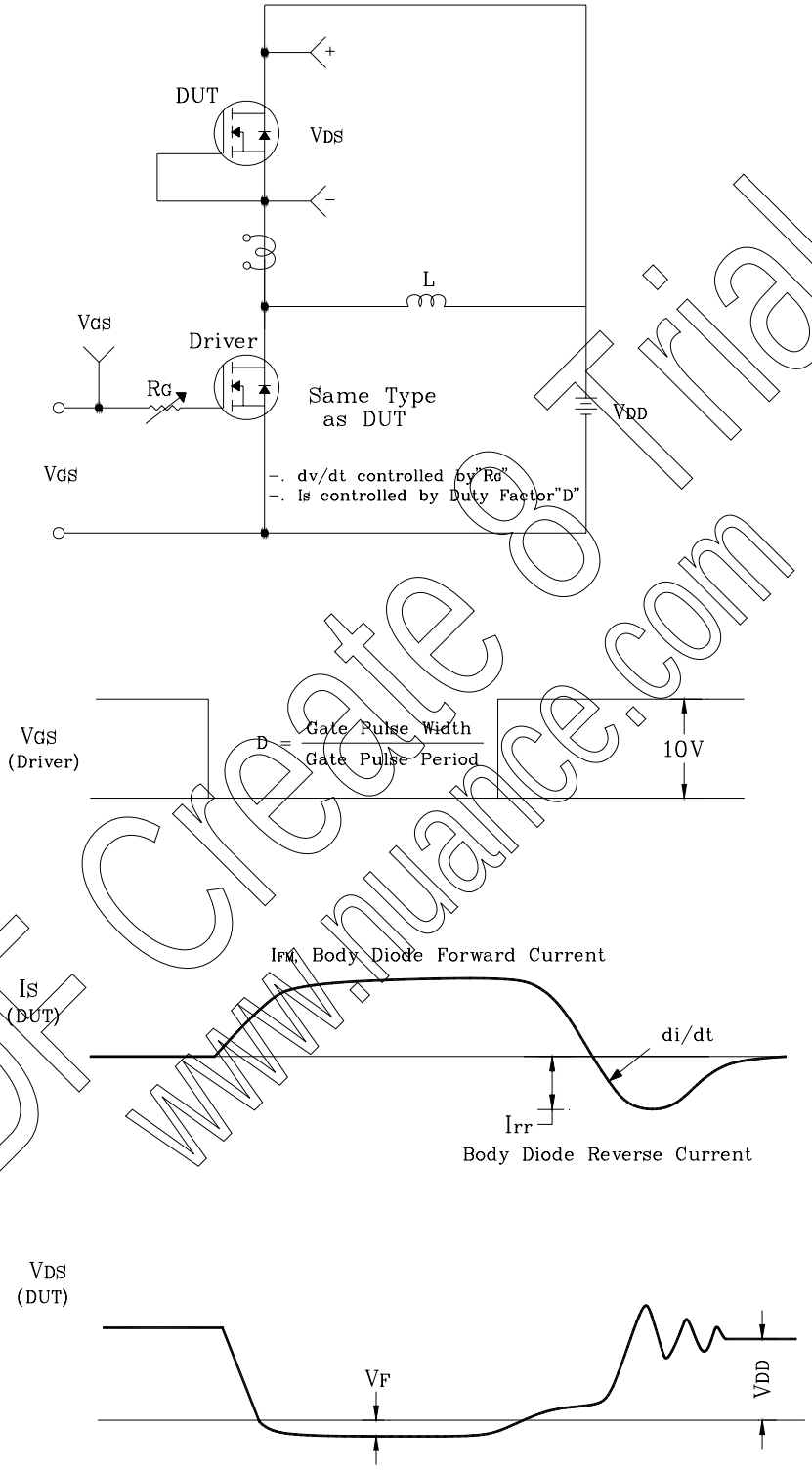
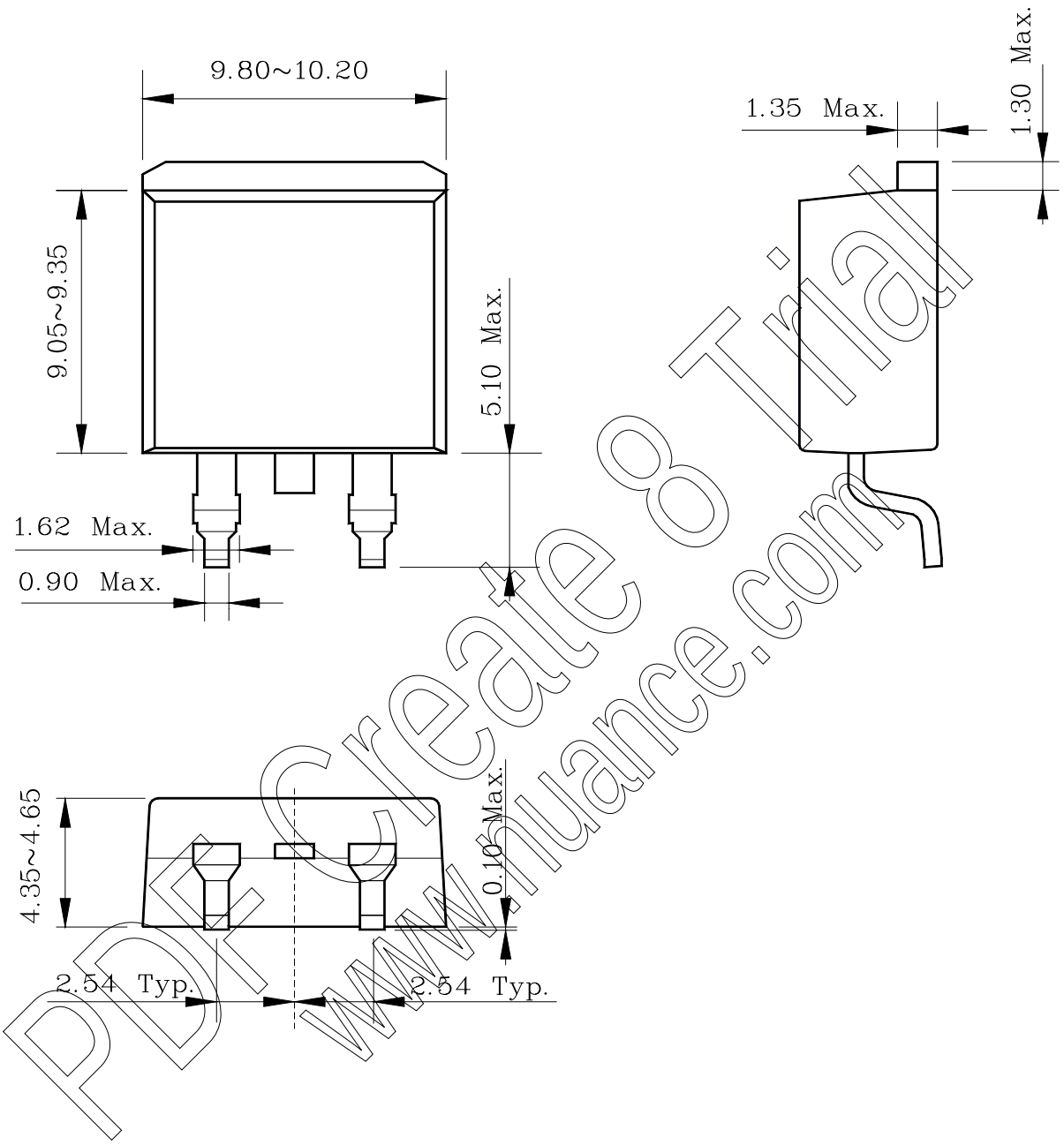


Fig. 14 Diode Reverse Recovery Time Test Circuit & Waveform



Outline Dimension **u** **nit: mm**



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