Product Summary

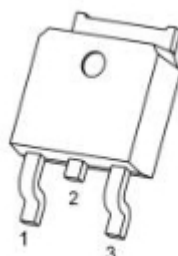| $V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
700V	0.8Ω@10V	12A

Feature

- Fast Switching
- Improved dv/dt capability
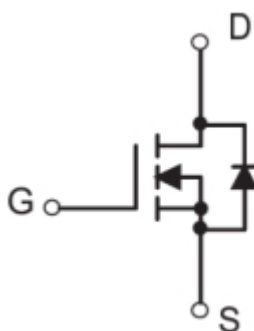- 100% Single Pulse avalanche energy Test

Applications

- DC Motor Control and Class D Amplifier
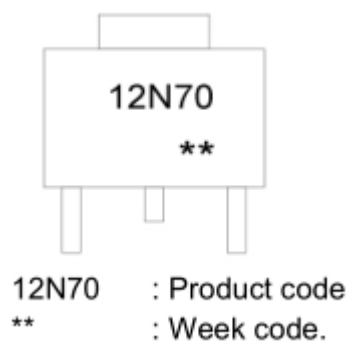- Uninterruptible Power Supply (UPS)

Package

TO-252-2L(G:1 D:2 S:3)

Circuit diagram

Marking

12N70 : Product code
** : Week code.

Absolute maximum ratings

(T_a=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	700	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current (T_C = 25℃)	I_D	12	W
Pulsed Drain Current	I_{DM}	48	A
Single Pulse Avalanche Energy	E_{AS}	550	mJ
Power Dissipation (T_C = 25℃)	P_D	55	W
Thermal Resistance Junction-Case	$R_{\theta JC}$	2.27	℃/ W
Operating and Storage Temperature Range	T_J, T_{STG}	-55~ +150	℃

Electrical characteristics

(T_A=25℃, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	BV_{DSS}	V_{GS} = 0V, I_D =250μA	700			V
Zero gate voltage drain current	I_{DSS}	V_{DS} =700V,V_{GS} = 0V , T_J=25℃			10	uA
Gate-body leakage current	I_{GSS}	V_{GS} =±20V , V_{DS}=0V			±100	uA
Gate threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA	2		4	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} =10V, I_D =5A		0.8	1	Ω
Dynamic characteristics[4]						
Input Capacitance	C_{iss}	V_{DS}=25V,V_{GS}=0V, f=1MHz		1852		pF
Output Capacitance	C_{oss}			190		
Reverse Transfer Capacitance	C_{rss}			20		
Total Gate Charge(4.5V)	Q_g	V_{DS}=520V, V_{GS}=10V, I_D=18A		42		nC
Gate-Source Charge	Q_{gS}			9		
Gate-Drain Charge	Q_{gd}			18.3		
Switching Characteristics						
Turn-On Delay Time	$T_{d(on)}$	V_{DS}=15V, I_D=5.5A, R_{GEN}=1.8Ω, V_{GS}=4.5V		30		nS
Rise Time	T_r			115		
Turn-Off Delay Time	$T_{d(off)}$			95		
Fall Time	T_f			85		
Drain-Source Diode Characteristics and Maximum Ratings						
Maximum Continuous Drain to Source Diode Forward Current	I_S				130	A
Maximum Pulsed Drain to Source Diode Forward Current	I_{SM}				360	A
Drain to Source Diode Forward Voltage	V_{SD}	V_{GS} = 0V, I_S=20A			1.2	V
Body Diode Reverse Recovery Time	t_{rr}	I_F=60A,dI/dt=100A/μs		56		ns
Body Diode Reverse Recovery Time Charge	Q_{rr}			110		nC

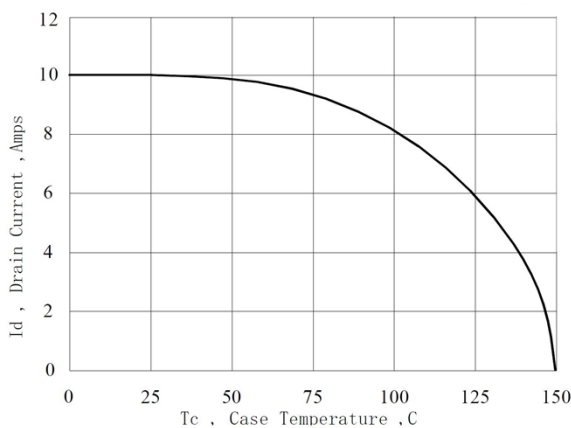**Note :**

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

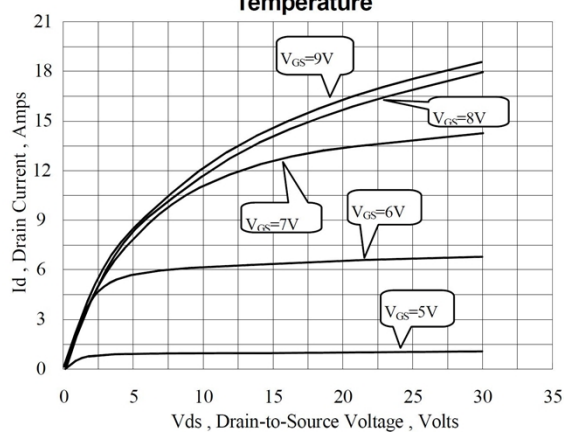2. EAS condition: T_j=25℃, V_G=10V,L=30mH,Rg=25Ω,V_{DD}=100V
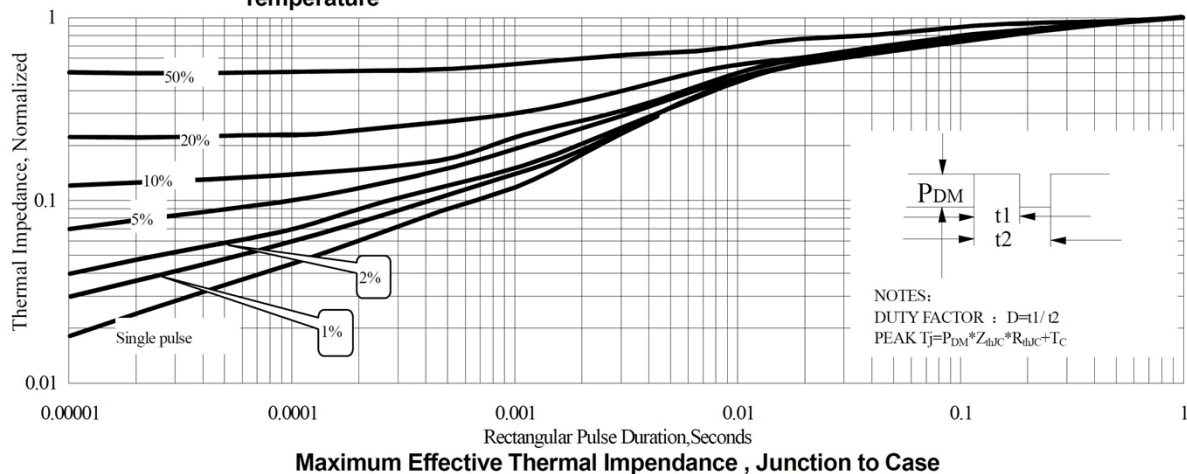
Typical Characteristics
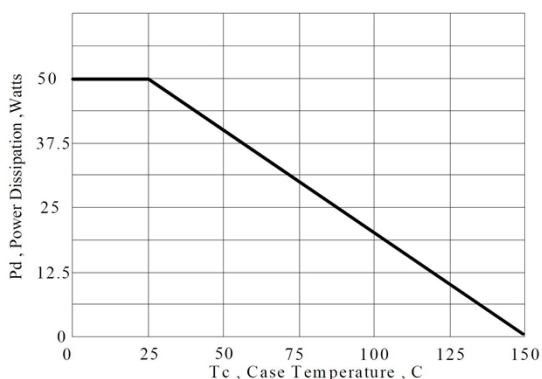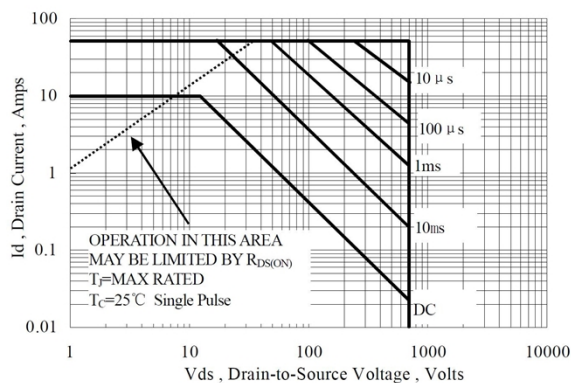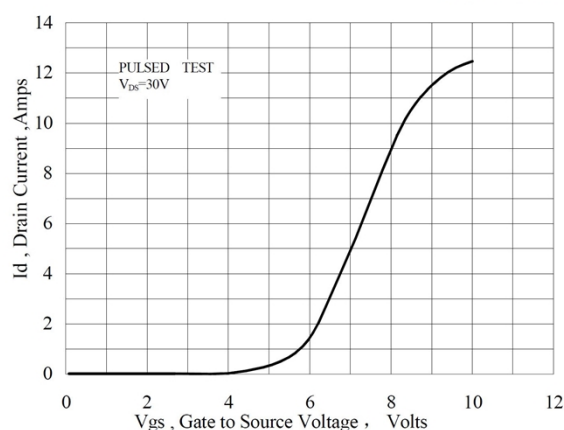

Maximum Forward Bias Safe Operating Area
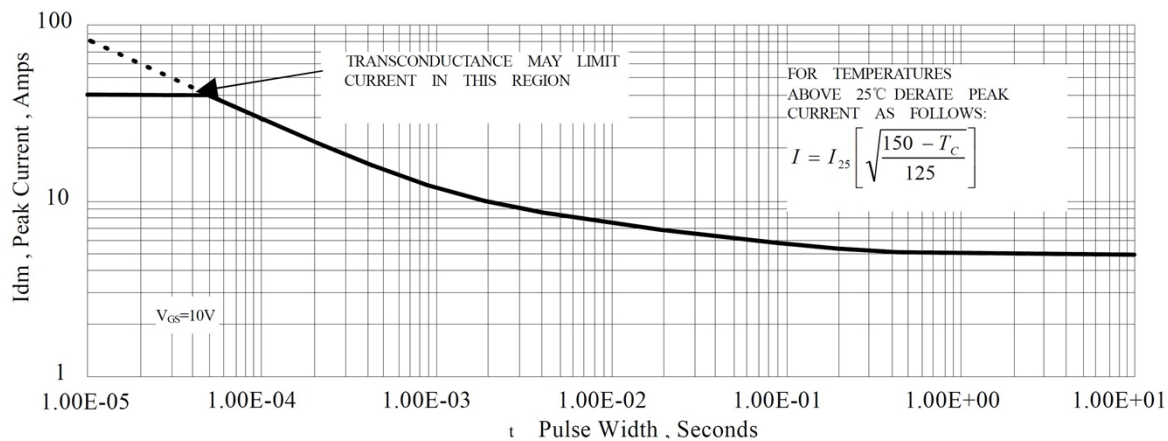

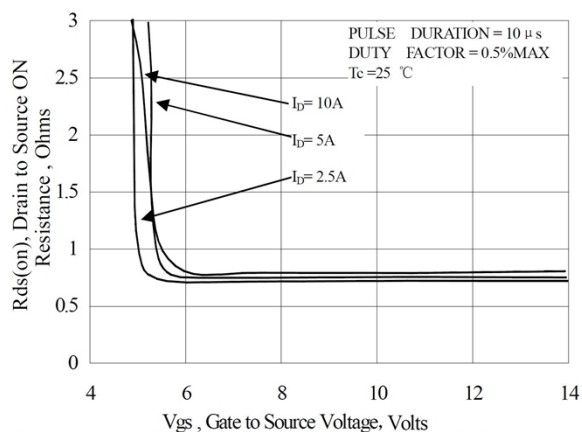**Maximum Power Dissipation vs Case Temperature**

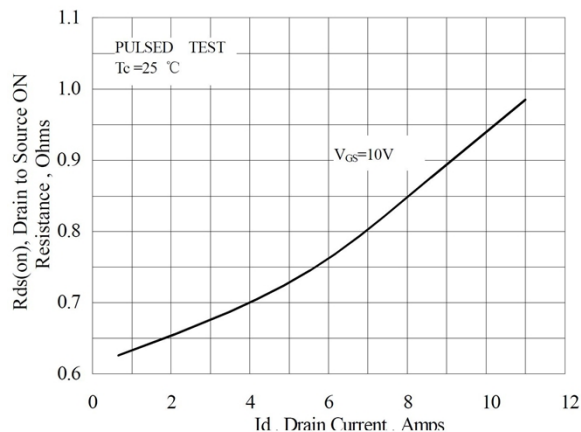**Maximum Continuous Drain Current vs Case Temperature**
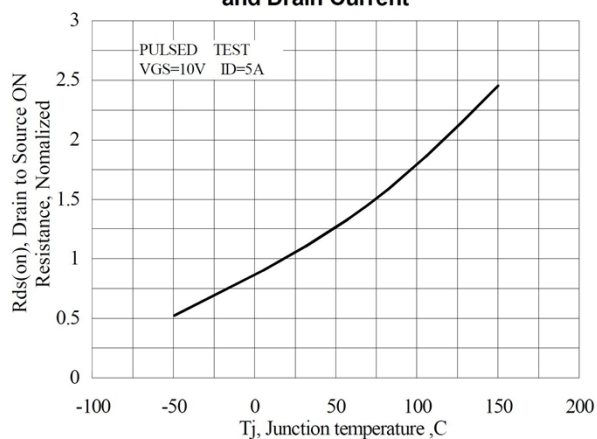

Typical Output Characteristics

NOTES:
DUTY FACTOR : D=t1/t2
PEAK Tj=P_{DM}*Z_{thJC}*R_{thJC}+T_C

Maximum Effective Thermal Impendance , Junction to Case

TRANSCONDUCTANCE MAY LIMIT CURRENT IN THIS REGION

FOR TEMPERATURES ABOVE 25℃ DERATE PEAK CURRENT AS FOLLOWS:

$$I = I_{25}\left[\sqrt{\frac{150 - T_C}{125}}\right]$$

$V_{GS}=10V$

Maximum Peak Current Capability

PULSED TEST
V_{DS}=30V

Typical Transfer Characteristics

PULSE DURATION = 10 μs
DUTY FACTOR = 0.5%MAX
Tc =25 ℃

I_D= 10A
I_D= 5A
I_D= 2.5A

Typical Drain to Source ON Resistance vs Gate Voltage and Drain Current

PULSED TEST
Tc =25 ℃

V_{GS}=10V

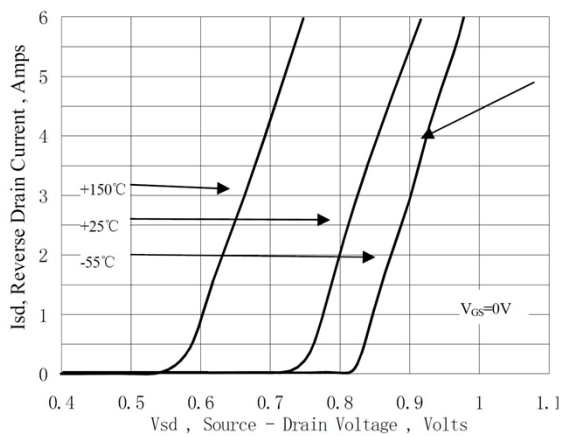**Typical Drain to Source ON Resistance vs Drain Current**

PULSED TEST
VGS=10V ID=5A

Typical Drian to Source on Resistance vs Junction Temperature
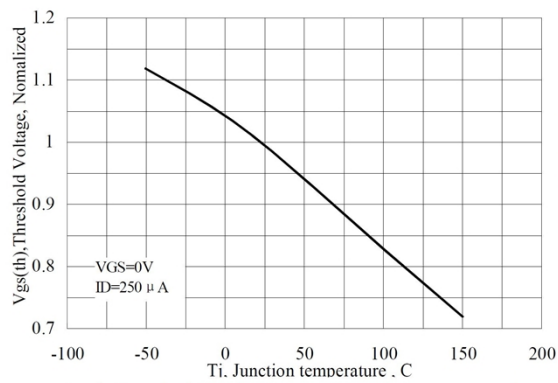
Typical Theshold Voltage vs Junction Temperature

Typical Breakdown Voltage vs Junction Temperature

Tpical Capacitance vs Drain to Source Voltage
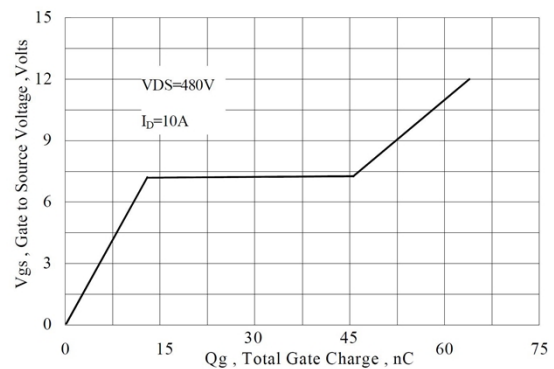
Typical Gate Charge vs Gate to Source Voltage

Typical Body Diode Transfer Characteristics
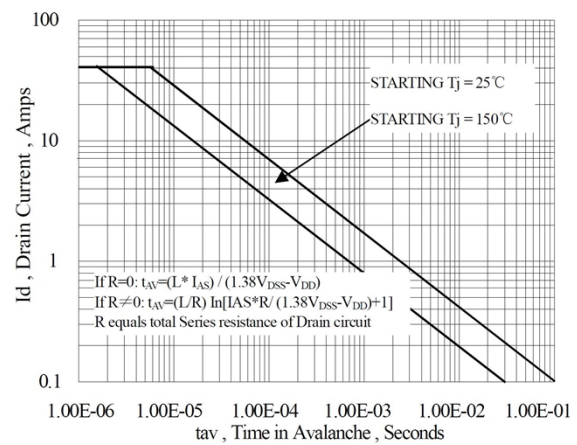
Maximum Forward Bias Safe Operating Area

TO-252 Package Information
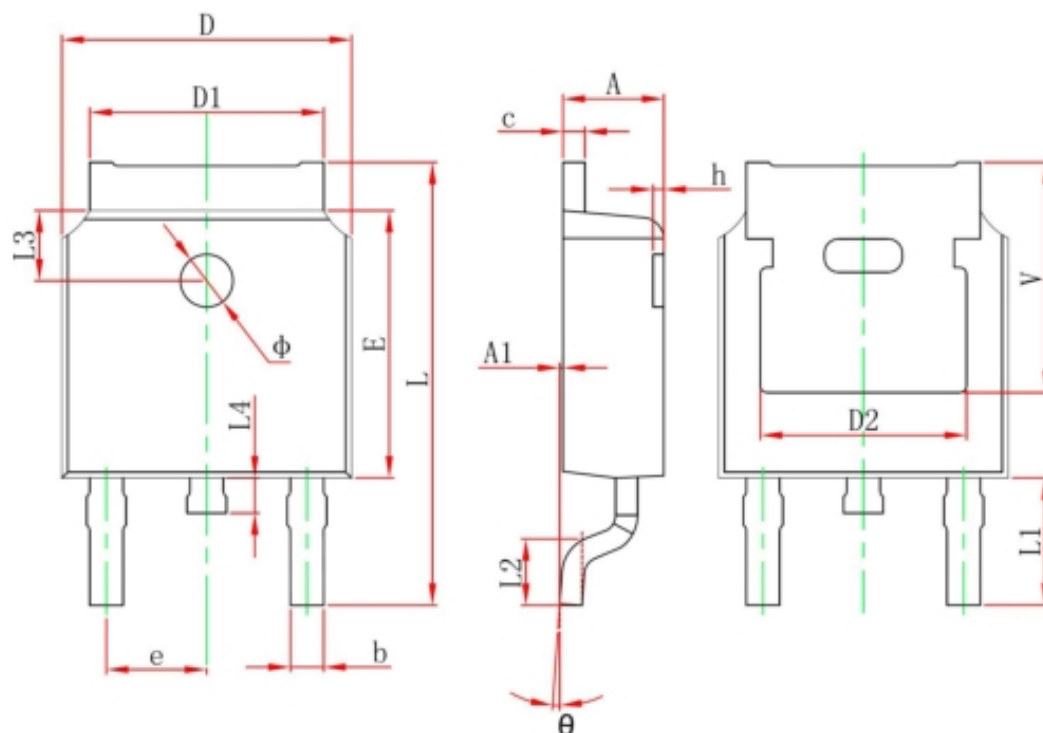
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 REF.		0.211 REF.	