N Channel MOSFET

Lead Free Package and Finish

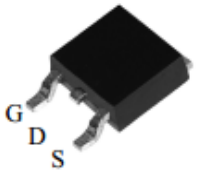
Applications:

- PWM applications
- AC-DC Switching Power Supply
- Load switch
- Power management

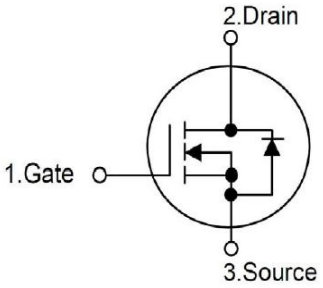
I_D	$R_{DS(ON)}$(Max.)	V_{DSS}
86A	5.5mΩ	30V

Features:

- V_{DS} = 30V,I_D =86A
  $R_{DS(ON)}$ < 5.5 mΩ @ V_{GS} =10V
  $R_{DS(ON)}$ < 11mΩ @ V_{GS} =4.5V
- High Power and current handing capability
- Surface Mount Package
- RoHS Compliant



TO-252



Not to Scale

Ordering Information

Part Number	Package	Marking
RS30N86D	TO-252	RS30N86D

Absolute Maximun Ratings Tc=25℃ unless otherwise specified

Symbol	Parameter	RS30N86D	Units
VDSS	Drain-to-Source Voltage	30	V
ID	Continuous Drain Current（Tc=25℃） （Note*1)	86	A
	Continuous Drain Current Tc=100℃	50	
IDM	Pulsed Drain Current (Note*2)	170	
PD	Power Dissipation（Tc=25℃）	83	W
	Power Dissipation（Tc=100℃）	42	
VGS	Gate-to-Source Voltage	±20	V
EAS	Single Pulse Avalanche Engergy (Note *3)	306	mJ
TL TPKG	Maximum Temperature for Soldering Leads at 0.063in(1.6mm)from Case for 10 seconds Package Body for 10 seconds	300 260	℃
TJ and TSTG	Operating Junction and Storage Temperature Range	-55 to 175	

*Drain Current Limited by Maximum Junction Temperature

Caution:Stresses greater than those listed in the“Absolute Maximum Ratings”Table may cause permanent damage to the device.

Thermal Resistance

Symbol	Parameter	RS30N86D	Units	Test Conditions
RθJC	Junction-to-Case	1.8	℃/W	Drain lead soldered to water cooled heatsink,PD adjusted for a peak junction temperature of +175℃.

OFF Characteristics TJ=25℃ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
BVDSS	Drain-to-source Breakdown Voltage	30	--	--	V	VGS=0V,ID=250μA
IDSS	Drain-to-Source Leakage Current	--	--	1	μA	VDS=30V,VGS=0V
IGSS	Gate-to-Source Forward Leakage	--	--	100	nA	VGS=+20V VDS=0V
	Gate-to-Source Reverse Leakage	--	--	-100		VGS=-20V VDS=0V

ON Characteristics TJ=25℃ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
RDS(on)	Static Drain-to-Source On-Resistance	--	4.7	5.5	mΩ	VGS=10V,ID=30A
			7.8	11		VGS=4.5V,ID=24A
VGS(TH)	Gate Threshold Voltage	1.0	1.5	3.0	V	VGS=VDS,ID=250μA

Resistive Switching Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
td(ON)	Turn-on Delay Time	--	20	--	nS	VDS=10V VGS=10V ID=30A RGEN=2.7Ω
trise	Rise Time	--	15	--		
td(OFF)	Turn-OFF Delay Time	--	60	--		
tfall	Fall Time	--	10	--		

Dynamic Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
Ciss	Input Capacitance	--	2330	--	pF	VGS=0V VDS=15V f=1.0MHz
Coss	Output Capacitance	--	460	--		
Crss	Reverse Transfer Capacitance	--	230	--		
Qg	Total Gate Charge	--	51	--	nC	VDS=10V ID=30A VGS=10V
Qgs	Gate-to-Source Charge	--	14	--		
Qgd	Gate-to-Drain("Miller"）Charge	--	11	--		

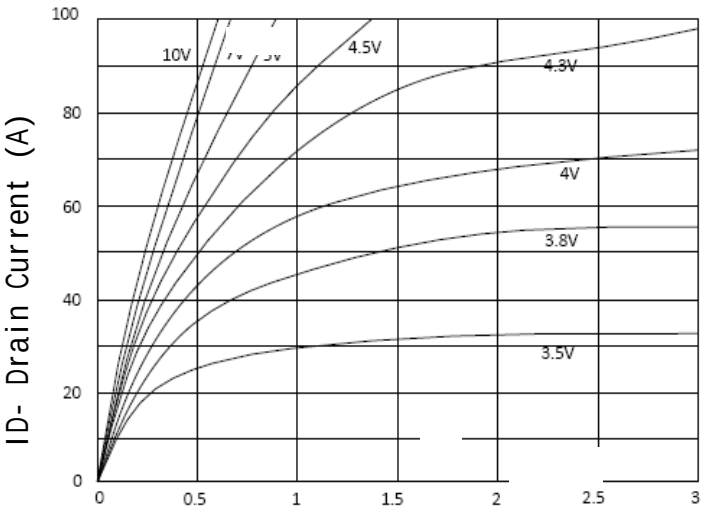
Source-Drain Diode Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I_{SD}	Source-Drain Current(Body Diode)	--	--	86	A	Integral pn-diode in MOSFET
V_{SD}	Diode Forward Voltage	--	--	1.2	V	IS=24A,VGS=0V
trr	Reverse Recovery Time	--	32	50	nS	VGS=0V I_F=80A,di/dt=100A/μs
Qrr	Reverse Recovery Charge	--	12	20	nC	

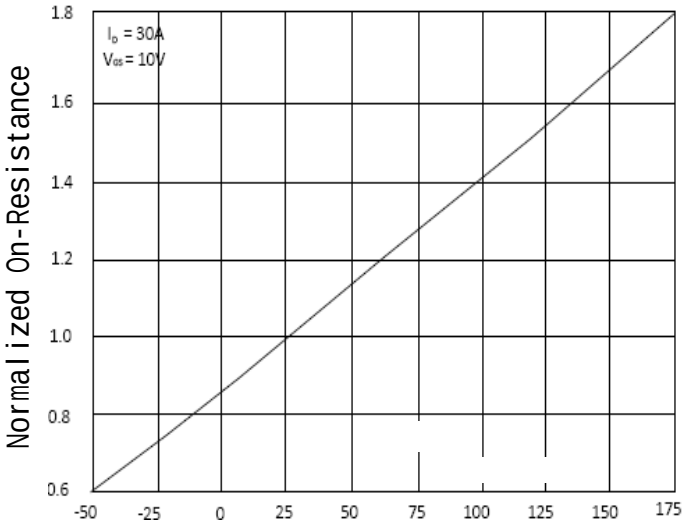
Notes:

*1.The maximum current rating is package limited.
*2.Repetitive rating;pulse width limited by maximum junction temperature.*3.
EAS condition: TJ=25℃,VDD=15V,VG=10V, RG=25Ω,L=0.5mH,I_{AS}=35A

Typical Electrical and Thermal Characteristics (Curves)



Vds Drain-Source Voltage (V)
Figure 1 Output Characteristics



TJ-Junction Temperature(°C)
Figure 4 Rdson-JunctionTemperature

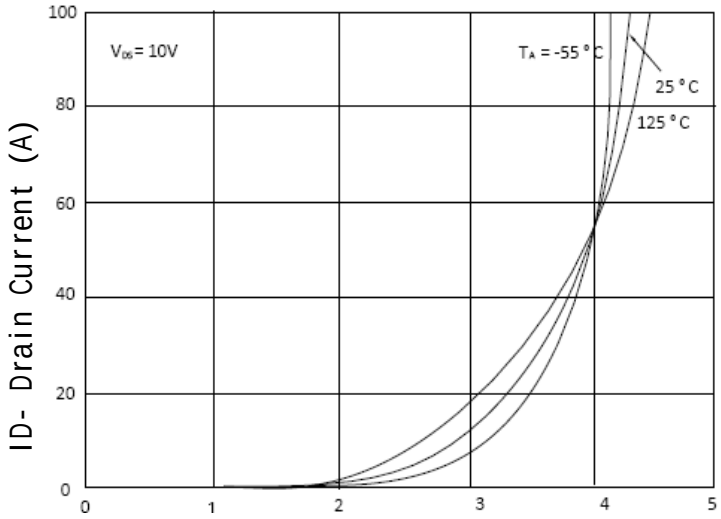


Figure 2 Transfer Characteristics

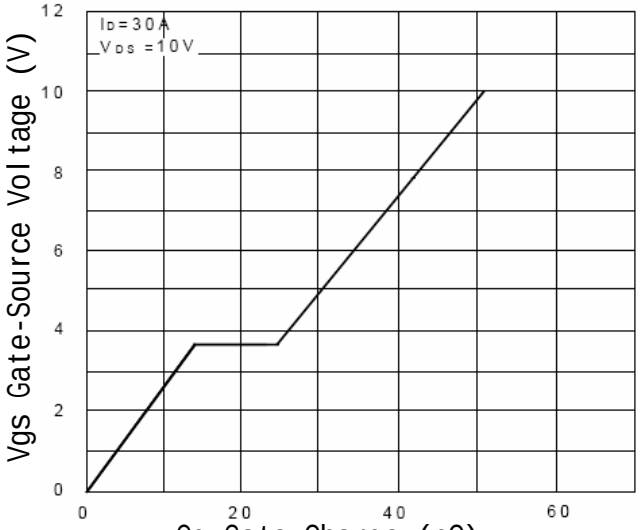


Figure 5 Gate Charge

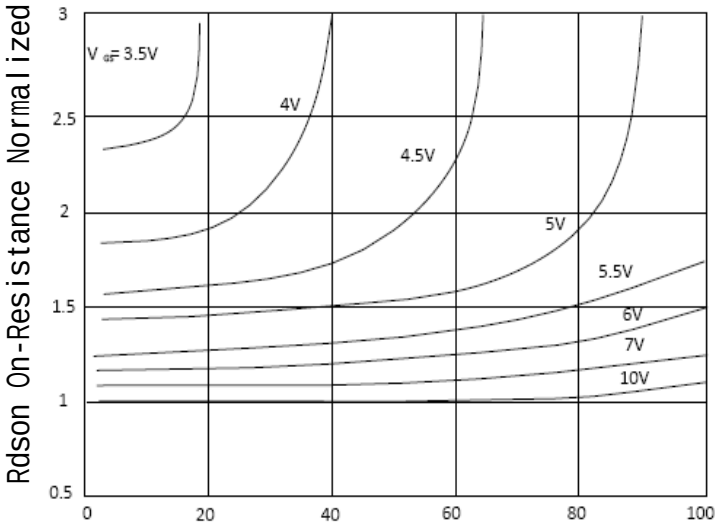


Figure 3 Rdson- Drain Current

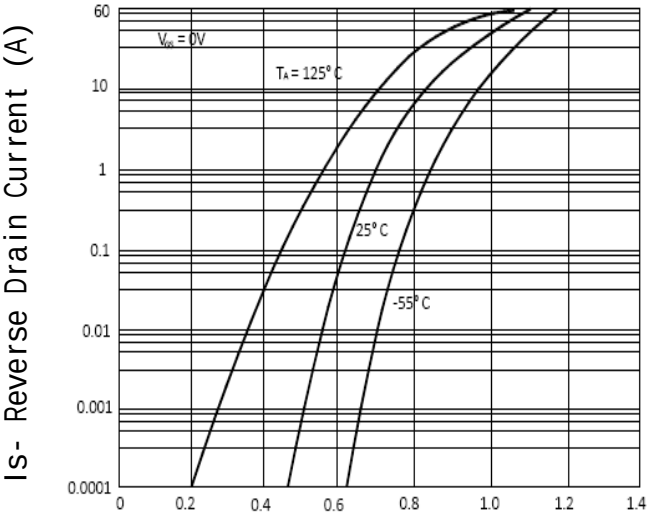


Figure 6 Source- Drain Diode Forward

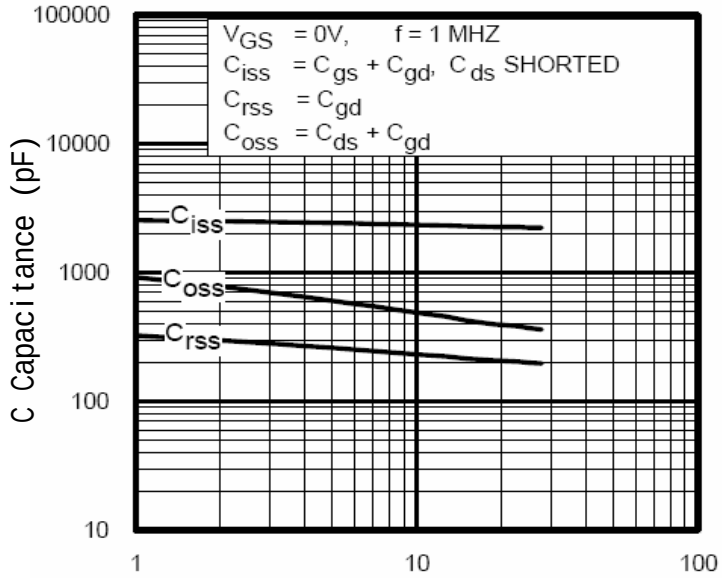


Figure 7 Capacitance vs Vds

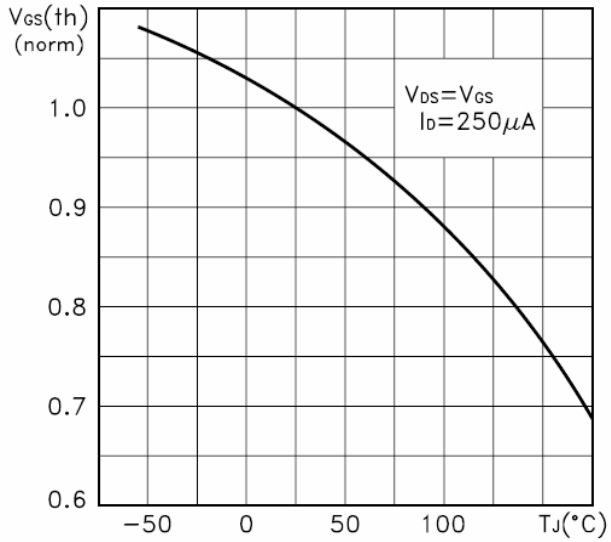
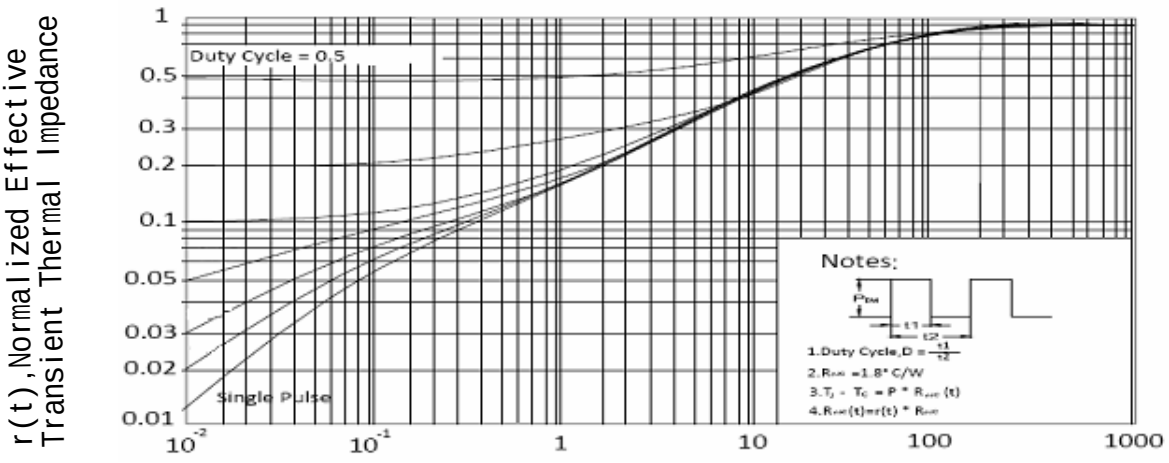


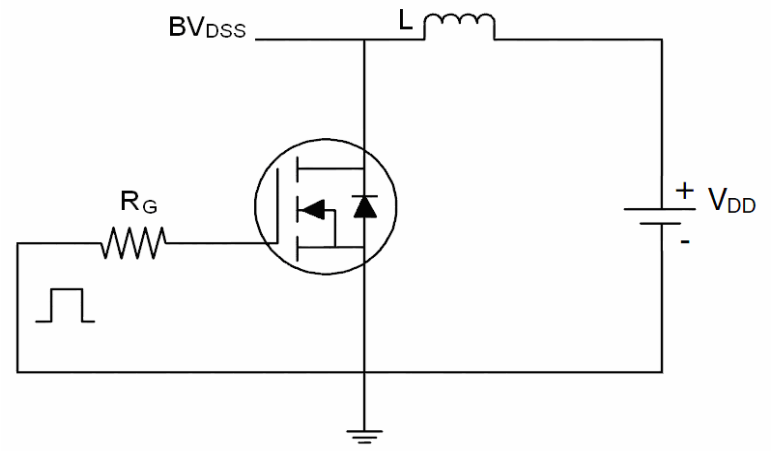
Figure 10 VGS(th) vs Junction Temperature



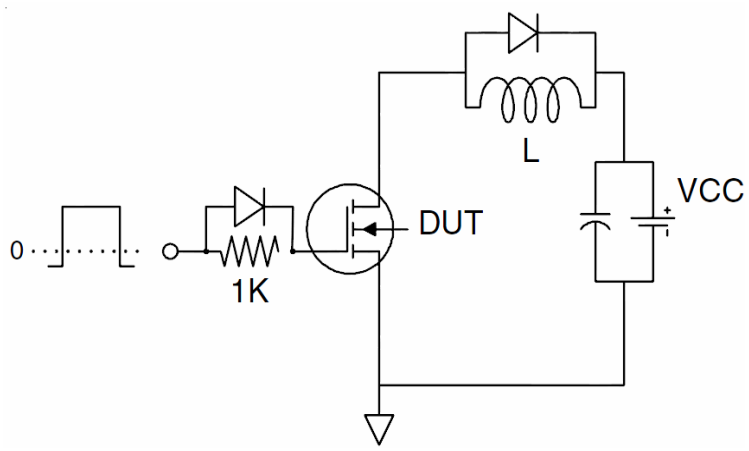
Square Wave Pluse Duration(sec)
Figure 11 Normalized Maximum Transient Thermal Impedance

Test Circuit

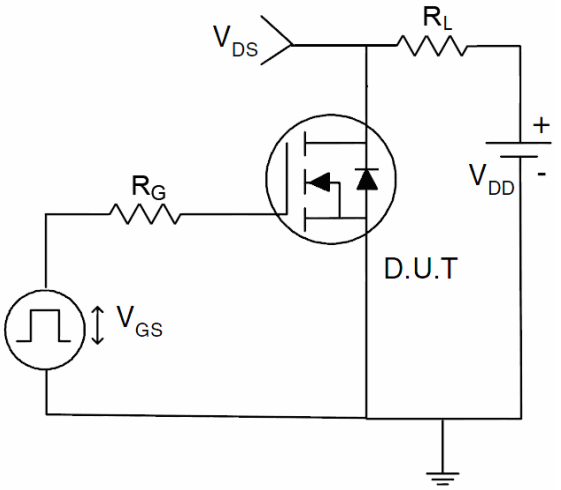
1) EAS Test Circuits



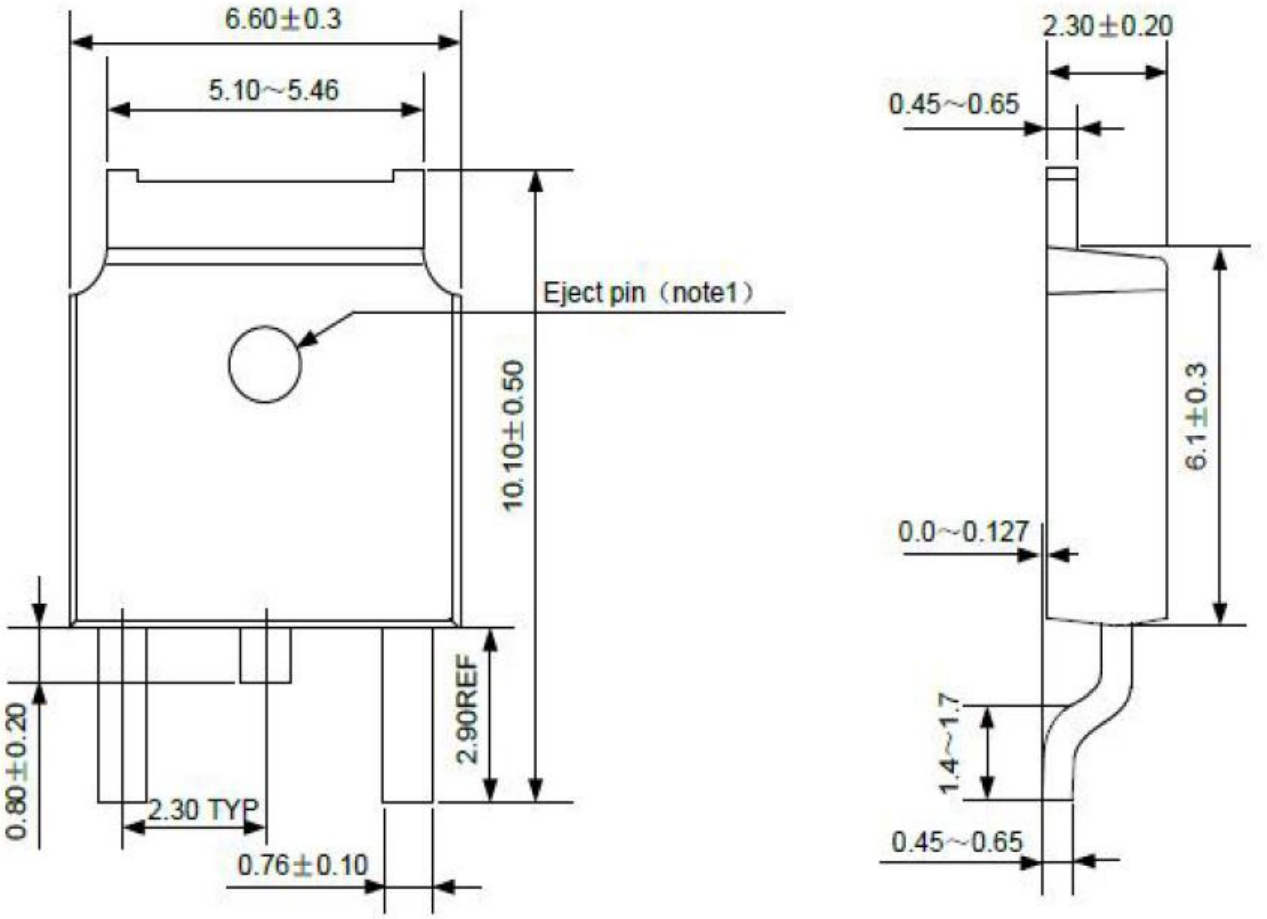
2) Gate Charge Test Circuit:



3) Switch Time Test Circuit：



Package outline drawing



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