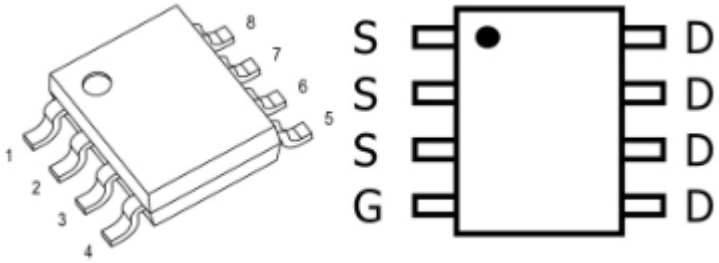
Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
40V	12mΩ@10V	10A
	16mΩ@4.5V	

Feature

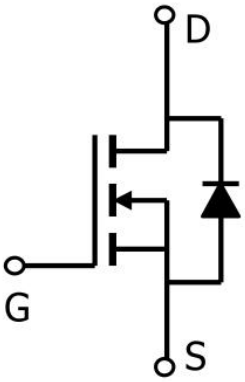
- High power and current handing capability
- Lead free product is acquired
- Surface mount package

Package

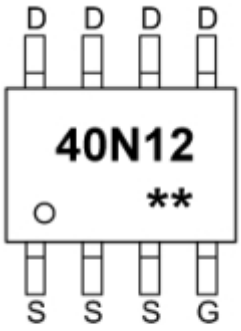


SOP-8L

Circuit diagram



Marking



40N12 **=Device Code**
****** **=Week Code**

Absolute maximum ratings

(T_a=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	10	A
Drain Current-Continuous(T_C=100℃)	$I_{D(100℃)}$	7	A
Pulsed Drain Current	I_{DM}	40	A
Maximum Power Dissipation	P_D	2	W
Thermal Resistance,Junction-to-Ambient	$R_{\theta JA}$	62.5	℃/ W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	℃

Electrical characteristics

(T_A=25℃, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	$BV_{(BR)DSS}$	V_{GS} = 0V, I_D =250μA	40			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} =40V,V_{GS} = 0V			1	uA
Gate-Body Leakage Current	I_{GSS}	V_{GS} =±20V , V_{DS}=0V			±100	uA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA	1	1.5	2.5	V
Drain-Source On-State Resistance	$R_{DS(on)}$	V_{GS} =10V, I_D =8A		12	15	mΩ
		V_{GS} =4.5V, I_D =4A		16	22	
Forward Transconductance	g_{FS}	V_{DS}=5V,I_D=8A	33			S
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=20V, V_{GS}=0V, f=1MHz		964		pF
Output Capacitance	C_{oss}			109		
Reverse Transfer Capacitance	C_{rss}			96		
Switching Characteristics						
Turn-On Delay Time	$T_{d(on)}$	V_{DD}=20V, R_L =2.5Ω, V_{GS}=10V, R_{GEN}=3Ω		5.5		nS
Rise Time	T_r			14		
Turn-Off Delay Time	$T_{d(off)}$			24		
Fall Time	T_f			12		
Total Gate Charge	Q_g	V_{DS}=20V, I_D =8A, V_{GS}=10V		22.9		pF
Gate-Source Charge	Q_{gs}			3.5		
Gate-Drain Charge	Q_{gd}			5.3		
Drain-Source Diode Characteristics						
Diode Forward Voltage	V_{SD}	V_{GS}=0V,I_S=9A		0.8	1.2	A

Typical Characteristics

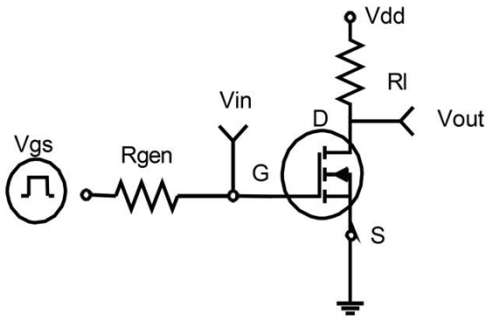


Figure 1:Switching Test Circuit

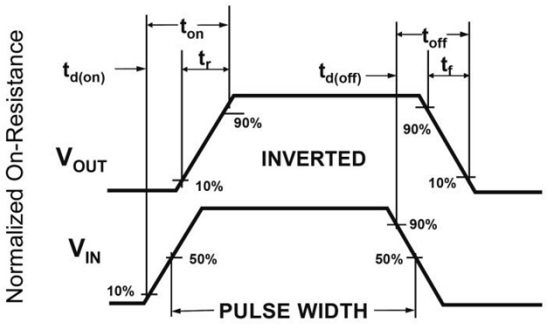


Figure 2:Switching Waveforms

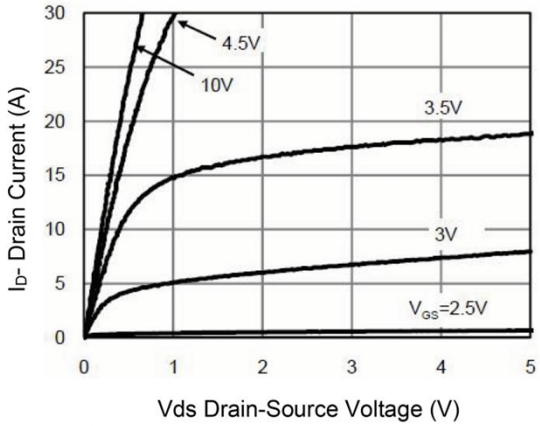


Figure 3 Output Characteristics

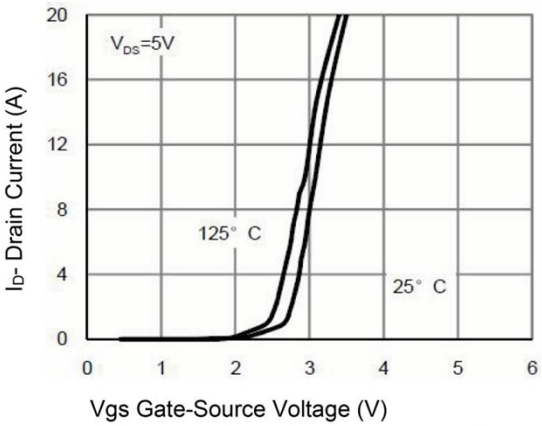


Figure 4 Transfer Characteristics

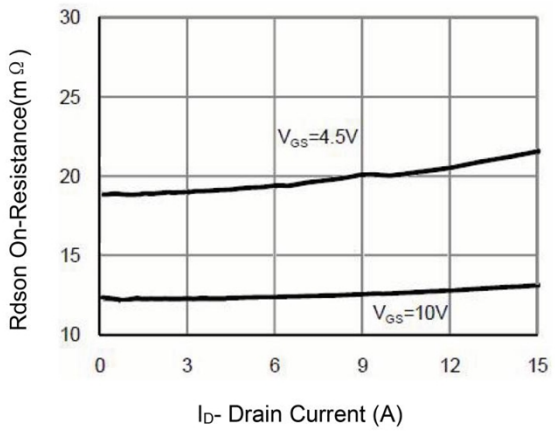


Figure 5 Drain-Source On-Resistance

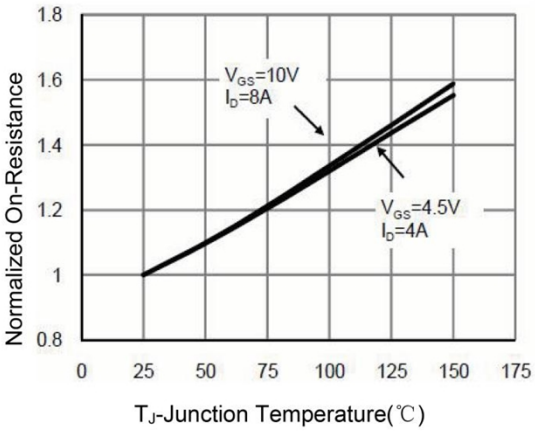


Figure 6 Drain-Source On-Resistance

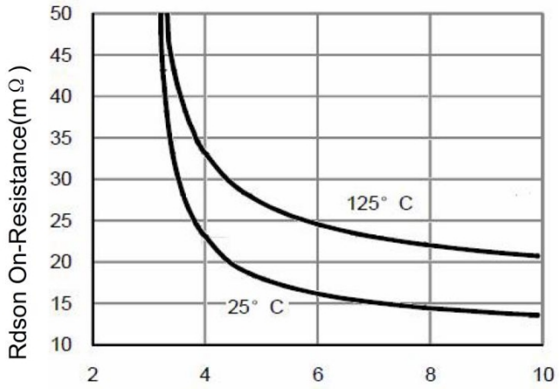


Figure7 Rdson vs Vgs

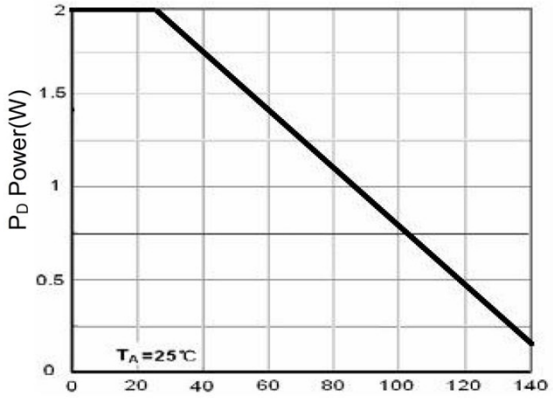


Figure 8 Power Dissipation

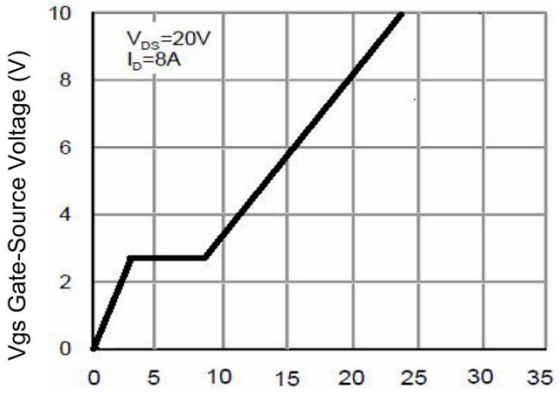


Figure 9 Gate Charge

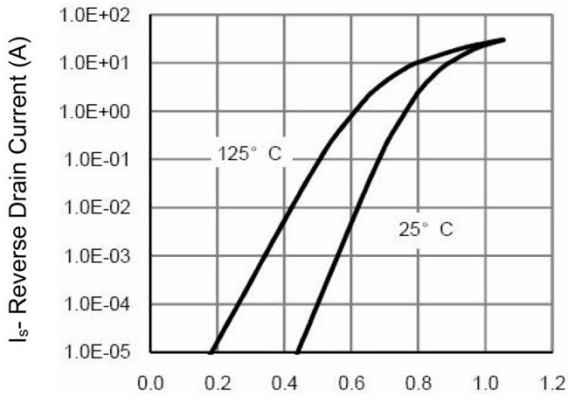


Figure 10 Source- Drain Diode Forward

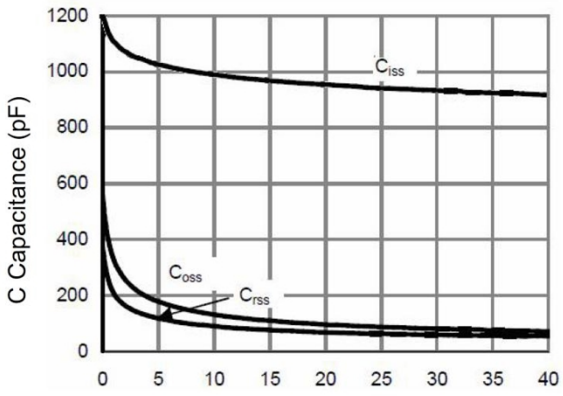


Figure 11 Capacitance vs Vds

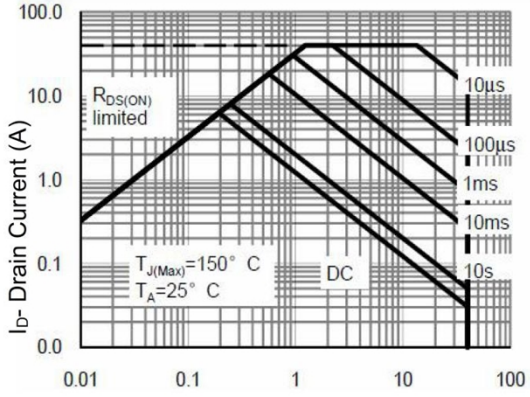


Figure 12 Safe Operation Area

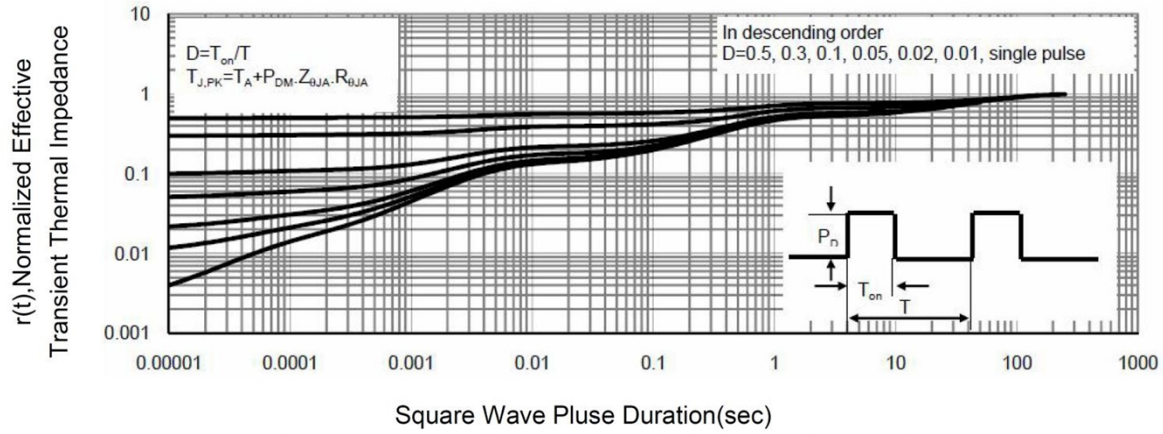
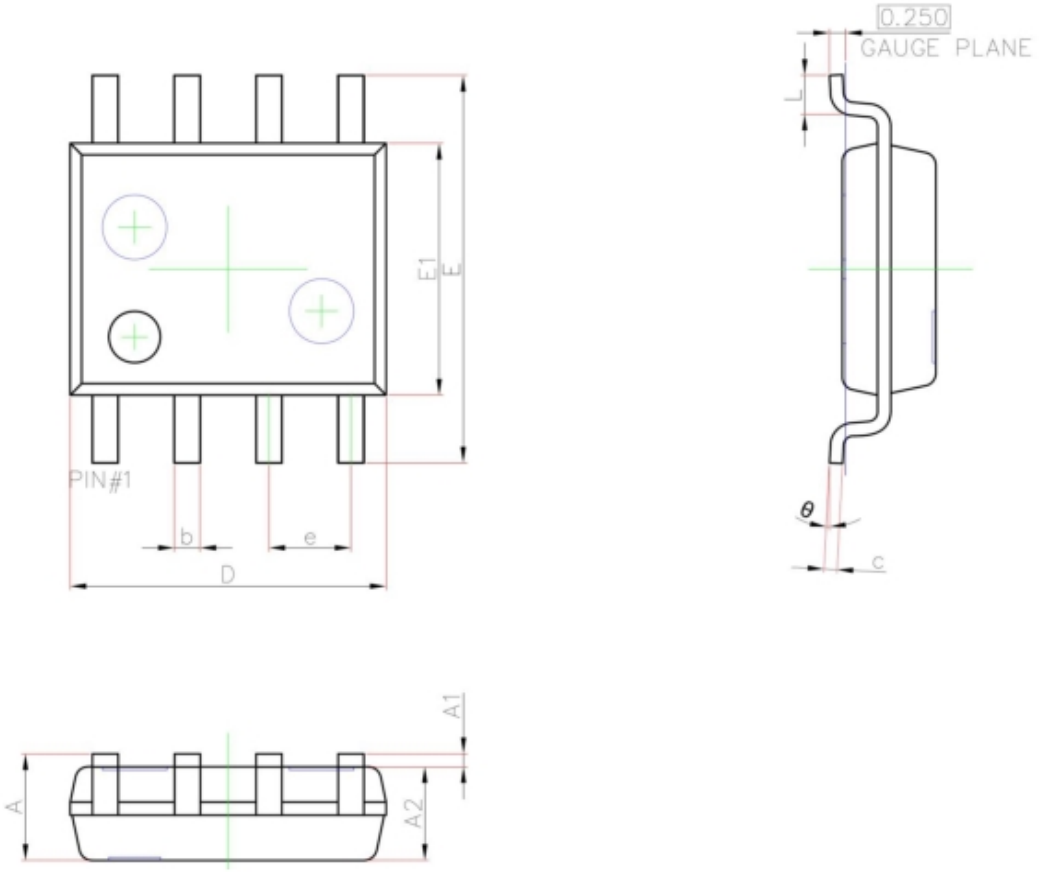


Figure 13 Normalized Maximum Transient Thermal Impedance

SOP-8 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.450	1.750	0.057	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.700	5.100	0.185	0.201
E	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°