Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
60V	13mΩ@10V	9A
	18mΩ@4.5V	

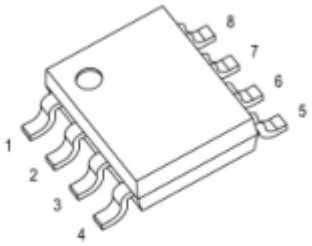
Feature

- V_{DS} = 60V,I_D =9A
- $R_{DS(ON)}$ < 18mΩ @ V_{GS}=10V (Typ:13mΩ)
  $R_{DS(ON)}$ < 26mΩ @ V_{GS}=4.5V (Typ:18mΩ)
- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Low gate to drain charge to reduce switching losses

Applications

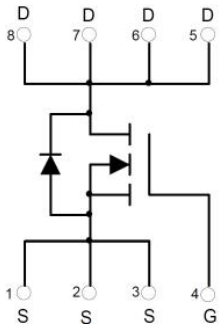
- Power switching application
- Load switch

Package

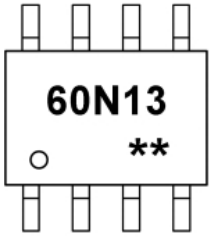


SOP-8L

Circuit diagram



Marking



60N13 : Product code
**** : Week code.**

Absolute maximum ratings

(T_a=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	9	A
Pulsed Drain Current(1)	I_{DM}	36	A
Maximum Power Dissipation	P_D	2.1	W
Thermal Resistance,Junction-to-Case(2)	$R_{\theta JC}$	60	°C/W
Operating Junction and Storage Temperature Range	$T_{STG,,}$ T_J	-55 To 150	°C

Electrical characteristics

(T_A=25℃, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	$BV_{(BR)DSS}$	V_{GS} = 0V, I_D =250μA	60			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} =60V, V_{GS} = 0V			1	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	1	1.6	2.5	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} =10V, I_D =10A		13	18	mΩ
		V_{GS} =4.5V, I_D =6A		18	26	
Dynamic Characteristics						
Input capacitance	C_{iss}	V_{DS}=30V, V_{GS}=0V, f=1MHz		864		pF
Output capacitance	C_{oss}			282		
Reverse transfer capacitance	C_{rss}			27		
Total Gate Charge (VGS = 4.5V)	Q_g	V_{DS}=30V , I_D =10A		8.4		pF
Total Gate Charge (VGS = 10V)	Q_{gs}			17		
Gate-Drain Charge	Q_{gd}			3.1		
Gate-Drain Charge	Q_{gd}			4.3		
Switching Characteristics						
Turn-on Delay Time	$T_{d(on)}$	V_{GS}=10V, V_{DS}=30V, R_G =6Ω, I_D =10A		3.4		nS
Turn-on Rise Time	T_r			5.2		
Turn-Off Delay Time	$T_{d(off)}$			13		
Turn-Off Fall Time	t_f			7		
Drain-Source Body Diode Characteristics						
Diode Forward Voltage	V_{SD}	V_{GS}=0V ,I_S=1A		0.7	1.2	V
Reverse Recovery Time	t_{rr}	I_F =10A di/dt = 100A/μs		22		nS
Reverse Recovery Charge	Q_{rr}			11		nC

Typical Characteristics

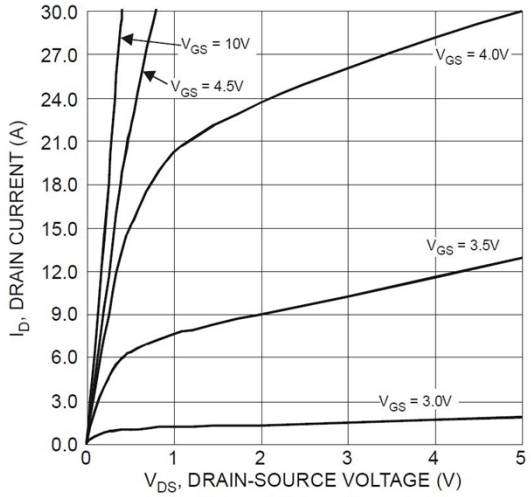


Figure 1 Typical Output Characteristics

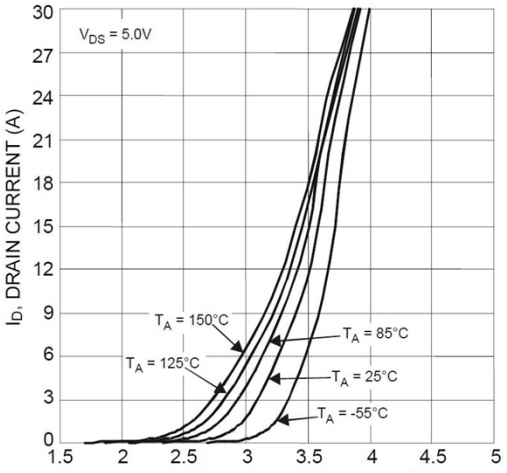


Figure 2 Typical Transfer Characteristics

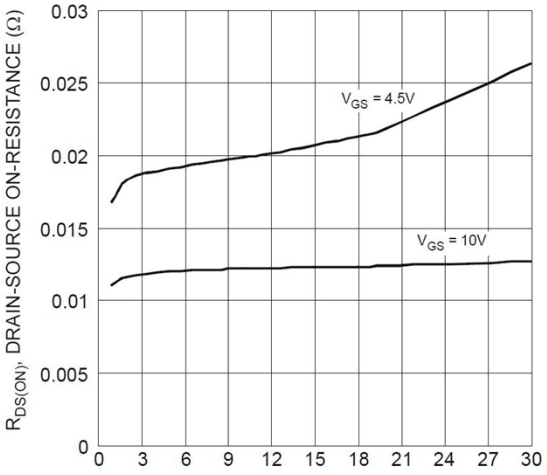


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

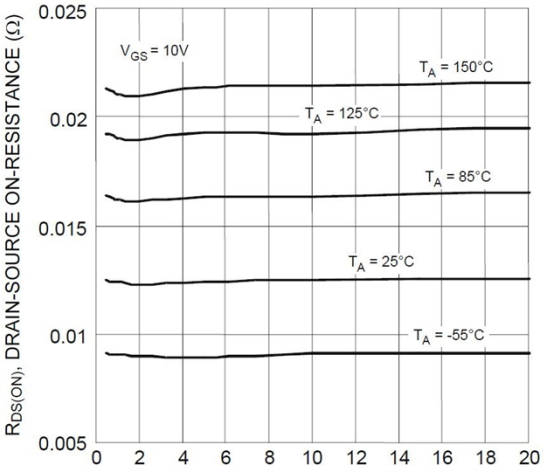


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

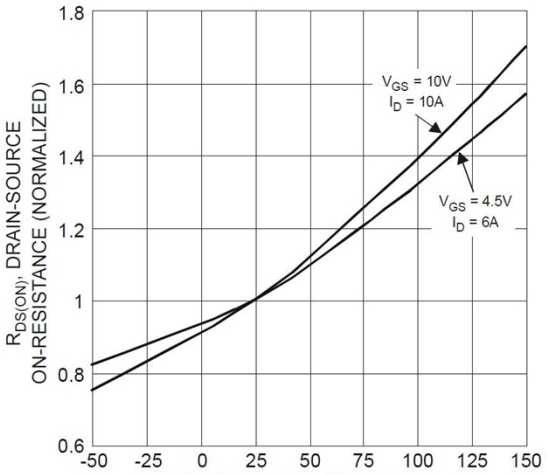


Figure 5 On-Resistance Variation with Temperature

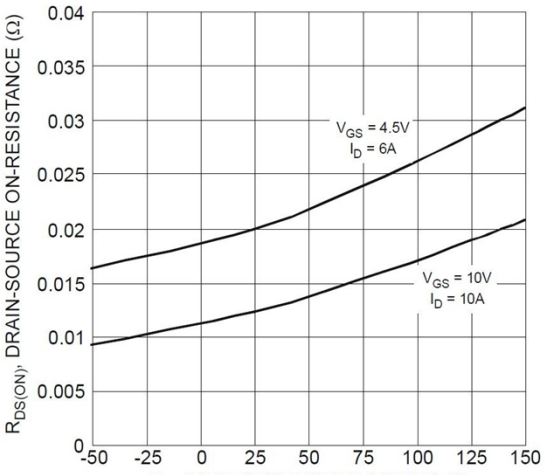


Figure 6 On-Resistance Variation with Temperature

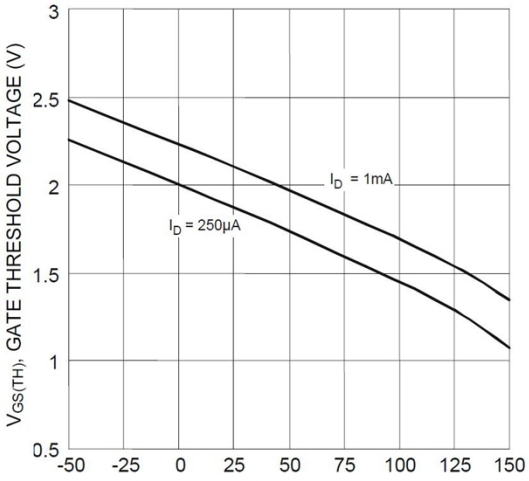


Figure 7 Gate Threshold Variation vs. Temperature

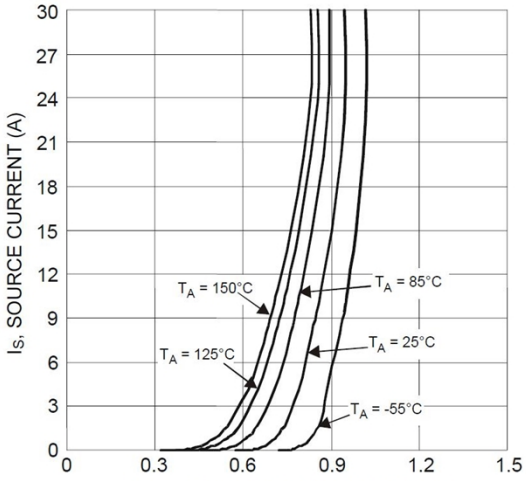


Figure 8 Diode Forward Voltage vs. Current

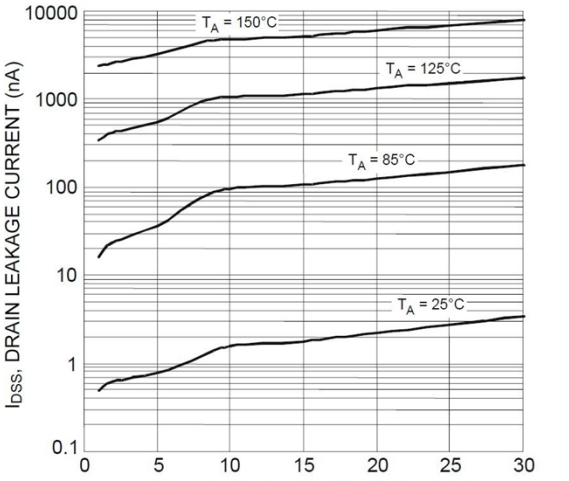


Figure 9 Typical Drain-Source Leakage Current vs. Voltage

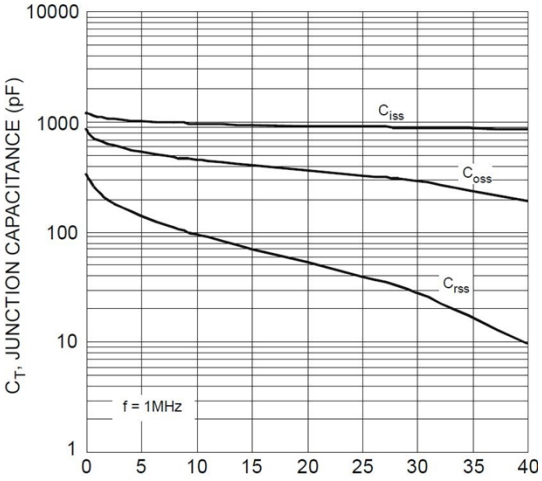


Figure 10 Typical Junction Capacitance

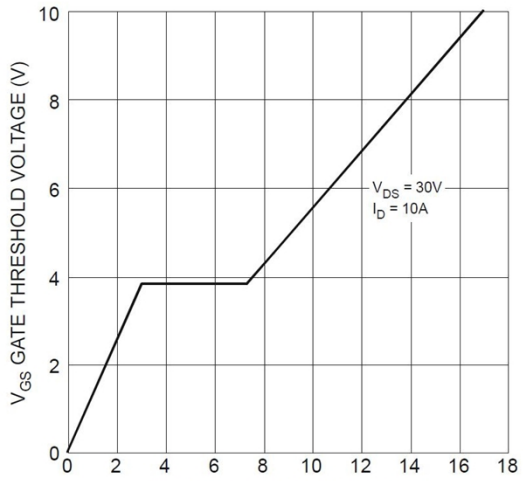


Figure 11 Gate Charge

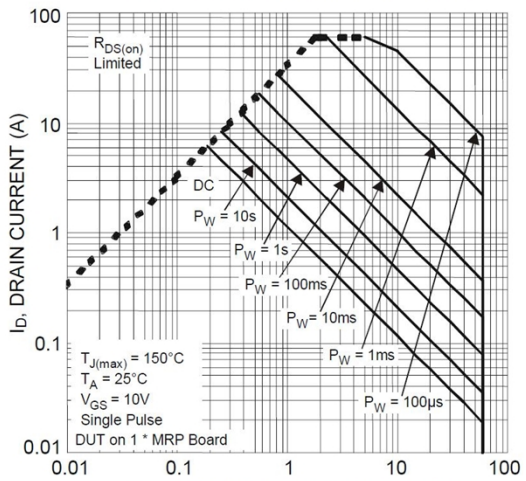
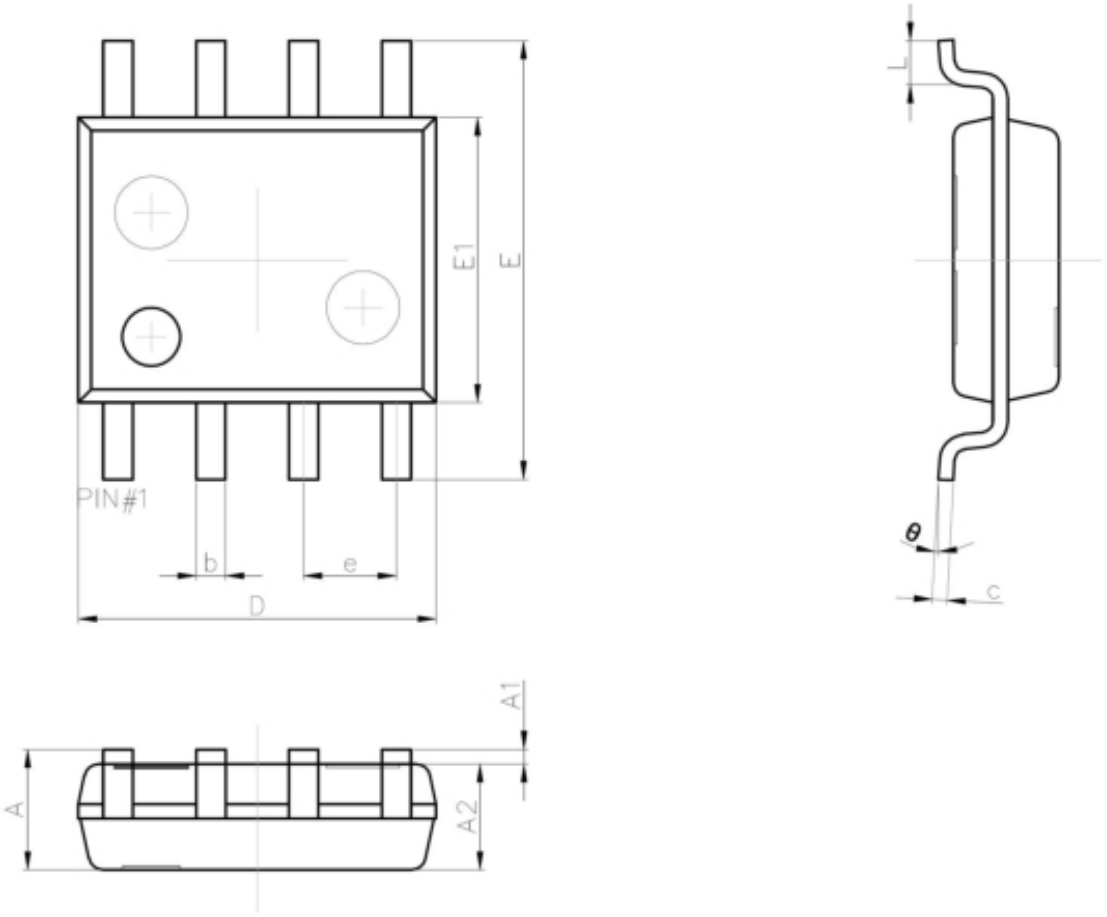


Figure 12 SOA, Safe Operation Area

SOP-8 Package Information



Symbol	Dimensions In Millimeters	
	Min.	Max.
A	1.35	1.75
A1	0.10	0.25
A2	1.35	1.55
b	0.33	0.51
c	0.17	0.25
D	4.80	5.00
e	1.27 REF.	
E	5.80	6.20
E1	3.80	4.00
L	0.40	1.27
θ	0°	8°