

60V N-Channel Enhancement Mode MOSFET

Description

The AP8N06SI uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

$V_{DS} = 60V$ $I_D = 8.5A$

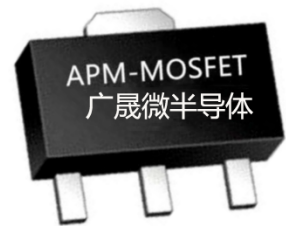
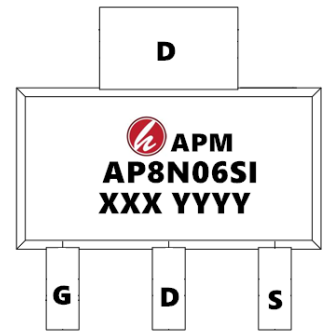
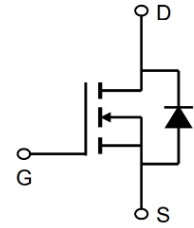
$R_{DS(ON)} < 35m\Omega$ @ $V_{GS}=10V$ (Type: 28m Ω)

Application

Battery protection

Load switch

Uninterruptible power supply



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP8N06SI	SOT89-3L	AP8N06SI XXX YYYY	3000

Absolute Maximum Ratings ($T_C=25^{\circ}C$ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_A=25^{\circ}C$	Continuous Drain Current, V_{GS} @ 10V ¹	8.5	A
$I_D@T_A=70^{\circ}C$	Continuous Drain Current, V_{GS} @ 10V ¹	5.8	A
I_{DM}	Pulsed Drain Current ²	14.6	A
E_{AS}	Single Pulse Avalanche Energy ³	21.5	mJ
I_{AS}	Avalanche Current	20.6	A
$P_D@T_A=25^{\circ}C$	Total Power Dissipation ⁴	1.2	W
T_{STG}	Storage Temperature Range	-55 to 150	$^{\circ}C$
T_J	Operating Junction Temperature Range	-55 to 150	$^{\circ}C$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	62.5	$^{\circ}C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	36	$^{\circ}C/W$



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Electrical Characteristics (T_J=25°C, unless otherwise noted)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
V(BR)DSS	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	60	65	-	V
IDSS	Zero Gate Voltage Drain Current	V _{DS} =60V, V _{GS} =0V,	-	-	1.0	μA
IGSS	Gate to Body Leakage Current	V _{DS} =0V, V _{GS} =±20V	-	-	±100	nA
VGS(th)	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	1.0	1.6	2.5	V
RDS(on)	Static Drain-Source on-Resistance note3	V _{GS} =10V, I _D =10A	-	28	40	mΩ
		V _{GS} =4.5V, I _D =5A	-	33	45	
Ciss	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1.0MHz	-	1148	-	pF
Coss	Output Capacitance		-	58.5	-	pF
Crss	Reverse Transfer Capacitance		-	49.4	-	pF
Qg	Total Gate Charge	V _{DS} =30V, I _D =10A, V _{GS} =10V	-	20.3	-	nC
Qgs	Gate-Source Charge		-	3.7	-	nC
Qgd	Gate-Drain("Miller") Charge		-	5.3	-	nC
td(on)	Turn-on Delay Time	V _{DS} =30V, I _D =20A, R _G =1.8Ω, V _{GS} =10V	-	7.6	-	ns
t _r	Turn-on Rise Time		-	20	-	ns
td(off)	Turn-off Delay Time		-	15	-	ns
t _f	Turn-off Fall Time		-	24	-	ns
IS	Maximum Continuous Drain to Source Diode Forward Current		-	-	20	A
ISM	Maximum Pulsed Drain to Source Diode Forward Current		-	-	80	A
VSD	Drain to Source Diode Forward Voltage	V _{GS} =0V, I _S =20A	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	I _F =20A, dI/dt=100A/μs	-	29	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	43	-	nC

Notes:

- 1、 Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
- 2、 EAS condition : T_J =25°C, V_{DD} =30V, V_G =10V, L=0.5mH, R_G=25Ω, I_{AS} =3.5A
- 3、 Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

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Typical Characteristics

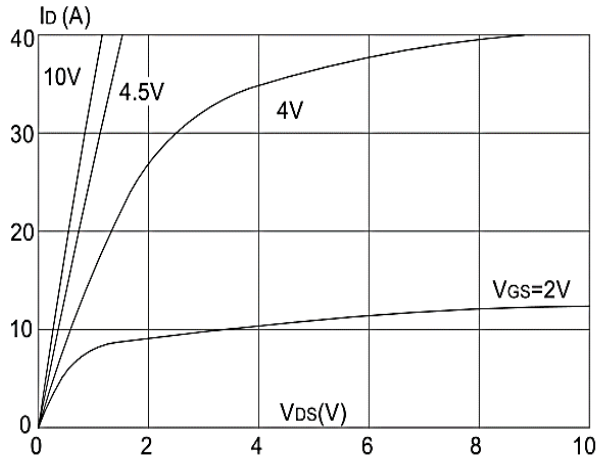


Figure1: Output Characteristics

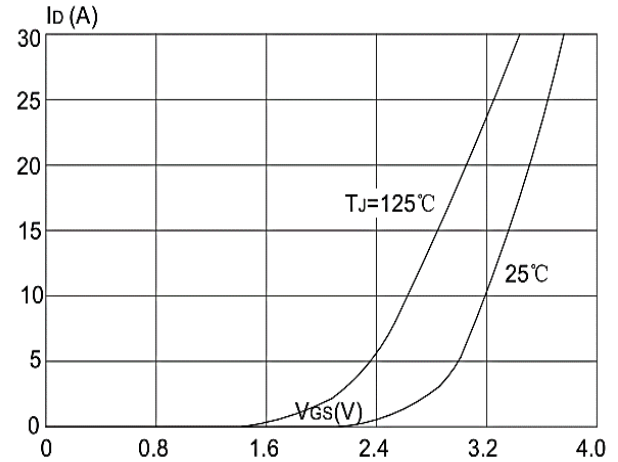


Figure 2: Typical Transfer Characteristics

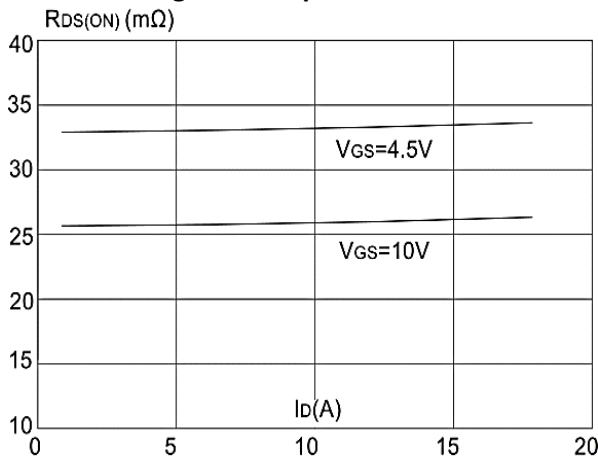


Figure 3: On-resistance vs. Drain Current

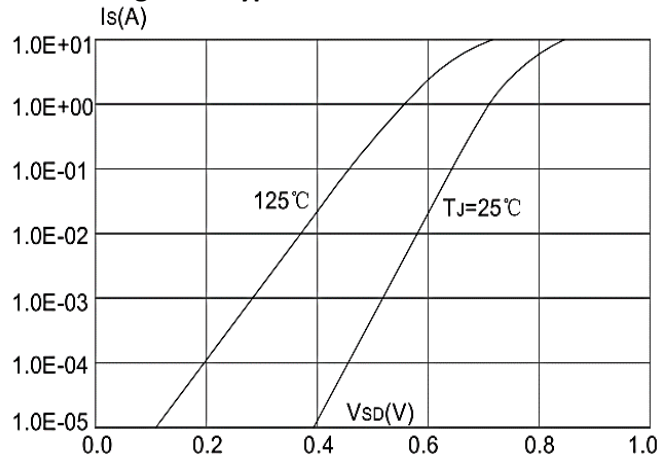


Figure 4: Body Diode Characteristics

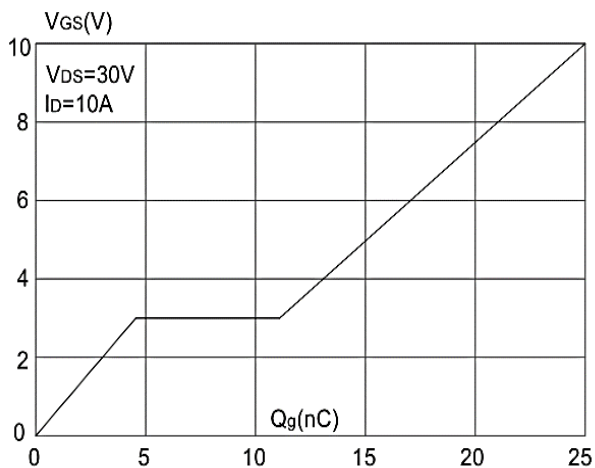


Figure 5: Gate Charge Characteristics

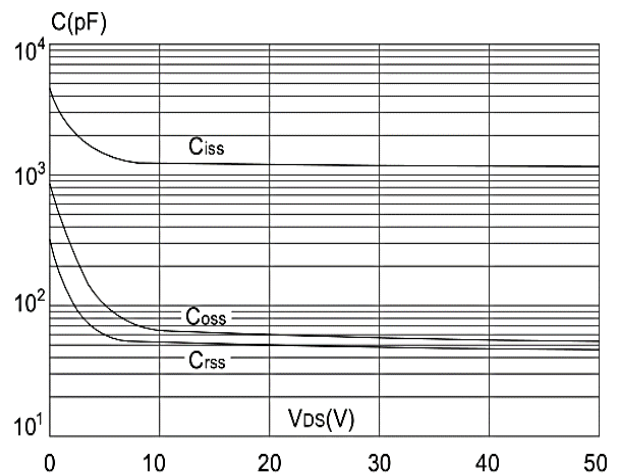


Figure 6: Capacitance Characteristics

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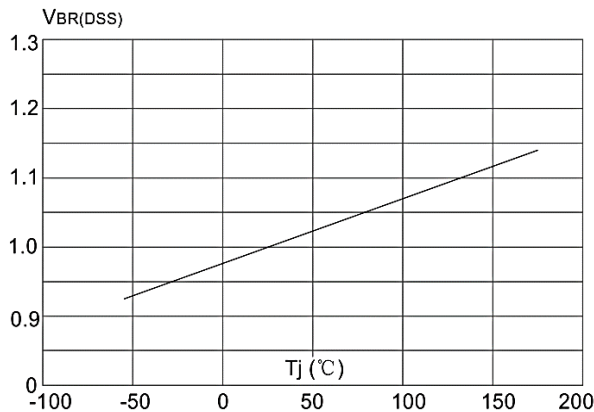


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

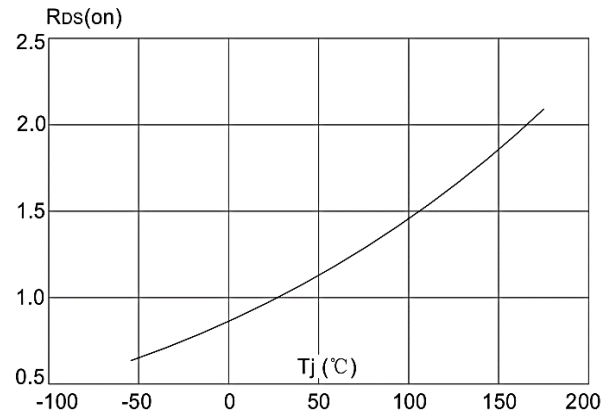


Figure 8: Normalized on Resistance vs. Junction Temperature

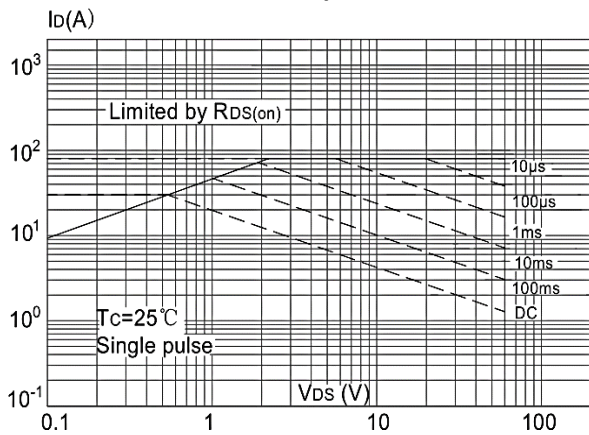


Figure 9: Maximum Safe Operating Area vs. Case Temperature

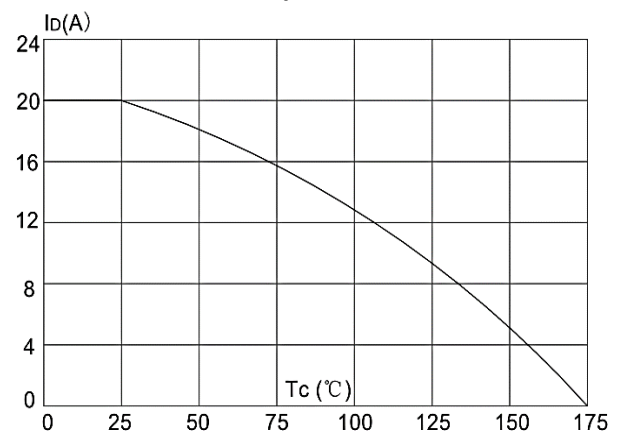


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

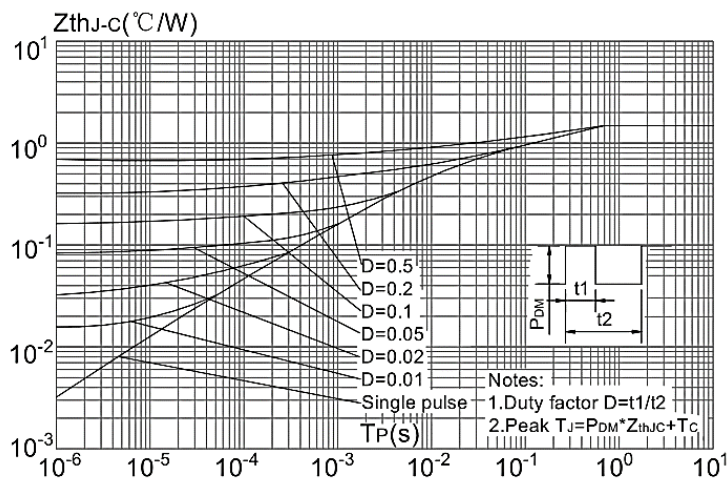
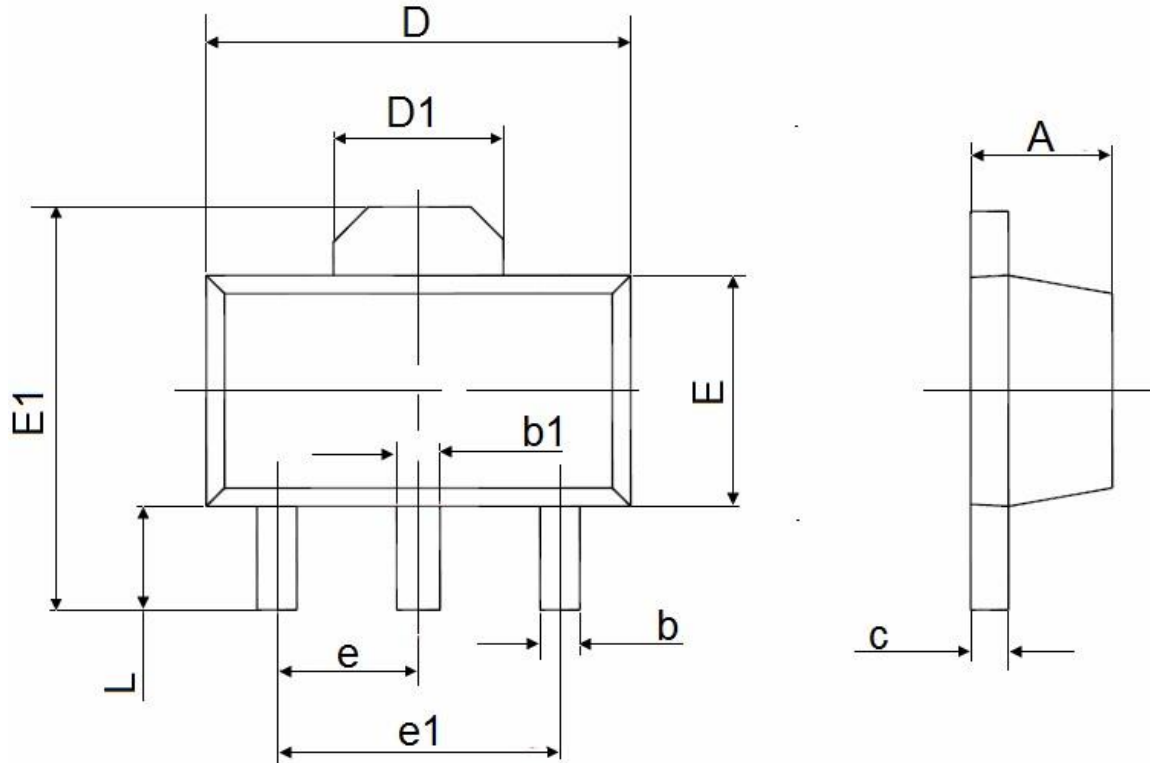


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

Package Mechanical Data-SOT89-3L-YX



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF.		0.061 REF.	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP.		0.060 TYP.	
e1	3.000 TYP.		0.118 TYP.	
L	0.900	1.200	0.035	0.047

60V N-Channel Enhancement Mode MOSFET**Attention**

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Edition	Date	Change
Rve1.0	2020/12/1	Initial release

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