

100V N-Channel Enhancement Mode MOSFET

Description

The AP12N10SI 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

$V_{DS} = 100V$ $I_D = 12A$

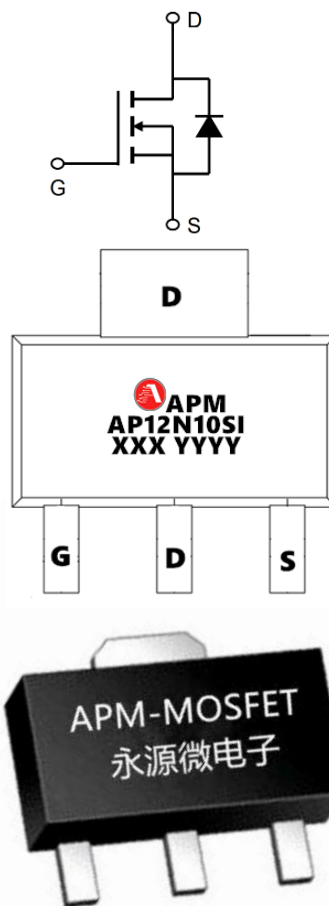
$R_{DS(ON)} < 120m\Omega @ V_{GS}=10V$ (Type: 95m Ω)

Application

Automotive lighting

Load switch

Uninterruptible power supply



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP12N10SI	SOT89-3L	AP12N10SI XXX YYYY	3000

Absolute Maximum Ratings (TC=25°C unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_C=25^\circ C$	Drain Current, $V_{GS} @ 10V$	12	A
$I_D @ T_C=100^\circ C$	Drain Current, $V_{GS} @ 10V$	6.5	A
IDM	Pulsed Drain Current ¹	25	A
$P_D @ T_C=25^\circ C$	Total Power Dissipation	44	W
TSTG	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C
$R_{\theta JA}$	Maximum Thermal Resistance, Junction ambient	62.5	°C/W
$R_{\theta JC}$	Maximum Thermal Resistance, Junction-case	6	°C/W



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Electrical Characteristics@T_j=25°C(unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
V(BR)DSS	Drain-Source Breakdown Voltage	VGS=0V, ID=250μA	100	-	-	V
IDSS	Zero Gate Voltage Drain Current	VDS=100V, VGS=0V,	-	-	1.0	μA
IGSS	Gate to Body Leakage Current	VDS=0V, VGS=±20V	-	-	±100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS, ID=250μA	1.0	1.5	2.5	V
RDS(on)	Static Drain-Source on-Resistance ^{note3}	VGS=10V, ID=5A	-	95	120	mΩ
		VGS=4.5V, ID=3A	-	105	145	mΩ
Ciss	Input Capacitance	VDS=50V, VGS=0V, f=1.0MHz	-	547	-	pF
Coss	Output Capacitance		-	30	-	pF
Crss	Reverse Transfer Capacitance		-	8	-	pF
Qg	Total Gate Charge	VDS=50V, ID=2A, VGS=10V	-	20	-	nC
Qgs	Gate-Source Charge		-	2.8	-	nC
Qgd	Gate-Drain("Miller") Charge		-	4	-	nC
td(on)	Turn-on Delay Time	VDS=50V, ID=3A, RG=1.8Ω, VGS=10V	-	6	-	ns
tr	Turn-on Rise Time		-	7	-	ns
td(off)	Turn-off Delay Time		-	21	-	ns
tf	Turn-off Fall Time		-	3	-	ns
IS	Maximum Continuous Drain to Source Diode Forward Current		-	-	15	A
ISM	Maximum Pulsed Drain to Source Diode Forward Current		-	-	40	A
VSD	Drain to Source Diode Forward Voltage	VGS=0V, IS=10A	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	IF=10A, dI/dt=100A/μs	-	22	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	29	-	nC

Note :

- 1、The data tested by surface mounted on a 1 inch 2 FR-4 board with 2OZ copper.
- 2、The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3、The power dissipation is limited by 150°C junction temperature
- 4、The data is theoretically the same as I D and I DM , in real applications , should be limited by total power dissipation.

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Typical Characteristics

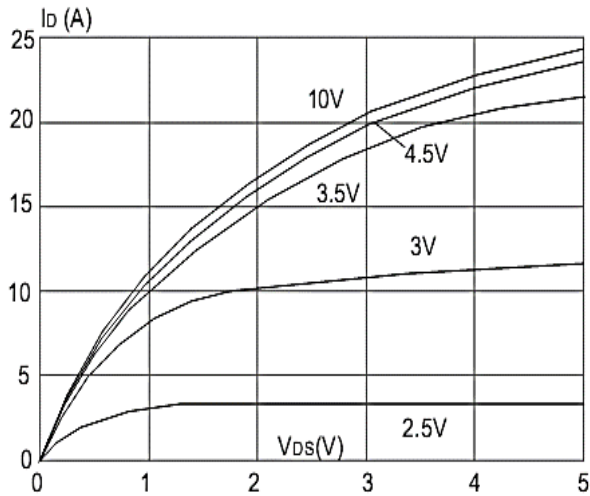


Figure1: Output Characteristics

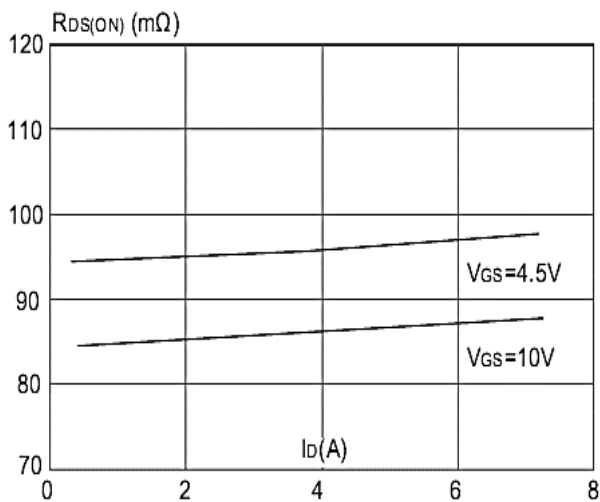


Figure 3: On-resistance vs. Drain Current

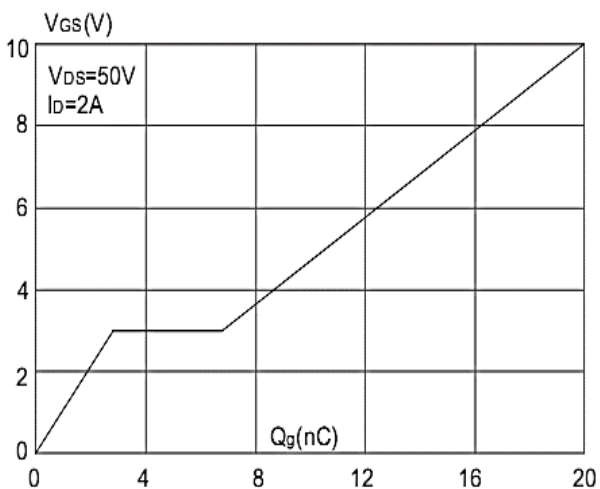


Figure 5: Gate Charge Characteristics

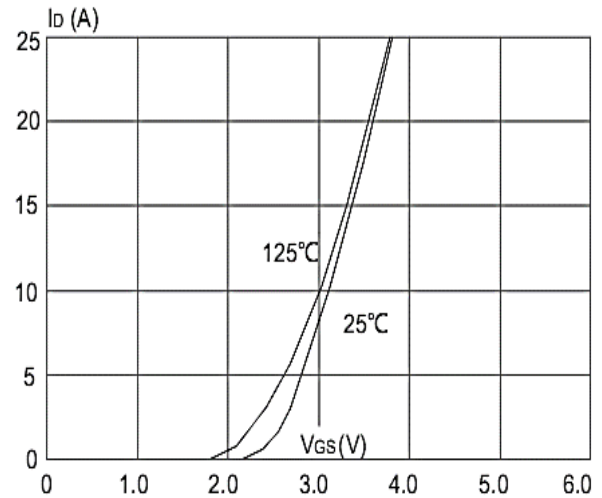


Figure 2: Typical Transfer Characteristics

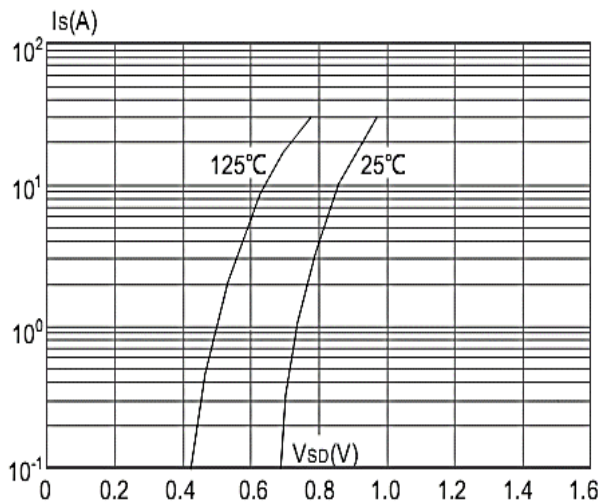


Figure 4: Body Diode Characteristics

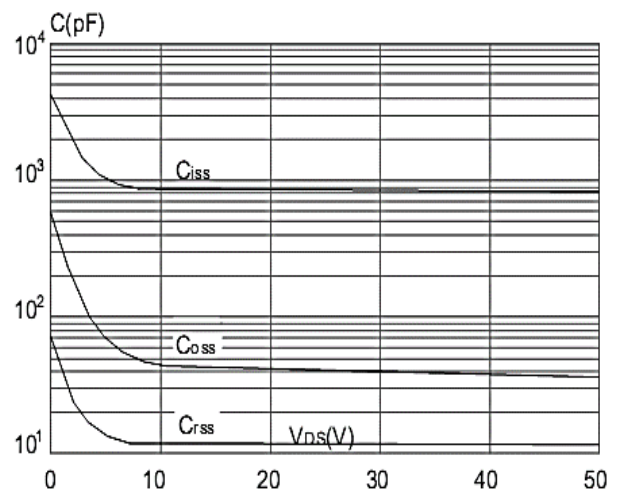


Figure 6: Capacitance Characteristics

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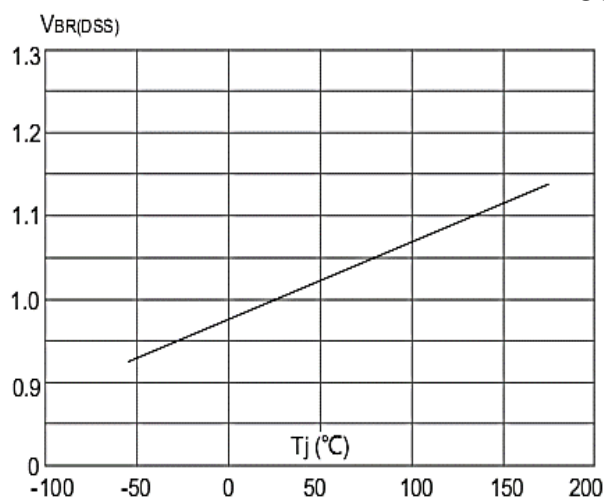


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

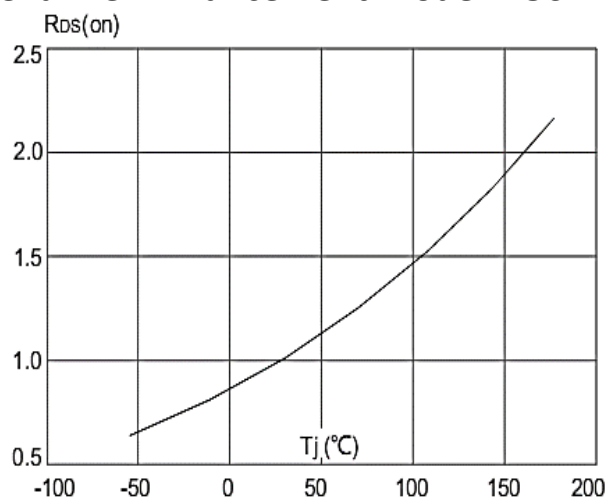


Figure 8: Normalized on Resistance vs. Junction Temperature

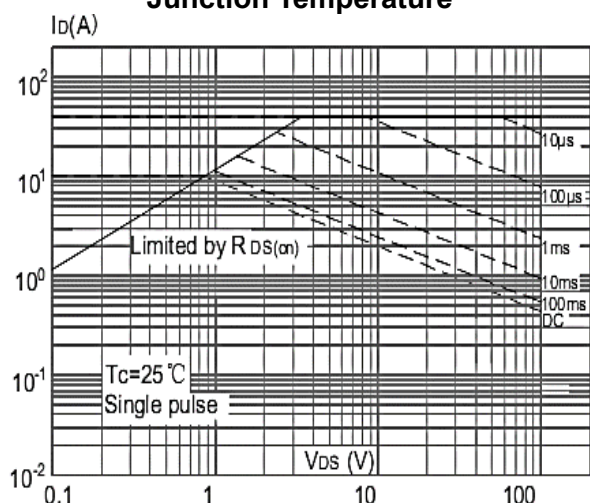


Figure 9: Maximum Safe Operating Area

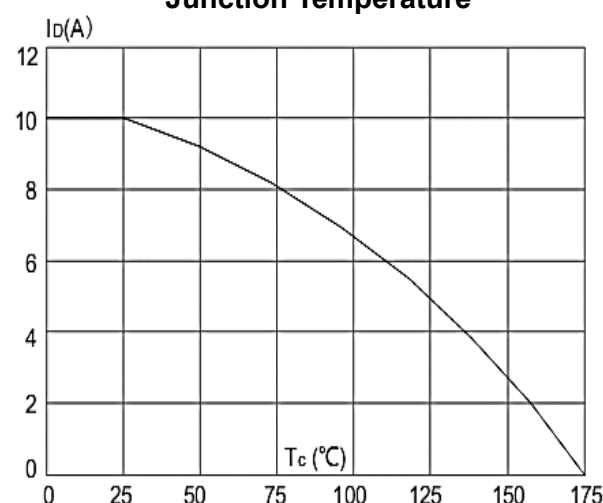


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

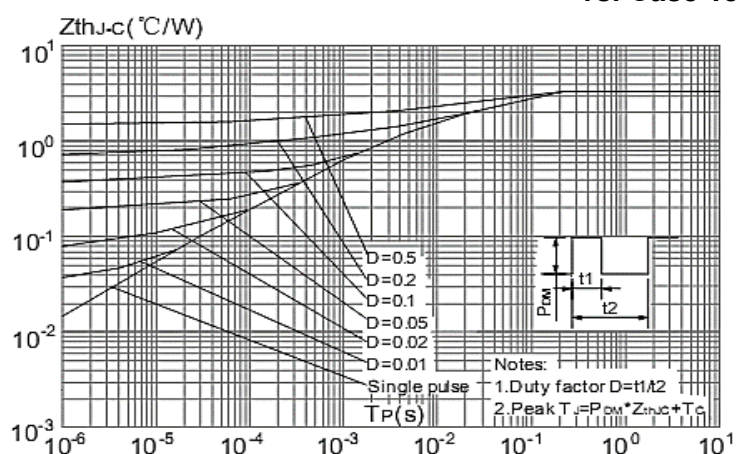
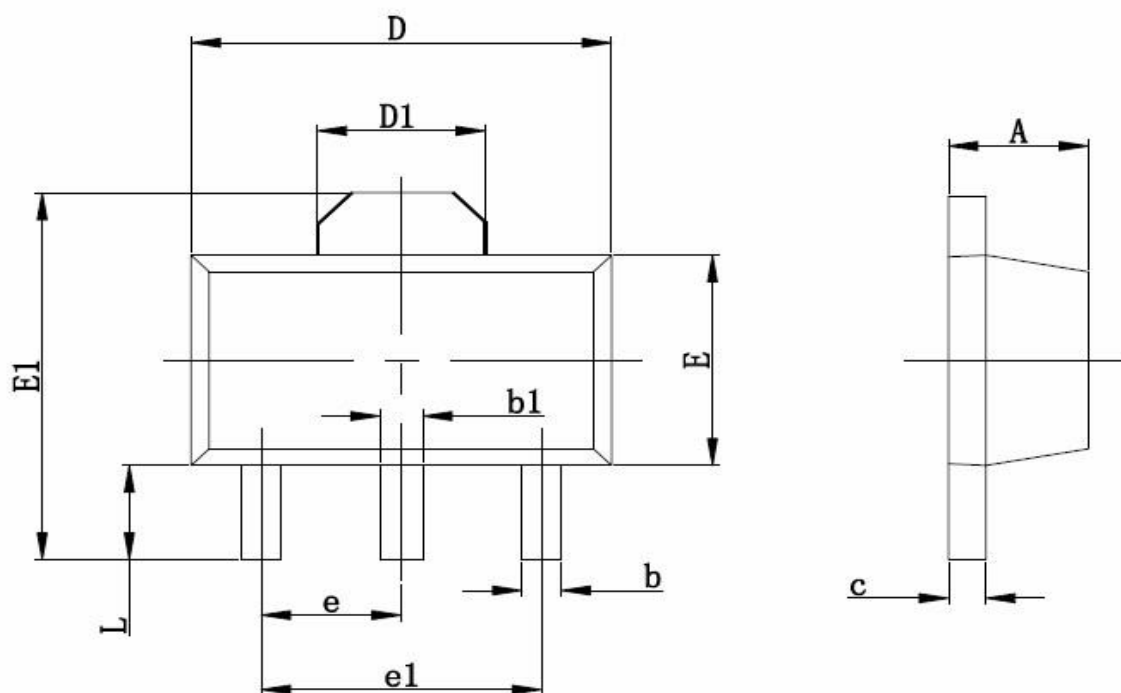


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

Package Mechanical Data:SOT89-3L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.350	0.520	0.013	0.197
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	2.350	2.550	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP		0.060TYP	
e1	3.000 TYP		0.118TYP	
L	0.900	1.100	0.035	0.047

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Edition	Date	Change
REV1.0	2024/1/31	Initial release

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