

## 100V N-Channel Enhancement Mode MOSFET

### Description

The AP65N10NF uses advanced **APM-SGT I I** 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

$V_{DS} = 100V$   $I_D = 65A$

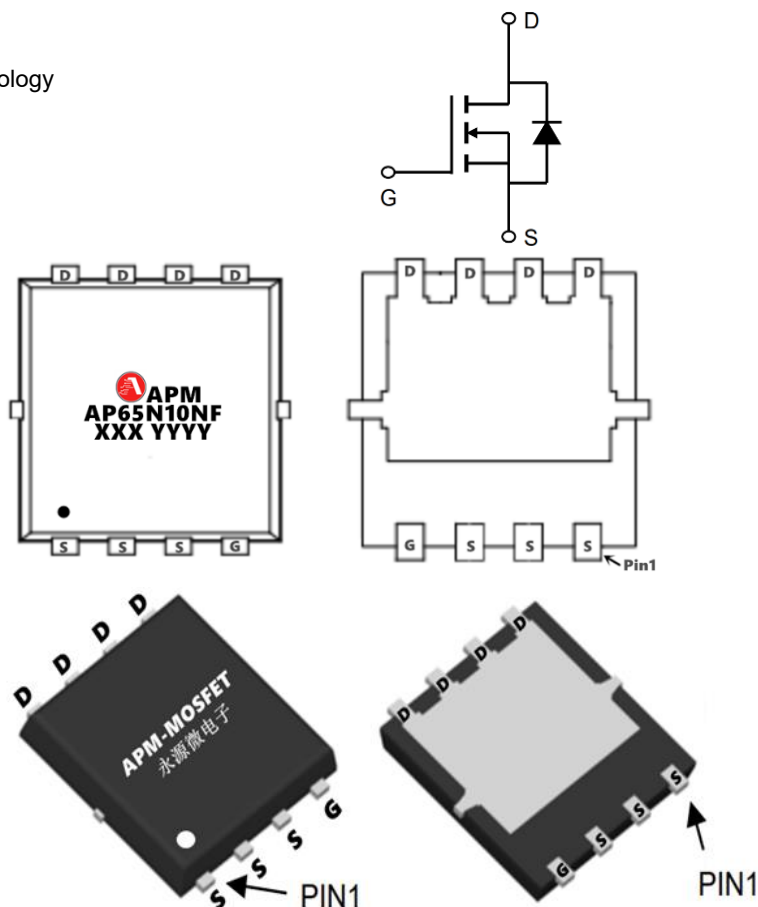
$R_{DS(ON)} < 12m\Omega$  @  $V_{GS}=10V$  (Type: **9.0m $\Omega$** )

### Application

DC/DC Converter

LED Backlighting

Power Management Switches



### Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP65N10NF	PDFN5X6-8L	AP65N10NF XXX YYYY	5000

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

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	100	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D@T_C=25^{\circ}C$	Continuous Drain Current, $V_{GS}$ @ 10V	65	A
$I_D@T_C=100^{\circ}C$	Continuous Drain Current, $V_{GS}$ @ 10V	40	A
IDM	Pulsed Drain Current	252	A
EAS	Single Pulse Avalanche Energy	286	mJ
IAS	Avalanche Current	24	A
$P_D@T_C=25^{\circ}C$	Total Power Dissipation <sup>4</sup>	83	W
TSTG	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	1.5	$^{\circ}C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case	62.5	$^{\circ}C/W$

**100V N-Channel Enhancement Mode MOSFET**
**Electrical Characteristics ( $T_c=25^{\circ}\text{C}$  unless otherwise noted)**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V(BR)DSS	Drain-Source Breakdown Voltage	ID = 250uA, VGS = 0V	100			V
IDSS	Zero Gate Voltage Drain Current	VDS=100V, VGS = 0V			1.0	uA
IGSS	Gate-Body Leakage Current	VDS=0V, VGS=±20V			±100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS, ID=250uA	1.2	1.6	2.5	V
RDS(ON)	Static Drain-Source ON-Resistance	VGS=10V, ID=10A		9	12	mΩ
		VGS=4.5V, ID=6A		11	15	mΩ
gFS	Forward Transconductance	VDS=5V, ID=20A		48		S
Ciss	Input Capacitance	VGS=0V, VDS=50V, f=1MHz		1372		pF
Coss	Output Capacitance			291		pF
Crss	Reverse Transfer Capacitance			2.0		pF
Rg	Gate Resistance	VGS=0V, VDS=0V, f=1MHz		2.0		Ω
Qg	Total Gate Charge (@ VGS = 10V)	VGS=0 to 10V VDS=50V, ID=10A		21		nC
Qg	Total Gate Charge (@ VGS = 6.0V)			13.9		nC
Qgs	Gate Source Charge			5.4		nC
Qgd	Gate Drain Charge			5.5		nC
tD(on)	Turn-On DelayTime	VGS=10V, VDS=50V RL=2.5Ω, RGEN=6Ω		10.7		ns
tr	Turn-On Rise Time			20		ns
tD(off)	Turn-Off DelayTime			25		ns
tf	Turn-Off Fall Time			19.5		ns
trr	Body Diode Reverse Recovery Time	IF=20A, dIF/dt = 100A/us		48		ns
Qrr	Body Diode Reverse Recovery Charge	IF=20A, dIF/dt = 100A/us		79		nC
IS	Diode Continuous Current	TC = 25°C			63	A
VSD	Diode Forward Voltage	IS = 1A, VGS = 0V		0.7	1.0	V

**Notes:**

- 1、The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- 2、The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%
- 3、The EAS data shows Max. rating . The test condition is V<sub>DD</sub>=50V, V<sub>GS</sub>=10V, L=0.1mH, I<sub>AS</sub>=24A
- 4、The power dissipation is limited by 150°C junction temperature
- 5、The data is theoretically the same as I<sub>D</sub> and I<sub>DM</sub> , in real applications , should be limited by total power dissipation.

## Typical Characteristics

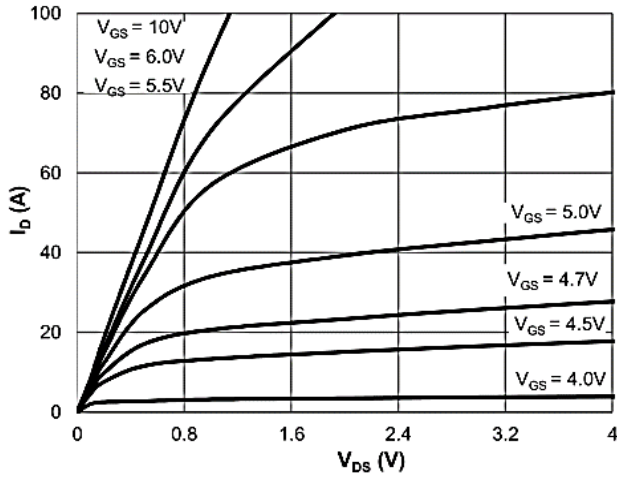


Figure 1: Saturation Characteristics

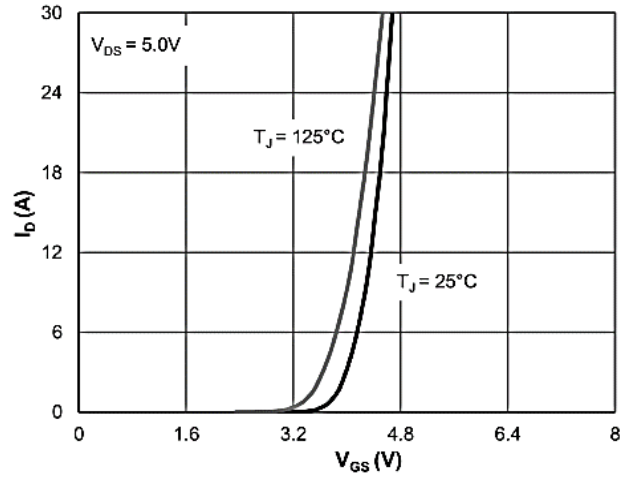


Figure 2: Transfer Characteristics

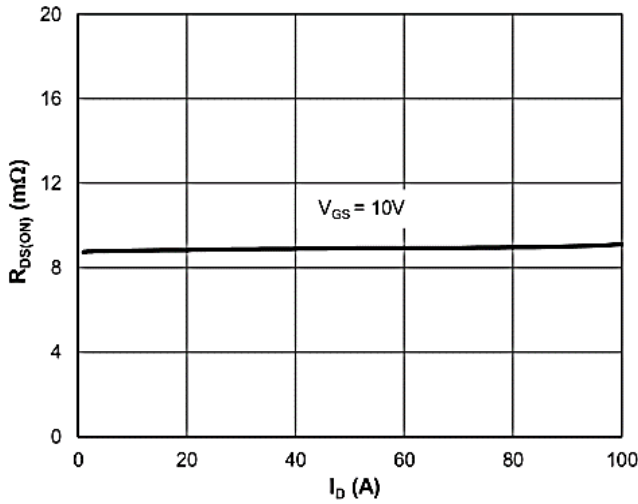


Figure 3:  $R_{DS(ON)}$  vs. Drain Current

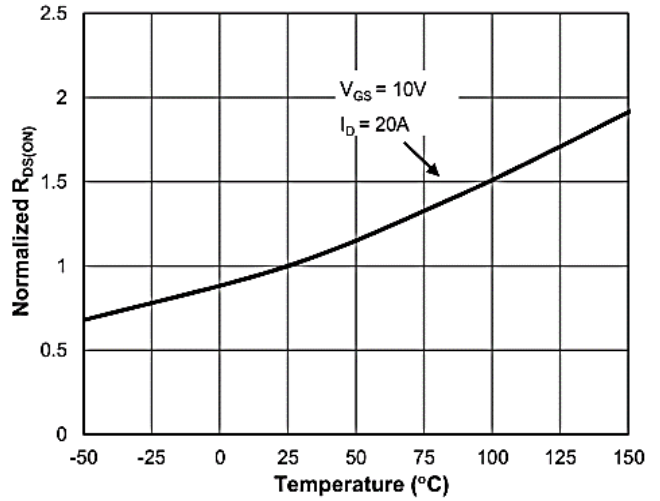


Figure 4:  $R_{DS(ON)}$  vs. Junction Temperature

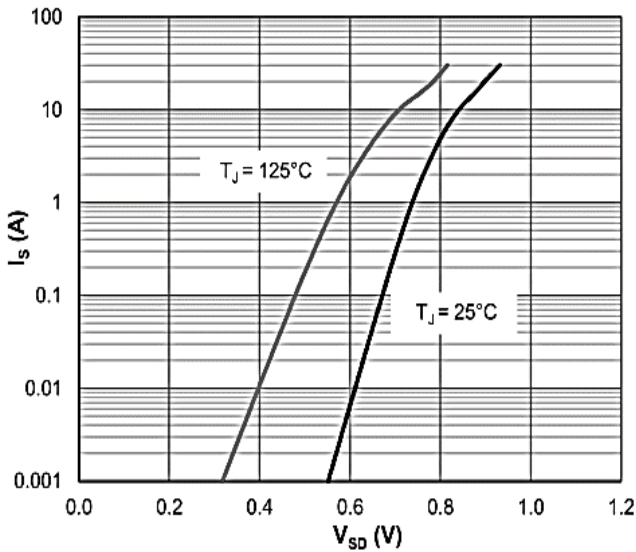


Figure 5: Body-Diode Characteristics

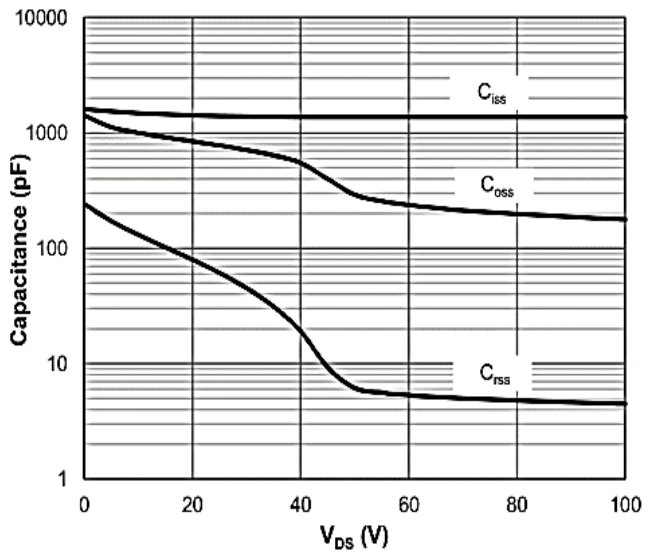


Figure 6: Capacitance Characteristics

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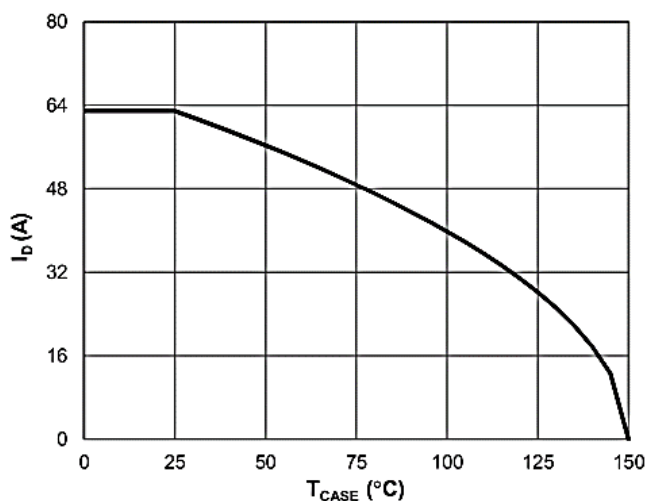


Figure 7: Current De-rating

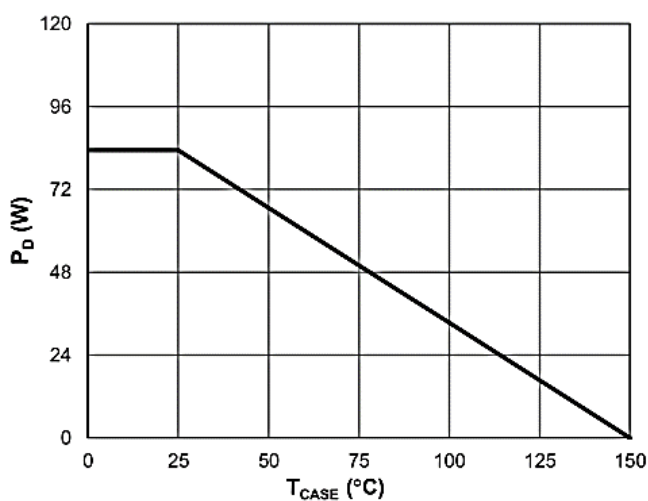


Figure 8: Power De-rating

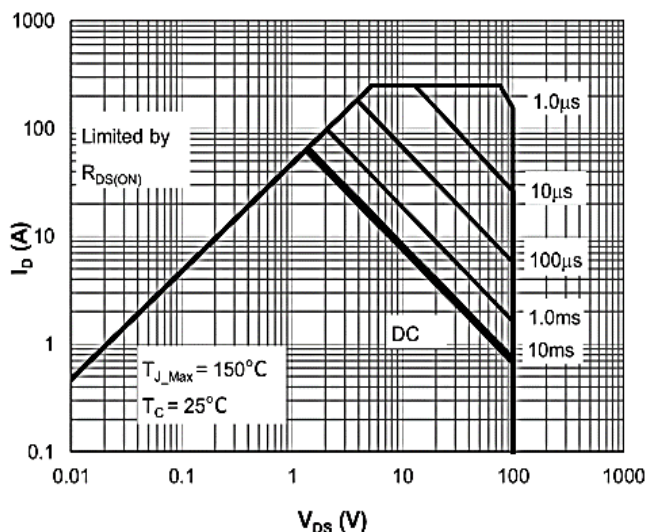


Figure 9: Maximum Safe Operating Area

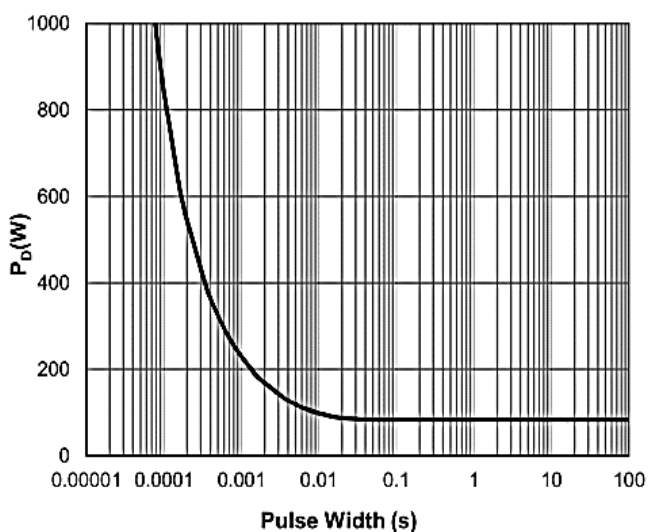


Figure 10: Single Pulse Power Rating, Junction-to-Case

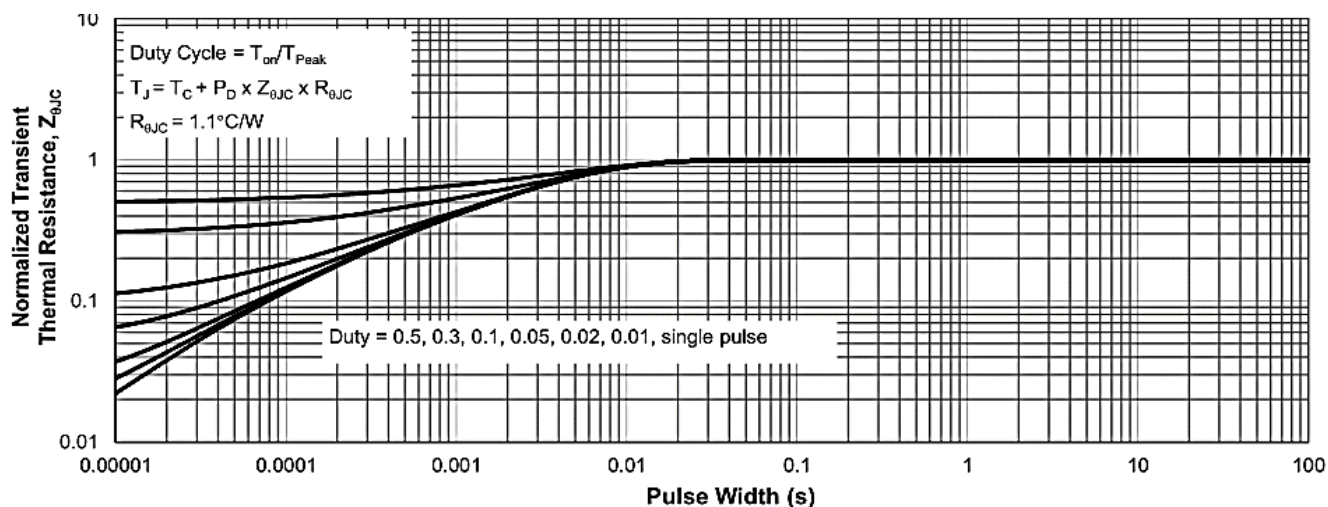
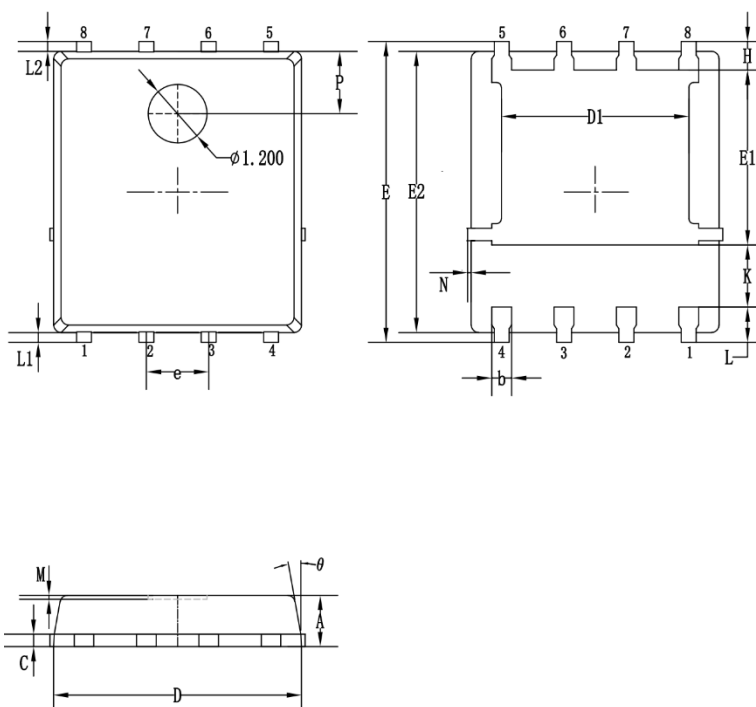


Figure 11: Normalized Maximum Transient Thermal Impedance

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Symbol	Dim in mm		
	Min	Typ	Max
A	0.9	1.05	1.2
b	0.3	0.4	0.5
C	0.2	0.25	0.35
D	4.9	5.05	5.2
D1	3.72	3.82	4.12
E	5.9	6.1	6.3
E1	3.3	3.5	3.7
E2	5.6	5.75	5.9
e	1.27BSC		
H	0.48	0.58	0.7
K	1.14	1.27	1.4
L	0.54	0.74	0.84
L1/L2	0.1	0.2	0.3
$\theta$	8°	10°	12°
M	0.08REF		
N	0		0.15
P	1.28REF		

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Edition	Date	Change
REV1.0	2023/11/24	Initial release

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