APM
A Power Microelectronics

Description

The AP240N15P/T uses advanced APM-SGT1 technology

to provide excellent $R_{DS(ON)}$, low gate charge and

operation with gate voltages as low as 10V. This

device is suitable for use as a Battery protection

or in other Switching application.

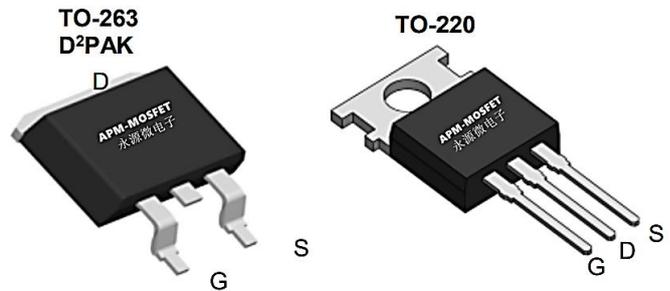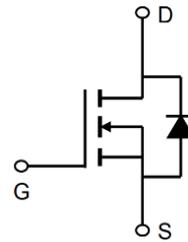## General Features

V_{DS} = 150V I_D =240A

$R_{DS(ON)}$ < 5.8mΩ @ V_{GS}=10V **(Type：4.8mΩ)**

Application

DC/DC Converter

LED Backlighting

Power Management Switches

TO-263 D²PAK

TO-220

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP240N15P	TO-220-3L	AP240N15P XXX YYYY	1000
AP240N15T	TO-263-3L	AP240N15T XXX YYYY	800

Absolute Maximum Ratings (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	150	V
VGS	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V	240	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V	185	A
IDM	Pulsed Drain Current	720	A
EAS	Single Pulse Avalanche Energy	1764	mJ
IAS	Avalanche Current	64	A
P_D@T_C=25℃	Total Power Dissipation[4]	326	W
TSTG	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
$R_{\theta}JA$	Thermal Resistance Junction-Ambient	0.46	℃/W
$R_{\theta}JC$	Thermal Resistance Junction-Case	62	℃/W

150V N-Channel Enhancement Mode MOSFET

Electrical Characteristics (T$_C$=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
BVDSS	Drain-Source Breakdown Voltage	VGS=0V ID=250µA	150	165		V
IDSS	Zero Gate Voltage Drain Current	V_{DS}=140V, V_{GS}=0V			1	µA
IGSS	Gate-Body Leakage Current	V_{GS}=±20V, V_{DS}=0V			±100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS, ID=250µA	2.0	2.9	4.0	V
GFS	Forward Transconductance	V_{DS}=5V, I_D=15A		33		S
RDS(ON)	Drain-Source On-State Resistance	V_{GS}=10V, I_D=40A		4.8	5.8	mΩ
Ciss	Input Capacitance	V_{DS}=25V,V_{GS}=0V, f=1.0MHz		4200		pF
Coss	Output Capacitance			2867		pF
Crss	Reverse Transfer Capacitance			215		pF
td(on)	Turn-on Delay Time	V_{GS}=10V, V_{DS}=75V, RL=1.07Ω, RGEN=3Ω		18		nS
tr	Turn-on Rise Time			22		nS
td(off)	Turn-Off Delay Time			35		nS
t$_f$	Turn-Off Fall Time			10		nS
Q$_g$	Total Gate Charge	V_{GS}=10V, V_{DS}=75V, I_D=70A		65		nC
Qgs	Gate-Source Charge			20		nC
Qgd	Gate-Drain Charge			19		nC
ISD	Source-Drain Current (Body Diode)				240	A
VSD	Forward on Voltage [Note 3]	V_{GS}=0V, I_S=20A			1.2	V
trr	Reverse Recovery Time	I$_F$=20A, dI/dt=500A/us		101		ns
Qrr	Reverse Recovery Charge	I$_F$=20A, dI/dt=500A/us		1,240		nC

Notes:

1、The data tested by surface mounted on a 1 inch2 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$_{DD}$=50V, V$_{GS}$=10V, L=0.5mH, I$_{AS}$=64A

4、The power dissipation is limited by 150°C junction temperature

5、The data is theoretically the same as I$_D$ and I$_{DM}$, in real applications , should be limited by total power dissipation.
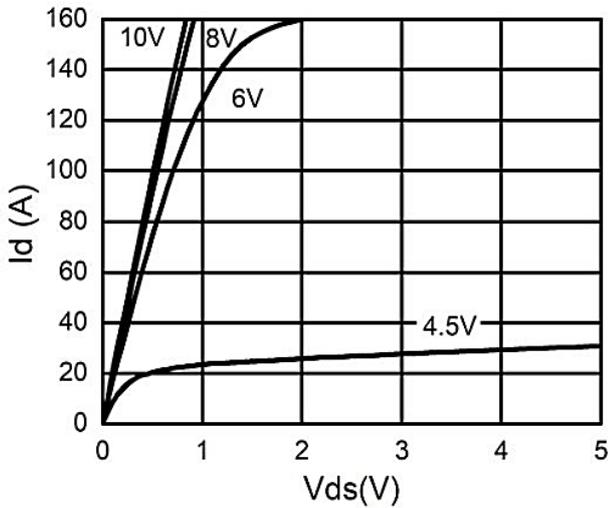
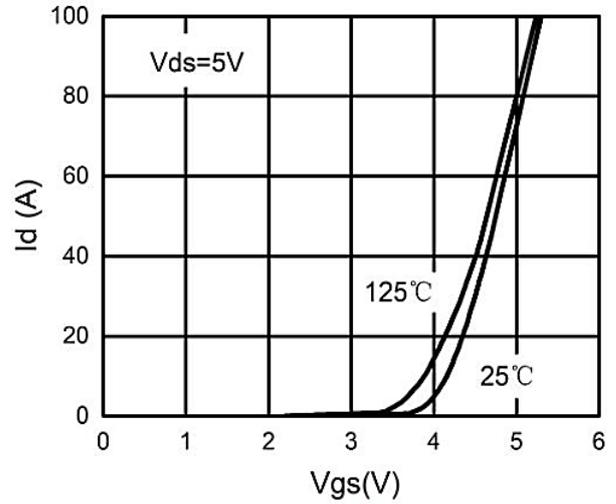## Typical Characteristics

Figure 1. Output Characteristics
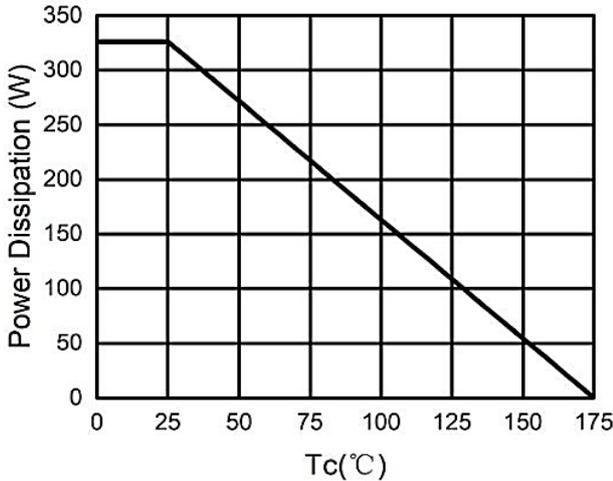

Figure 2. Transfer Characteristics

Figure 3. Power Dissipation
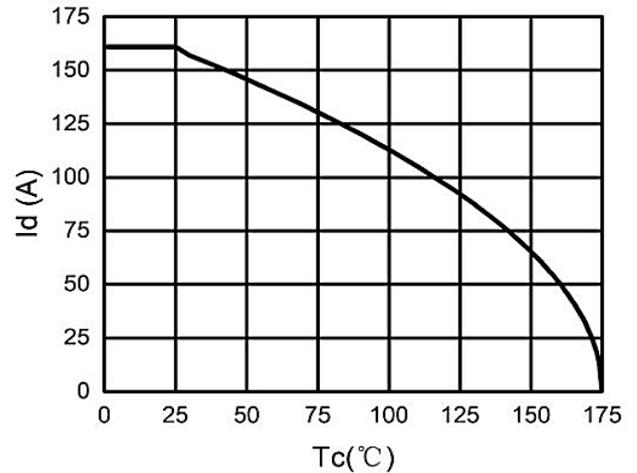
Figure 4. Drain Current
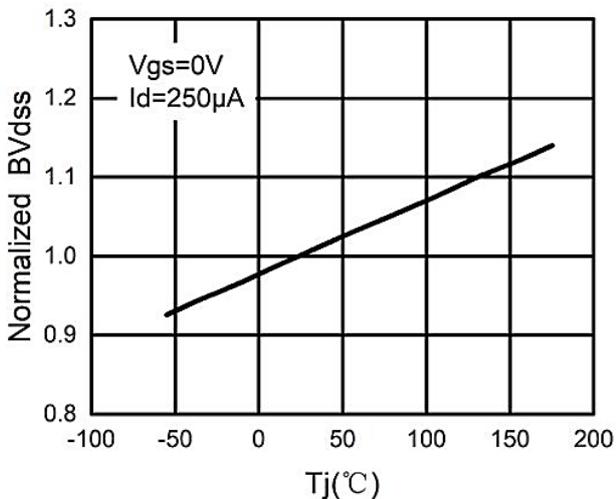
Figure5. BVDSS vs Junction Temperature
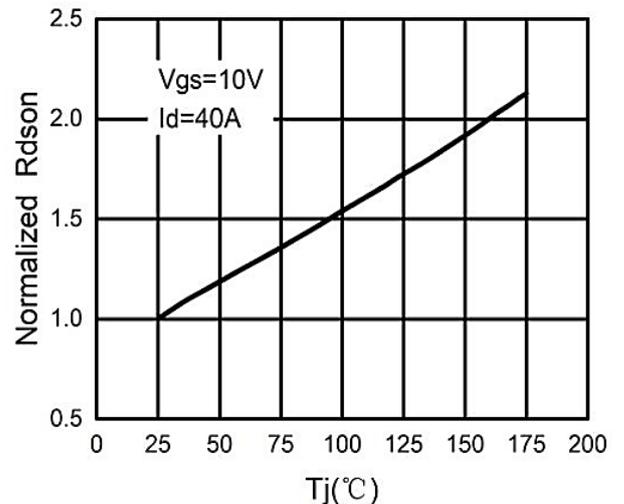
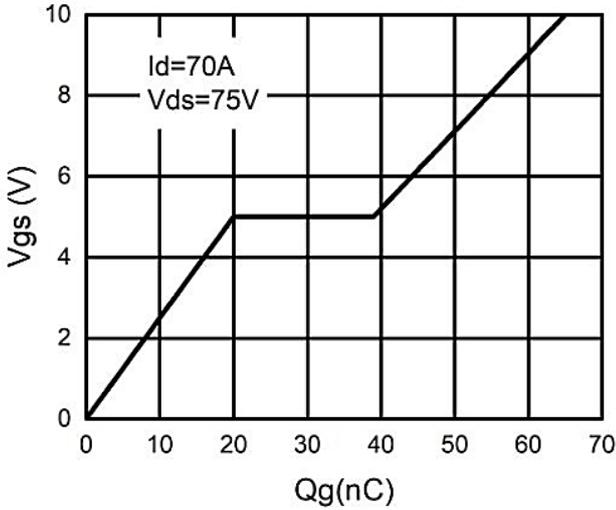**Figure6. RDS(ON) vs Junction Temperature**

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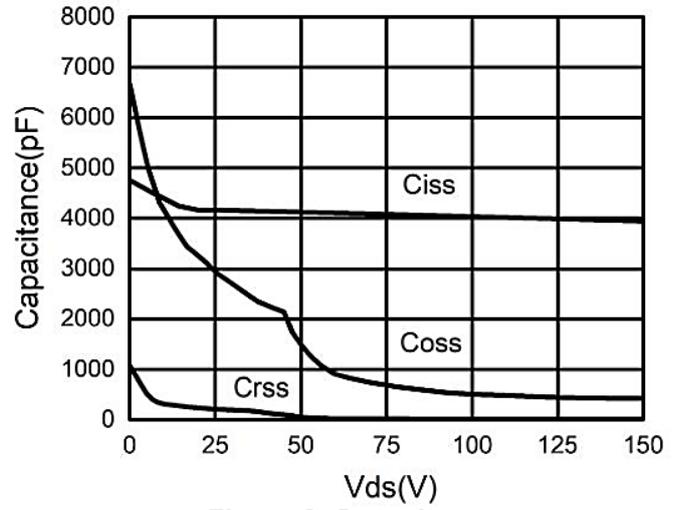**Figure 7. Gate Charge Waveforms**

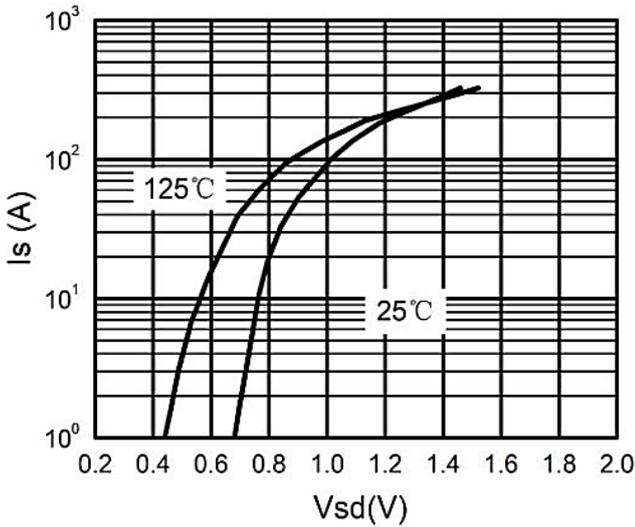**Figure 8. Capacitance**

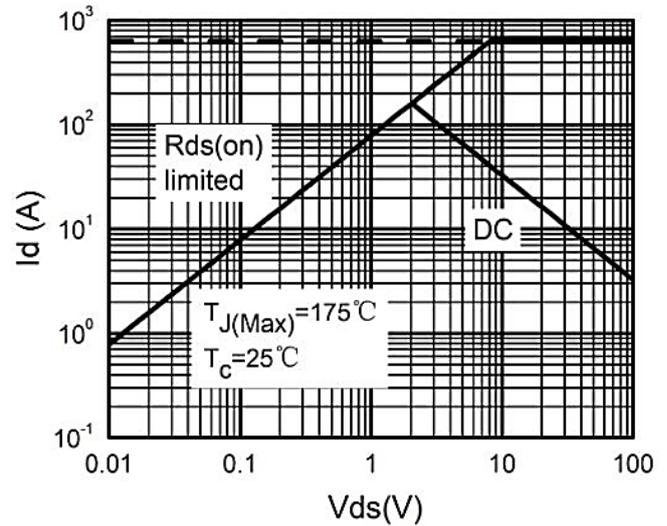**Figure 9. Body-Diode Characteristics**

Figure 10. Maximum Safe Operating Area

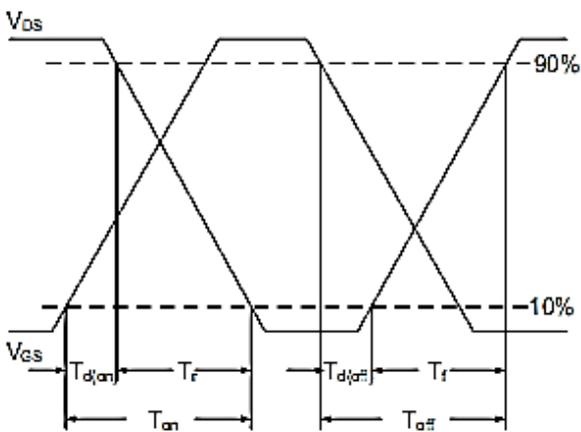**Figure11.Switching Time Waveform**
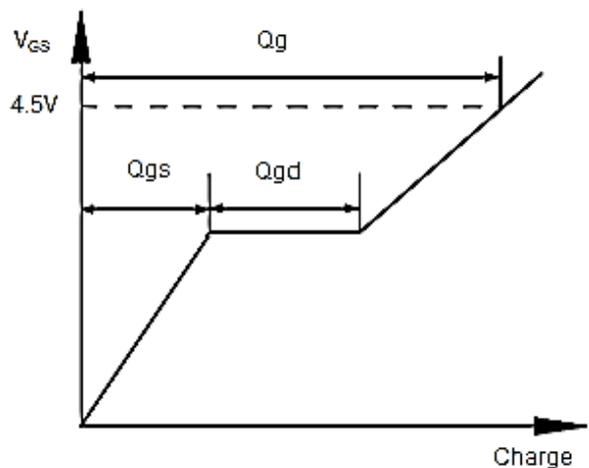
Figure12.Gate Charge Waveform

Package Mechanical Data-TO-220-3L-SLK
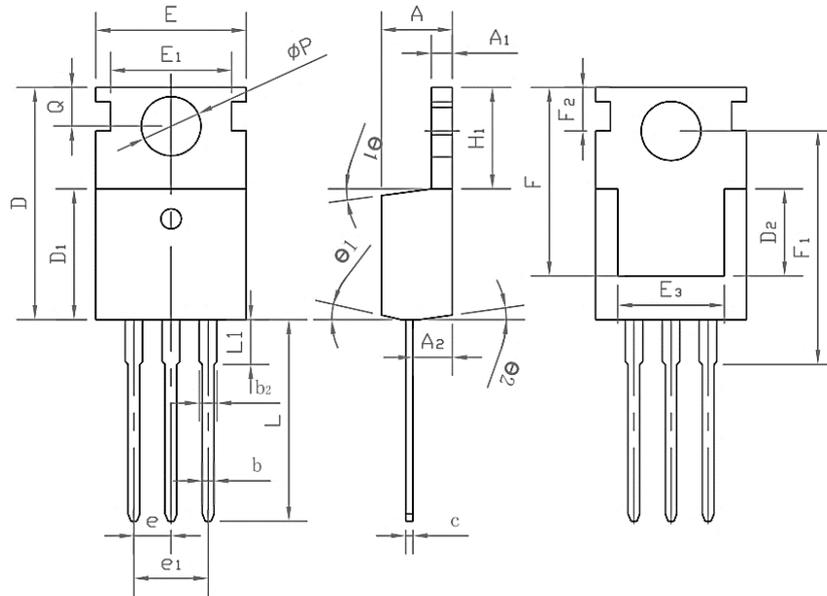
Symbol	Common mm		
	Mim	Nom	Max
A	4.27	4.57	4.87
A1	1.15	1.30	1.45
A2	2.10	2.40	2.70
b	0.70	0.80	1.00
b2	1.17	1.27	1.50
D	0.40	0.50	0.65
D1	8.80	9.10	9.40
D2	5.70	6.70	7.00
E	9.70	10.00	10.30
E1	-	8.70	-
E2	9.63	10.00	10.35
E3	7.00	8.00	8.40
e		0.37	
e1		0.10	
H1	6.00	6.50	6.85
L	12.75	13.50	13.90
L1	-	3.10	3.40
Φp	3.45	3.60	3.75
Q	2.60	2.80	3.00
θ1	4°	7°	10°
θ2	0°	3°	6°
F	13.30	13.50	13.70
F1	15.50	15.90	16.30
F2	2.80	3.00	3.20

Package Mechanical Data-TO-263-3L-SLK
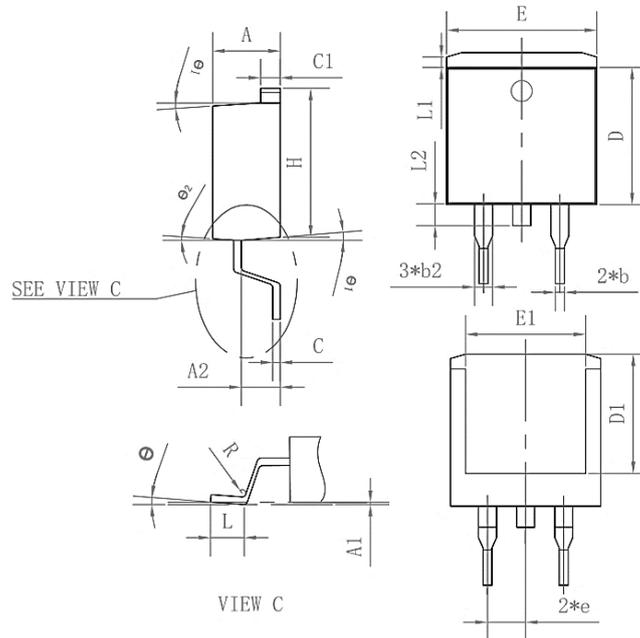
Symbol	Common		
	mm		
	Mim	Nom	Max
A	4.35	4.47	4.60
A1	0.09	0.10	0.11
A2	2.30	2.40	2.70
b	0.70	0.80	1.00
b2	1.25	1.36	1.50
C	0.45	0.50	0.65
C1	1.29	1.30	9.40
D	9.10	9.20	9.30
D1	7.90	8.00	8.10
E	9.85	10.00	10.20
E1	7.90	8.00	8.10
H	15.30	15.50	15.70
e	-	2.54	-
L	2.34	2.54	2.74
L1	1.00	1.10	1.20
L2	1.30	1.40	1.50
R	0.24	0.25	0.26
θ	0°	4°	8°
Θ1	4°	7°	10°
Θ2	0°	3°	6°

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Edition	Date	Change
Rve1.0	2021/8/5	Initial release

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