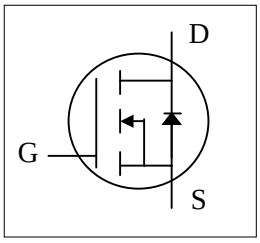
AP98T03GP/S

RoHS-compliant Product

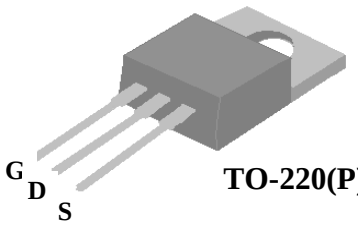
Advanced Power Electronics Corp.

N-CHANNEL ENHANCEMENT MODE POWER MOSFET

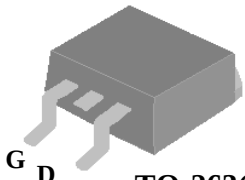
- **Simple Drive Requirement**
- **Ultra-low On-resistance**
- **Fast Switching Characteristic**



BV_{DSS}	30V
$R_{DS(ON)}$	2.8mΩ
I_D	200A



TO-220(P)



TO-263(S)

Description

Advanced Power MOSFETs from APEC provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

The TO-263 package is widely preferred for commercial-industrial surface mount applications and suited for low voltage applications such as DC/DC converters. The through-hole version (AP98T03GP) are available for low-profile applications.

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[3]	200	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V	125	A
I_{DM}	Pulsed Drain Current[1]	800	A
P_D@T_C=25℃	Total Power Dissipation	156	W
	Linear Derating Factor	1.25	W/℃
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Value	Units
Rthj-c	Maximum Thermal Resistance, Junction-case	0.8	℃/W
Rthj-a	Maximum Thermal Resistance, Junction-ambient	62	℃/W

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	30	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V, I_D=40A	-	-	2.8	mΩ
		V_{GS}=4.5V, I_D=30A	-	-	4	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	0.8	-	2.5	V
g_{fs}	Forward Transconductance	V_{DS}=10V, I_D=30A	-	30	-	S
I_{DSS}	Drain-Source Leakage Current (T_j=25°C)	V_{DS}=30V, V_{GS}=0V	-	-	1	uA
	Drain-Source Leakage Current (T_j=150°C)	V_{DS}=24V ,V_{GS}=0V	-	-	25	uA
I_{GSS}	Gate-Source Leakage	V_{GS}= ±20V	-	-	±100	nA
Q_g	Total Gate Charge[2]	I_D=30A	-	71	115	nC
Q_{gs}	Gate-Source Charge	V_{DS}=24V	-	9	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=4.5V	-	41	-	nC
$t_{d(on)}$	Turn-on Delay Time[2]	V_{DS}=15V	-	14	-	ns
t_r	Rise Time	I_D=30A	-	78	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=3.3Ω,V_{GS}=10V	-	74	-	ns
t_f	Fall Time	R_D=0.5Ω	-	136	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	4960	7940	pF
C_{oss}	Output Capacitance	V_{DS}=25V	-	1210	-	pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	1200	-	pF
R_g	Gate Resistance	f=1.0MHz	-	1	1.5	Ω

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage[2]	I_S=40A, V_{GS}=0V	-	-	1.3	V
t_{rr}	Reverse Recovery Time[2]	I_S=10A, V_{GS}=0V	-	54	-	ns
Q_{rr}	Reverse Recovery Charge	dI/dt=100A/μs	-	74	-	nC

Notes:

1.Pulse width limited by Max. junction temperature.

2.Pulse test

3.Package limitation current is 80A, calculated continuous current based on maximum allowable junction temperature is 200A.

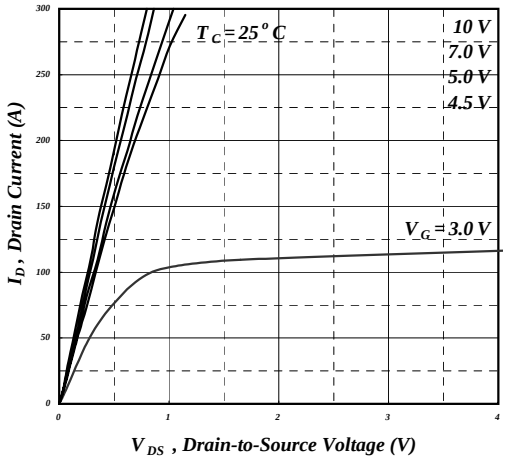


Fig 1. Typical Output Characteristics

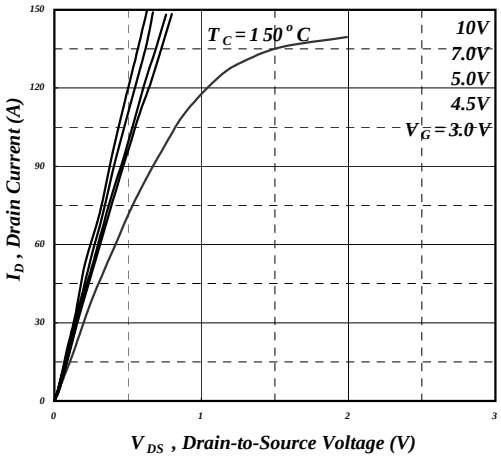


Fig 2. Typical Output Characteristics

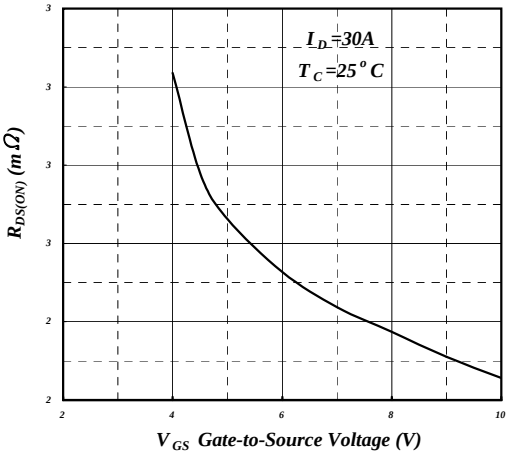


Fig 3. On-Resistance v.s. Gate Voltage

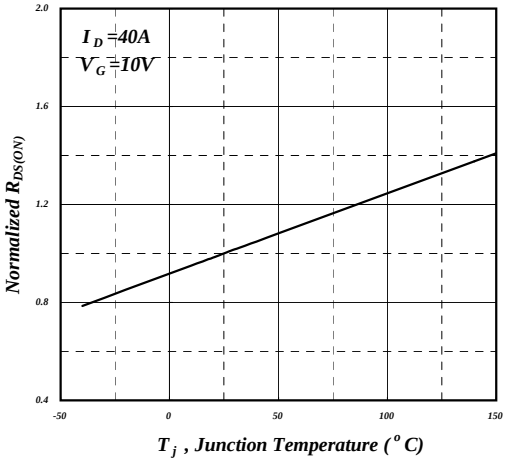


Fig 4. Normalized On-Resistance v.s. Junction Temperature

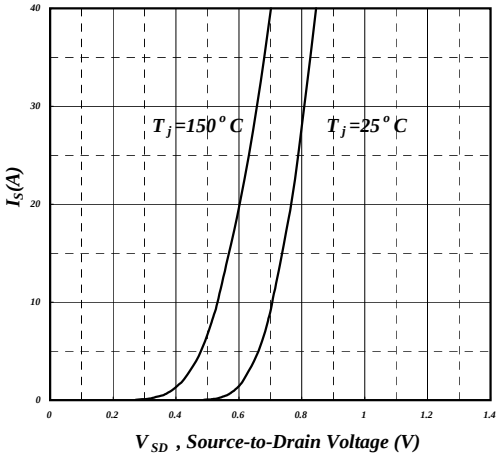


Fig 5. Forward Characteristic of Reverse Diode

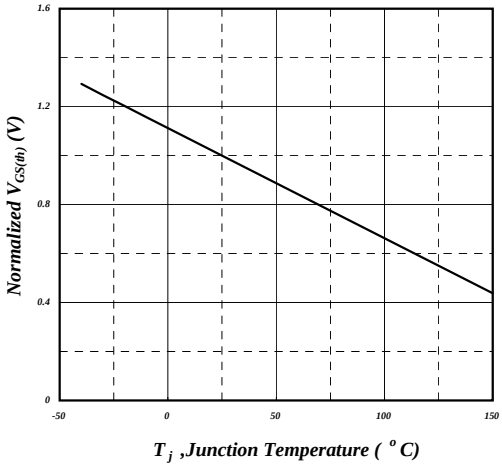


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

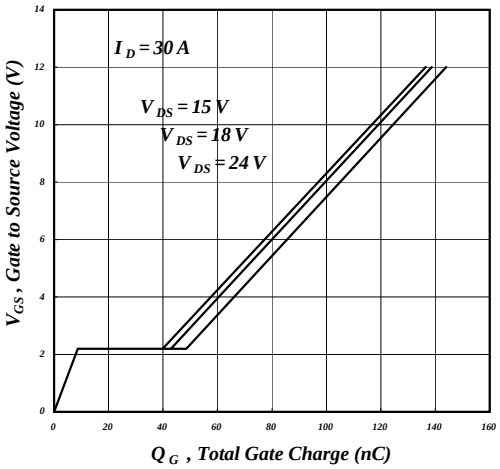


Fig 7. Gate Charge Characteristics

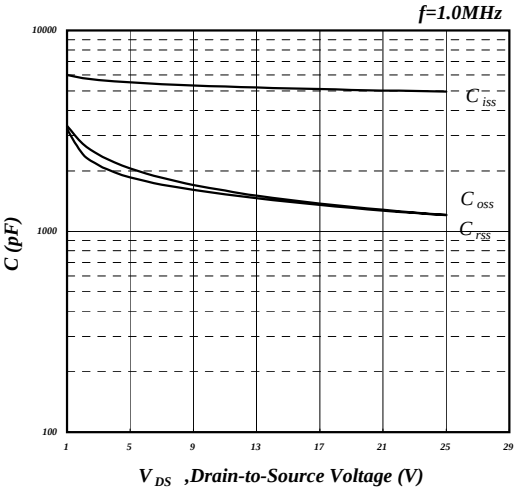


Fig 8. Typical Capacitance Characteristics

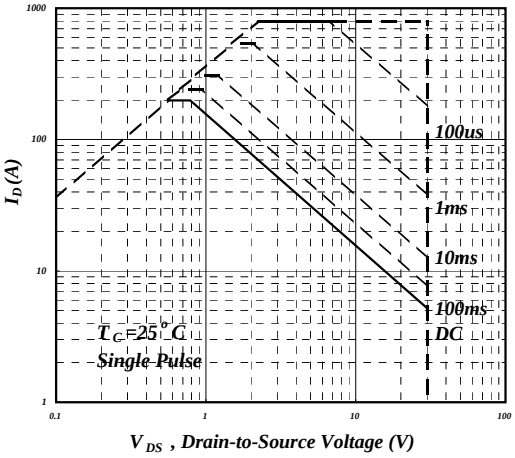


Fig 9. Maximum Safe Operating Area

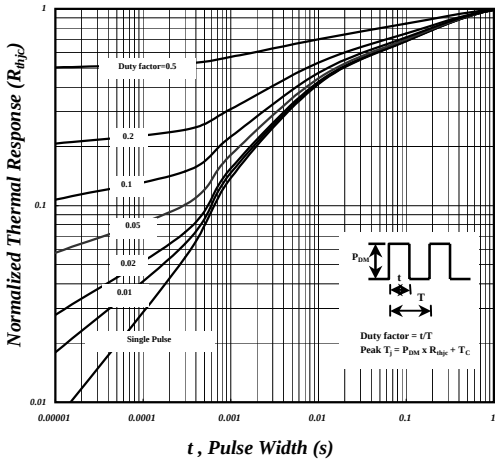


Fig 10. Effective Transient Thermal Impedance

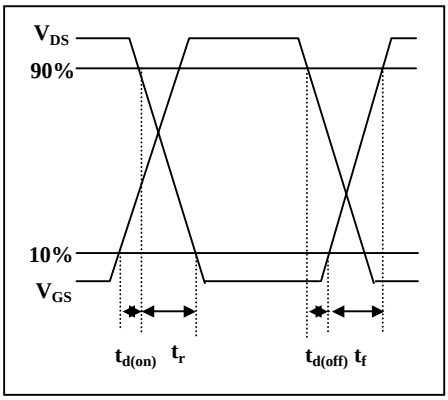


Fig 11. Switching Time Waveform

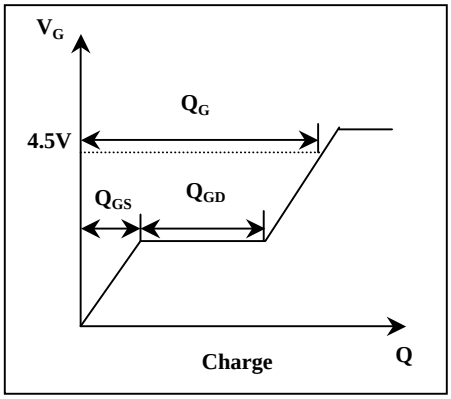
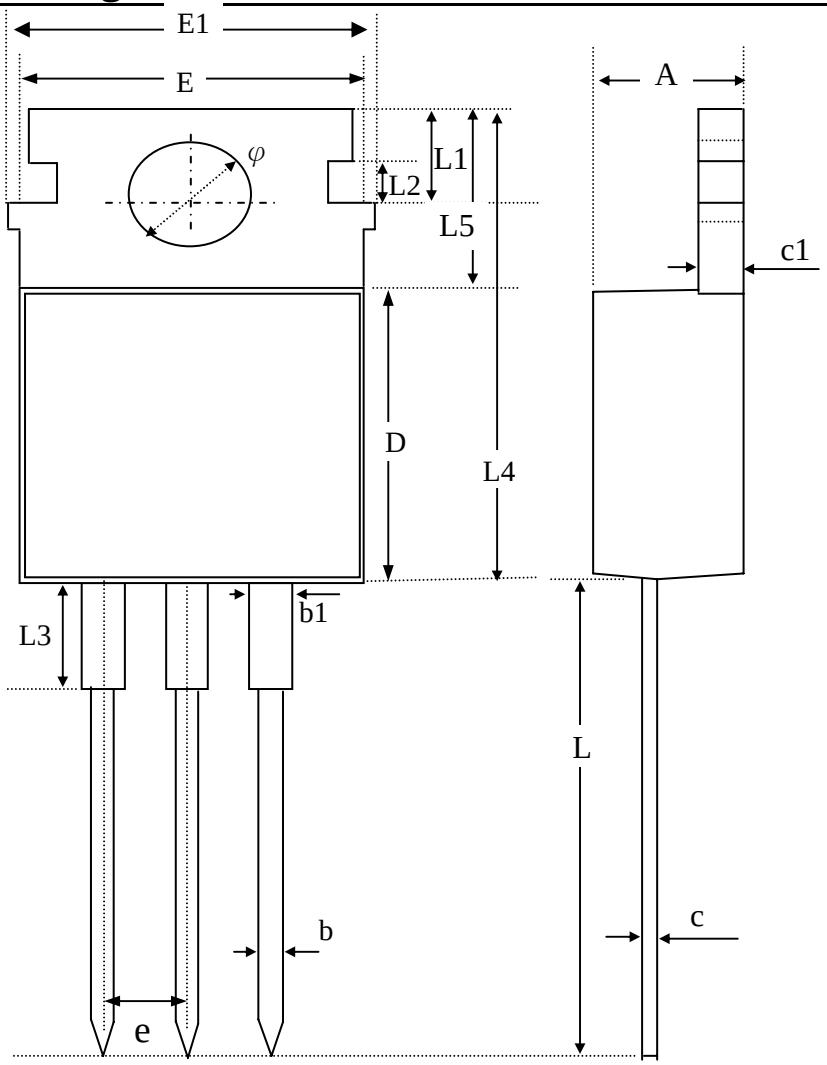


Fig 12. Gate Charge Waveform

Package Outline : TO-220

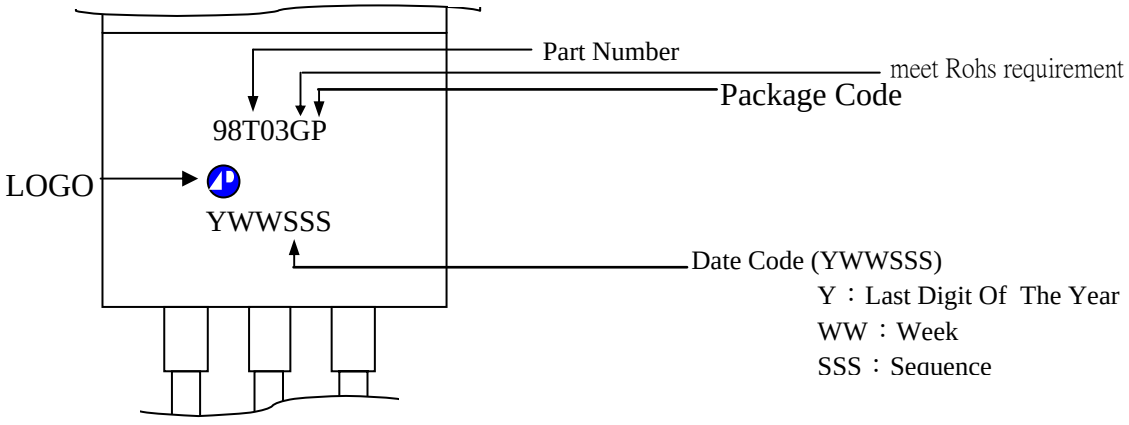


SYMBOLS	Millimeters		
	MIN	NOM	MAX
A	4.25	4.48	4.70
b	0.65	0.80	0.90
b1	1.15	1.38	1.60
c	0.40	0.50	0.60
c1	1.00	1.20	1.40
E	9.70	10.00	10.40
E1	---	---	11.50
e	----	2.54	----
L	12.70	13.60	14.50
L1	2.60	2.80	3.00
L2	1.00	1.40	1.80
L3	2.6	3.10	3.6
L4	14.70	15.50	16
L5	6.30	6.50	6.70
φ	3.50	3.60	3.70
D	8.40	8.90	9.40

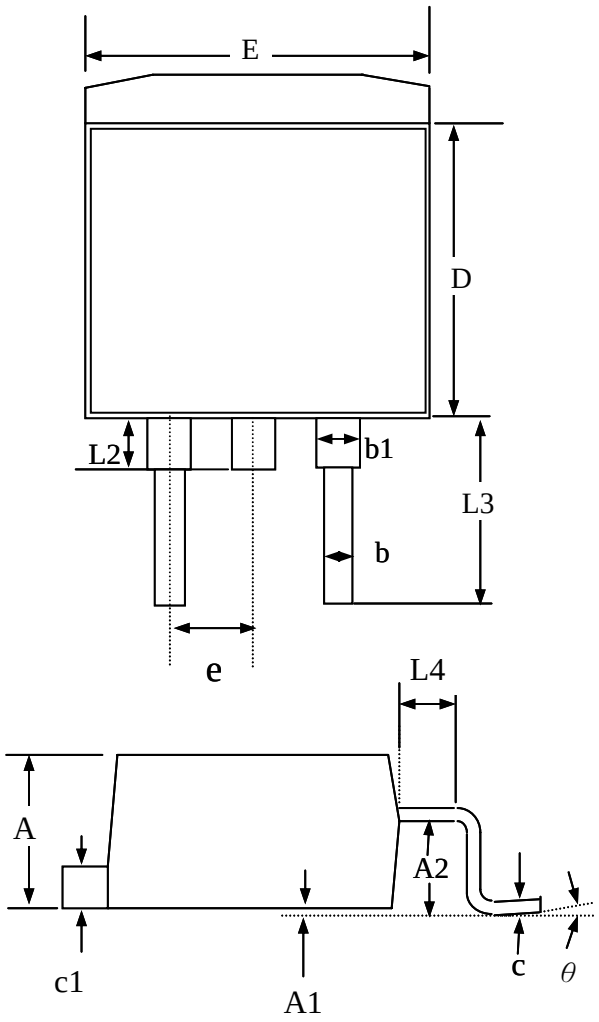
1.All Dimensions Are in Millimeters.

2.Dimension Does Not Include Mold Protrusions.

Part Marking Information & Packing : TO-220



Package Outline : TO-263



SYMBOLS	Millimeters		
	MIN	NOM	MAX
A	4.25	4.75	5.20
A1	0.00	0.15	0.30
A2	2.20	2.45	2.70
b	0.70	0.90	1.10
b1	1.07	1.27	1.47
c	0.30	0.45	0.60
c1	1.15	1.30	1.45
D	8.30	8.90	9.40
E	9.70	10.10	10.50
e	2.04	2.54	3.04
L2	-----	1.50	-----
L3	4.50	4.90	5.30
L4	-----	1.50	----

1.All Dimensions Are in Millimeters.

2.Dimension Does Not Include Mold Protrusions.

Part Marking Information & Packing : TO-263