



**Advanced Power
Electronics Corp.**

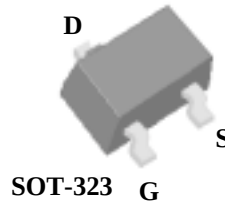
AP1333GU

Pb Free Plating Product

P-CHANNEL ENHANCEMENT MODE

POWER MOSFET

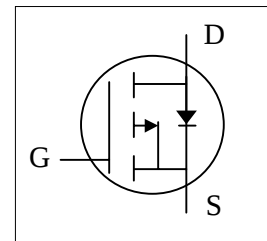
- ▼ Simple Gate Drive
- ▼ Small Package Outline
- ▼ Fast Switching Speed
- ▼ RoHS Compliant



BV_{DSS}	-20V
$R_{DS(ON)}$	800m Ω
I_D	-550mA

Description

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



Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-Source Voltage	± 12	V
$I_D@T_A=25^\circ\text{C}$	Continuous Drain Current ³	-550	mA
$I_D@T_A=70^\circ\text{C}$	Continuous Drain Current ³	-440	mA
I_{DM}	Pulsed Drain Current ^{1,2}	2.5	A
$P_D@T_A=25^\circ\text{C}$	Total Power Dissipation	0.35	W
	Linear Derating Factor	0.003	W/ $^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Data

Symbol	Parameter	Value	Unit
R_{thj-a}	Thermal Resistance Junction-ambient ³ Max.	360	$^\circ\text{C}/\text{W}$

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250uA	-20	-	-	V
ΔBV _{DSS} /ΔT _j	Breakdown Voltage Temperature Coefficient	Reference to 25°C, I _D =-1mA	-	0.01	-	V/°C
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =-10V, I _D =-550mA	-	-	600	mΩ
		V _{GS} =-4.5V, I _D =-500mA	-	-	800	mΩ
		V _{GS} =-2.5V, I _D =-300mA	-	-	1000	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250uA	-0.5	-	-1.2	V
g _{fs}	Forward Transconductance	V _{DS} =-5V, I _D =-500mA	-	1	-	S
I _{DSS}	Drain-Source Leakage Current (T _j =25°C)	V _{DS} =-20V, V _{GS} =0V	-	-	-1	uA
	Drain-Source Leakage Current (T _j =70°C)	V _{DS} =-16V, V _{GS} =0V	-	-	-10	uA
I _{GSS}	Gate-Source Leakage	V _{GS} =±12V	-	-	±100	nA
Q _g	Total Gate Charge ²	I _D =-500mA	-	1.7	2.7	nC
Q _{gs}	Gate-Source Charge	V _{DS} =-16V	-	0.3	-	nC
Q _{gd}	Gate-Drain ("Miller") Charge	V _{GS} =-4.5V	-	0.4	-	nC
t _{d(on)}	Turn-on Delay Time ²	V _{DS} =-10V	-	5	-	ns
t _r	Rise Time	I _D =-500mA	-	8	-	ns
t _{d(off)}	Turn-off Delay Time	R _G =3.3Ω, V _{GS} =-5V	-	10	-	ns
t _f	Fall Time	R _D =20Ω	-	2	-	ns
C _{iss}	Input Capacitance	V _{GS} =0V	-	66	105.6	pF
C _{oss}	Output Capacitance	V _{DS} =-10V	-	25	-	pF
C _{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	20	-	pF

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V _{SD}	Forward On Voltage ²	I _S =-300mA, V _{GS} =0V	-	-	-1.2	V

Notes:

- 1.Pulse width limited by Max. junction temperature.
- 2.Pulse width ≤300us , duty cycle ≤2%.
- 3.Surface mounted on FR4 board, t ≤ 10 sec.

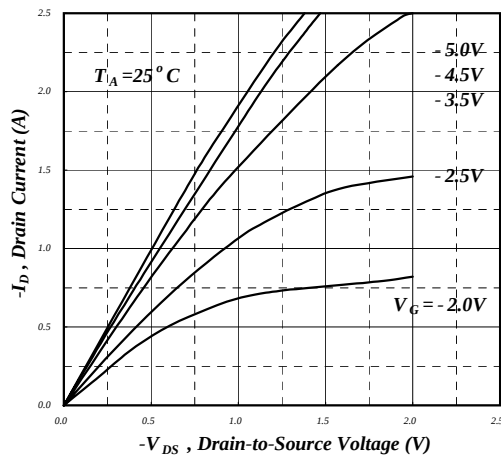


Fig 1. Typical Output Characteristics

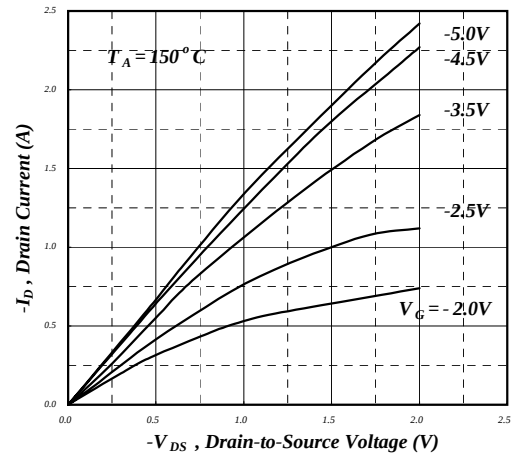


Fig 2. Typical Output Characteristics

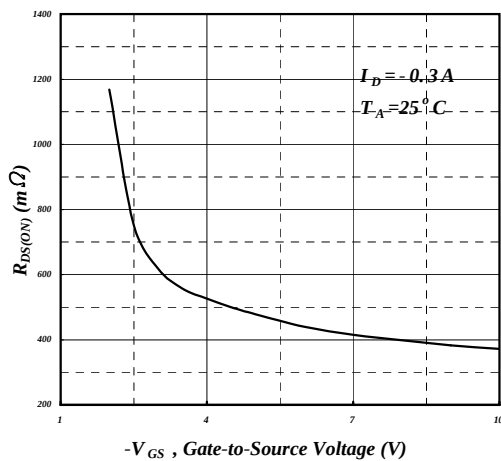
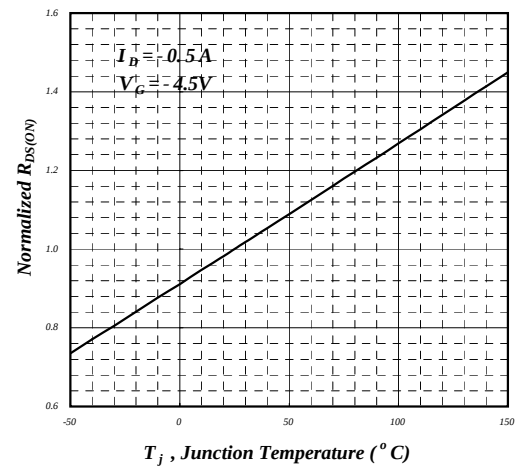
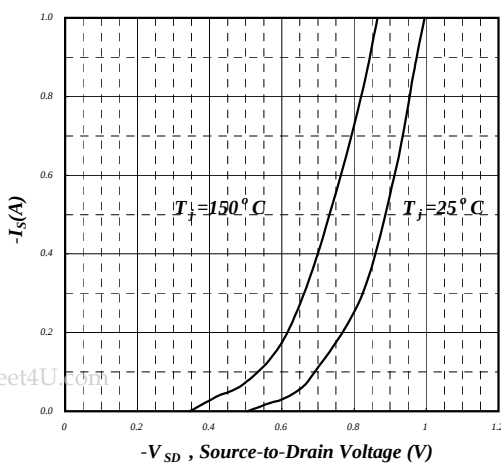
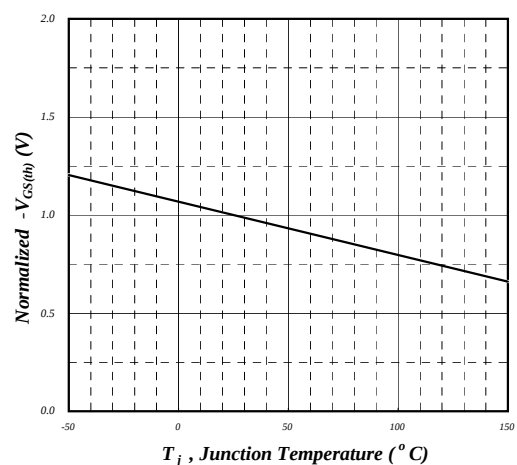


Fig 3. On-Resistance v.s. Gate Voltage

Fig 4. Normalized On-Resistance
v.s. Junction TemperatureFig 5. Forward Characteristic of
Reverse DiodeFig 6. Gate Threshold Voltage v.s.
Junction Temperature

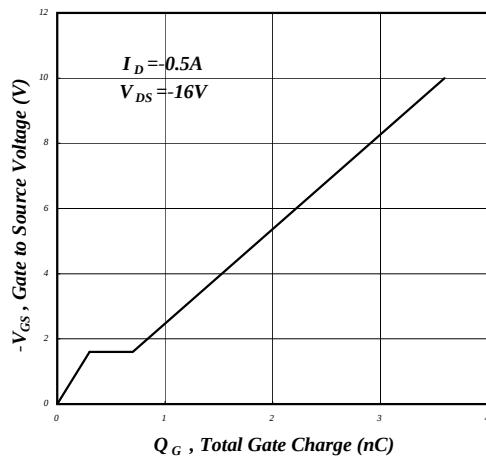


Fig 7. Gate Charge Characteristics

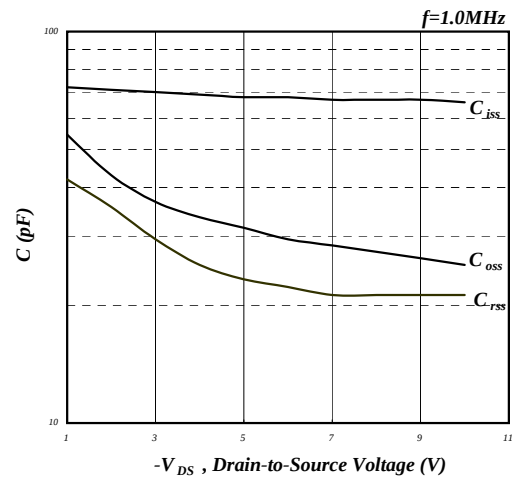


Fig 8. Typical Capacitance Characteristics

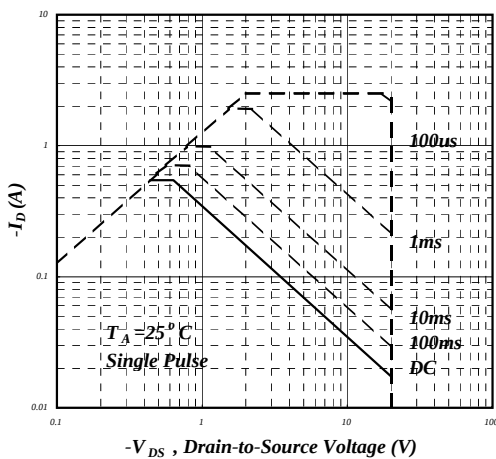


Fig 9. Maximum Safe Operating Area

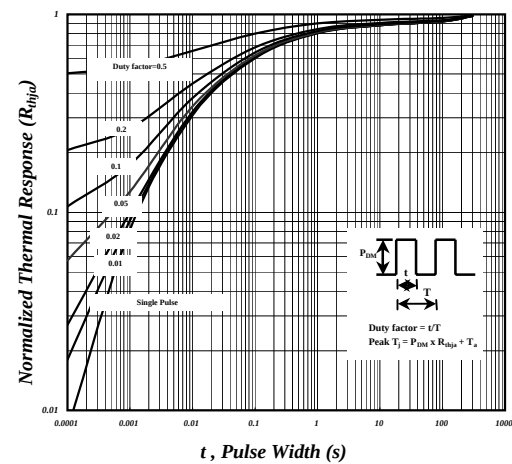


Fig 10. Effective Transient Thermal Impedance

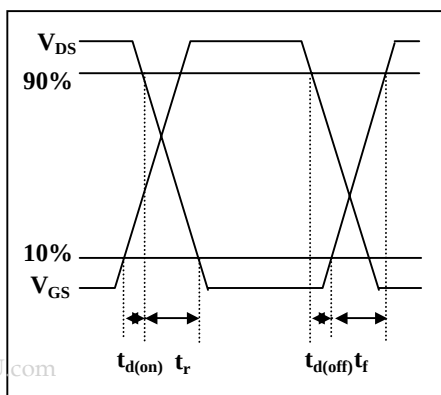


Fig 11. Switching Time Waveform

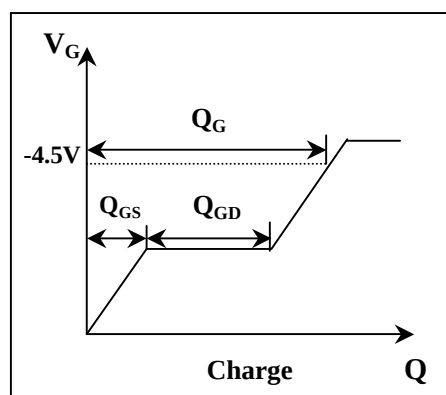


Fig 12. Gate Charge Waveform