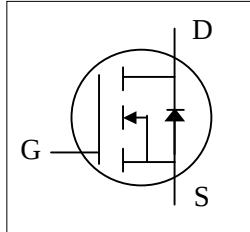


- ▼ Lower Gate Charge
- ▼ Simple Drive Requirement
- ▼ Fast Switching Characteristic
- ▼ RoHS Compliant

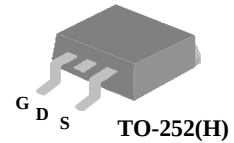


BV_{DSS}	30V
$R_{DS(ON)}$	50m Ω
I_D	12.5A

Description

XP20T03 series are innovated design and silicon process technology to achieve the lowest possible on-resistance and fast switching performance. It provides the designer with an extreme efficient device for use in a wide range of power applications.

The TO-252 package is widely preferred for all commercial-industrial surface mount applications using infrared reflow technique and suited for high current application due to the low connection resistance.



Absolute Maximum Ratings@ $T_J=25^{\circ}\text{C}$ (unless otherwise specified)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^{\circ}\text{C}$	Drain Current, V_{GS} @ 10V	12.5	A
$I_D@T_C=100^{\circ}\text{C}$	Drain Current, V_{GS} @ 10V	8	A
I_{DM}	Pulsed Drain Current ¹	40	A
$P_D@T_C=25^{\circ}\text{C}$	Total Power Dissipation	12.5	W
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-c}	Maximum Thermal Resistance, Junction-case	10	$^{\circ}\text{C}/\text{W}$
R_{thj-a}	Maximum Thermal Resistance, Junction-ambient (PCB mount) ³	62.5	$^{\circ}\text{C}/\text{W}$

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 =8A	-	-	50	mΩ
		V _{GS} =4.5V, I _D =5A	-	-	80	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250uA	1	-	3	V
g _{fs}	Forward Transconductance	V _{DS} =5V, I _D =5A	-	6	-	S
I _{DSS}	Drain-Source Leakage Current	V _{DS} =30V, V _{GS} =0V	-	-	1	uA
	Drain-Source Leakage Current (T _J =125°C)	V _{DS} =24V, V _{GS} =0V	-	-	250	uA
I _{GSS}	Gate-Source Leakage	V _{GS} = +20V, V _{DS} =0V	-	-	+100	nA
Q _g	Total Gate Charge	I _D =10A	-	4	7	nC
Q _{gs}	Gate-Source Charge	V _{DS} =24V	-	1.5	-	nC
Q _{gd}	Gate-Drain ("Miller") Charge	V _{GS} =4.5V	-	2.3	-	nC
t _{d(on)}	Turn-on Delay Time	V _{DS} =15V	-	6	-	ns
t _r	Rise Time	I _D =10A	-	30	-	ns
t _{d(off)}	Turn-off Delay Time	R _G =3.3 Ω	-	10	-	ns
t _f	Fall Time	V _{GS} =10V	-	3	-	ns
C _{iss}	Input Capacitance	V _{GS} =0V	-	270	430	pF
C _{oss}	Output Capacitance	V _{DS} =25V	-	70	-	pF
C _{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	50	-	pF
R _g	Gate Resistance	f=1.0MHz	-	1.6	2.4	Ω

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V _{SD}	Forward On Voltage ²	I _S =5A, V _{GS} =0V	-	-	1.3	V
t _{rr}	Reverse Recovery Time	I _S =10A, V _{GS} =0V,	-	16	-	ns
Q _{rr}	Reverse Recovery Charge	dI/dt=100A/μs	-	9	-	nC

Notes:

- 1.Pulse width limited by Max. junction temperature.
- 2.Pulse test
- 3.Surface mounted on 1 in² copper pad of FR4 board

THIS PRODUCT IS SENSITIVE TO ELECTROSTATIC DISCHARGE, PLEASE HANDLE WITH CAUTION.

USE OF THIS PRODUCT AS A CRITICAL COMPONENT IN LIFE SUPPORT OR OTHER SIMILAR SYSTEMS IS NOT AUTHORIZED.

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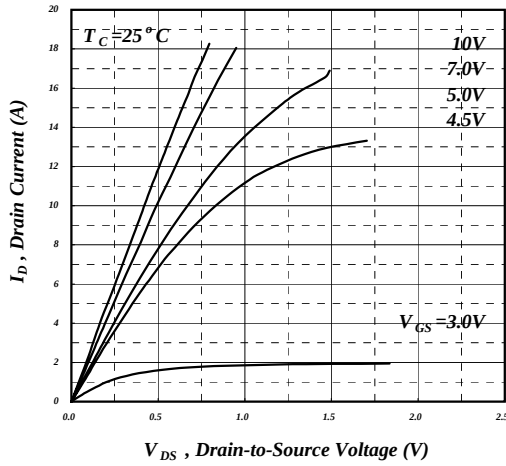


Fig 1. Typical Output Characteristics

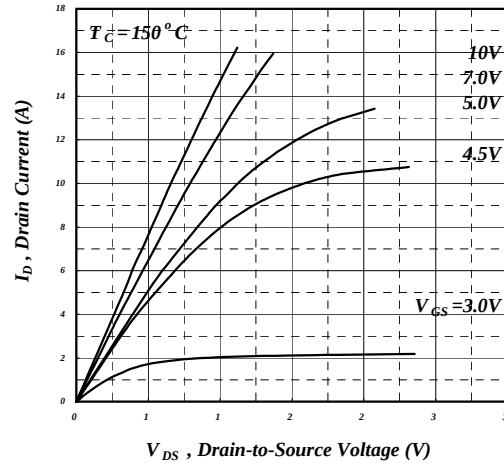


Fig 2. Typical Output Characteristics

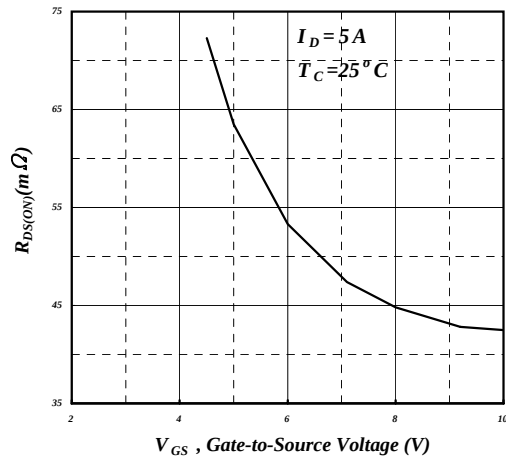
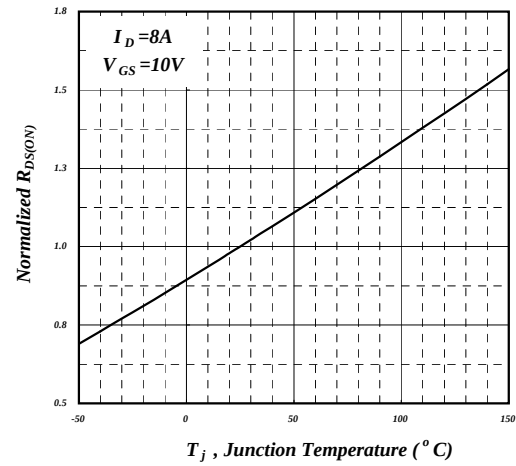
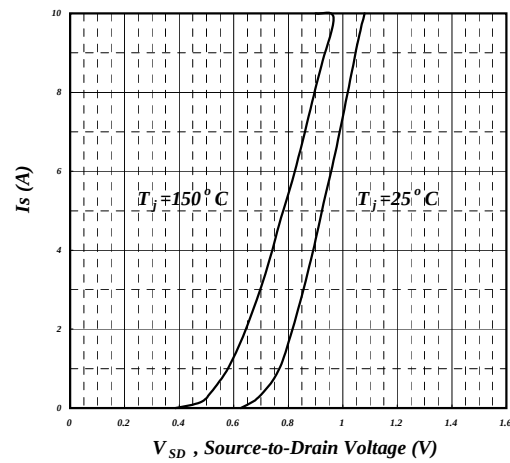


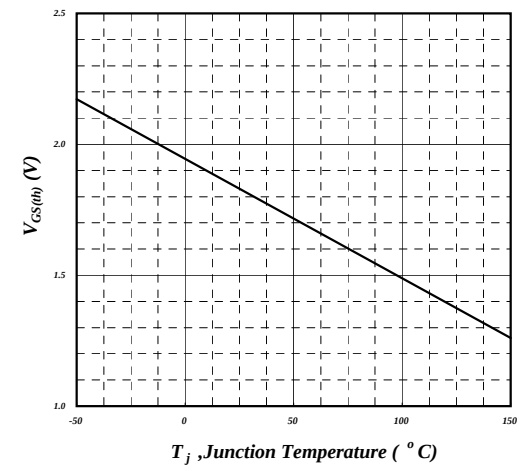
Fig 3. On-Resistance v.s. Gate Voltage



**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**

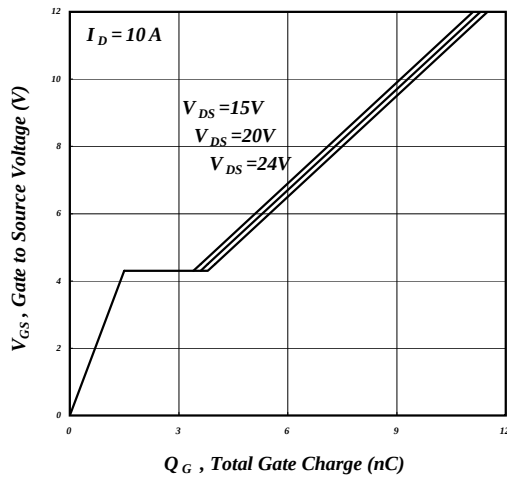


Fig 7. Gate Charge Characteristics

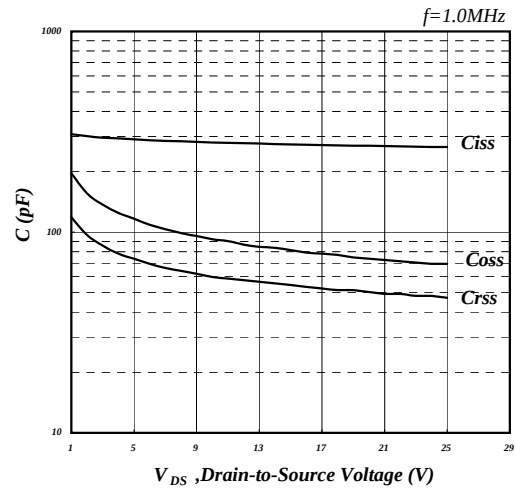


Fig 8. Typical Capacitance Characteristics

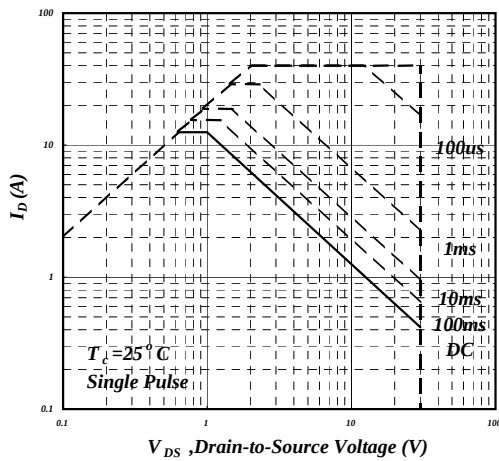


Fig 9. Maximum Safe Operating Area

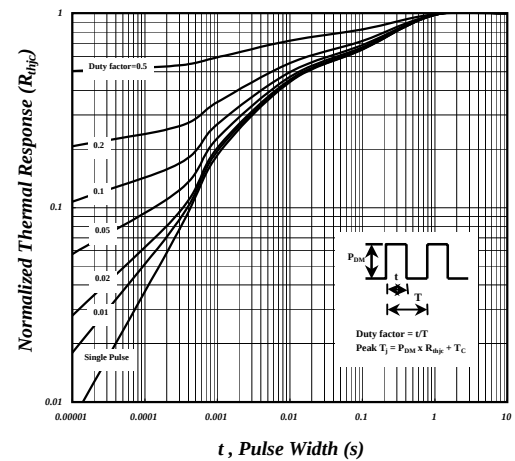


Fig 10. Effective Transient Thermal Impedance

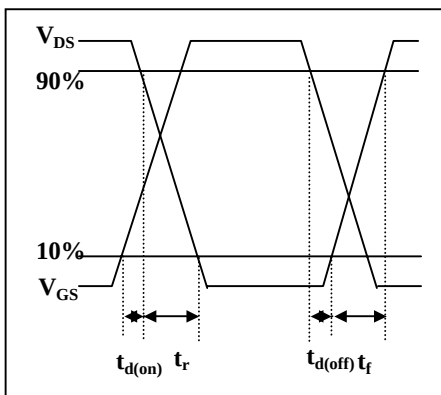


Fig 11. Switching Time Waveform

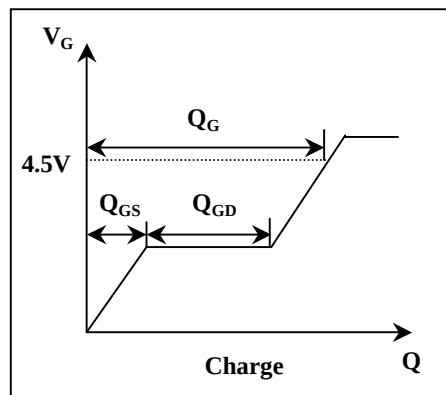
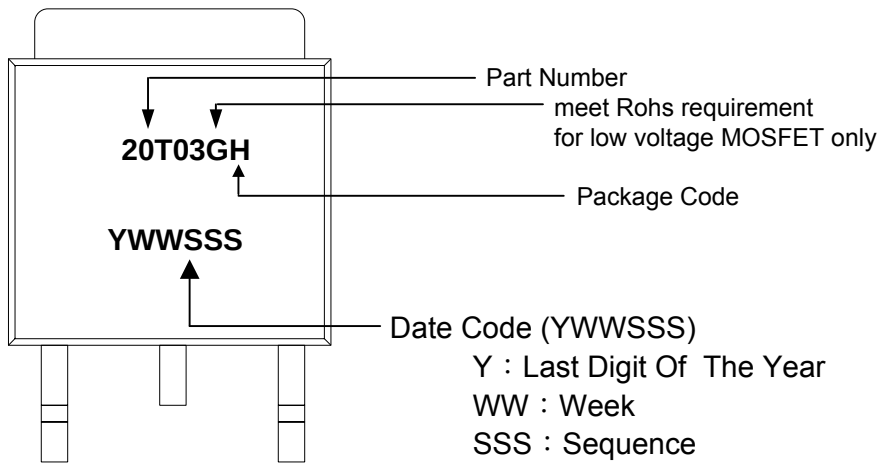
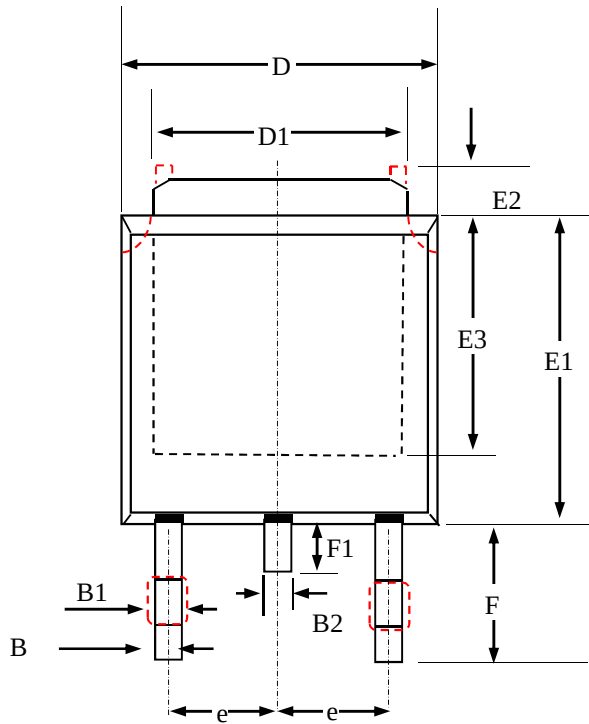


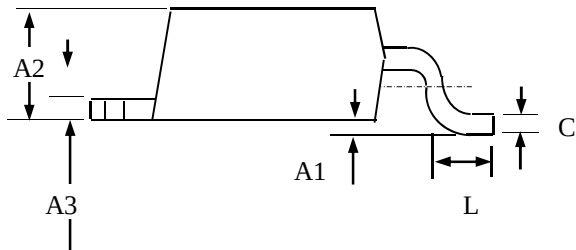
Fig 12. Gate Charge Waveform

MARKING INFORMATION

Package Outline : TO-252



SYMBOLS	Millimeters		
	MIN	NOM	MAX
A2	2.18	2.30	2.40
A3	0.40	0.50	0.65
B	0.40	0.70	1.00
B1	0.50	0.85	1.20
D	6.00	6.50	6.80
D1	4.80	5.35	5.90
E3	4.00 (ref.)		
F	2.00	2.63	3.05
F1	0.50	0.85	1.20
E1	5.00	5.70	6.30
E2	0.50	1.10	1.80
e	2.3 (ref)		
C	0.35	0.525	0.70
A1	0.00	—	0.25
B2	—	—	1.25
L	0.90	1.34	1.78



- 1.All Dimensions Are in Millimeters.
- 2.Dimension Does Not Include Mold Protrusions.
3. Thermal PAD, Body and Pin contour is for reference, it may has little difference by option.

TO-252 FOOTPRINT :

