

- ★ Green Device Available
- ★ Super Low Gate Charge
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology
- ★ 100% EAS Guaranteed

Product Summary



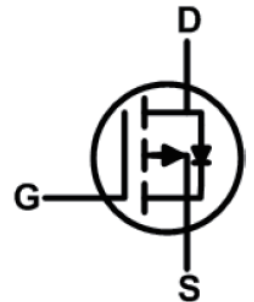
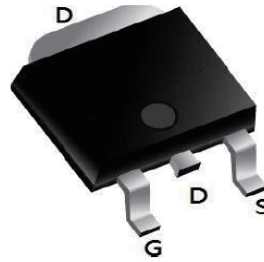
BVDSS	RDSON	ID
-30V	2.5mΩ	-120A

Description

The 120P03 is the high cell density trenched P-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The 120P03 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

TO252 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V <sub>DS</sub>	Drain-Source Voltage	-30	V
V <sub>GS</sub>	Gate-Source Voltage	±20	V
I <sub>D</sub> @T <sub>C</sub> =25°C	Continuous Drain Current, V <sub>GS</sub> @ -10V <sup>1,6</sup>	-120	A
I <sub>D</sub> @T <sub>C</sub> =100°C	Continuous Drain Current, V <sub>GS</sub> @ -10V <sup>1,6</sup>	-80	A
I <sub>DM</sub>	Pulsed Drain Current <sup>2</sup>	-470	A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	580	mJ
I <sub>AS</sub>	Avalanche Current	-80	A
P <sub>D</sub> @T <sub>C</sub> =25°C	Total Power Dissipation <sup>4</sup>	100	W
T <sub>STG</sub>	Storage Temperature Range	-55 to 175	°C
T <sub>J</sub>	Operating Junction Temperature Range	-55 to 175	°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
R <sub>θJA</sub>	Thermal Resistance Junction-ambient <sub>1</sub> (t≤10S)	---	20	°C/W
	Thermal Resistance Junction-ambient <sub>1</sub> (Steady State)	---	50	°C/W
R <sub>θJC</sub>	Thermal Resistance Junction-case <sub>1</sub>	---	3.6	°C/W

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
120P03	120P03	TO-252			2500

**Electrical Characteristics ( $T_J = 25^\circ\text{C}$  unless otherwise specified)**

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Units
<b>On/Off States</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_b=-250\mu A$	-30	-	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=-30V, V_{GS}=0V$	-	-	-1	$\mu A$
$I_{GSS}$	Gate-Body Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_b=-250\mu A$	-1	-1.7	-2.5	V
$g_{FS}$	Forward Transconductance	$V_{DS}=-5V, I_b=-20A$	-	65	-	S
$R_{DS(ON)}$	Drain-Source On-State Resistance	$V_{GS}=-10V, I_b=-20A$	-	2.5	3.1	m $\Omega$
		$V_{GS}=-4.5V, I_b=-20A$	-	4	5.2	m $\Omega$
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS}=-15V, V_{GS}=0V, f=1.0MHz$	-	7000	-	pF
$C_{oss}$	Output Capacitance		-	820	-	pF
$C_{rss}$	Reverse Transfer Capacitance		-	540	-	pF
$R_g$	Gate resistance	$V_{GS}=0V, V_{DS}=0V, f=1.0MHz$	-	2.2	-	$\Omega$
<b>Switching Parameters</b>						
$t_{d(on)}$	Turn-on Delay Time	$V_{GS}=-10V, V_{DS}=-15V, R_L=0.75\Omega, R_{GEN}=3\Omega$	-	14	-	nS
$t_r$	Turn-on Rise Time		-	13	-	nS
$t_{d(off)}$	Turn-Off Delay Time		-	65	-	nS
$t_f$	Turn-Off Fall Time		-	37	-	nS
$Q_g$	Total Gate Charge	$V_{GS}=-10V, V_{DS}=-15V, I_b=-20A$	-	130	-	nC
$Q_{gs}$	Gate-Source Charge		-	12	-	nC
$Q_{gd}$	Gate-Drain Charge		-	31	-	nC
<b>Source-Drain Diode Characteristics</b>						
$I_{SD}$	Source-Drain Current (Body Diode)		-	-	-108	A
$V_{SD}$	Forward on Voltage <sup>(Note 3)</sup>	$V_{GS}=0V, I_s=-20A$	-	-	-1.2	V
$t_{rr}$	Reverse Recovery Time	$I_F=-20A, di/dt=100A/\mu s$	-	30	-	ns
$Q_{rr}$	Reverse Recovery Charge	$I_F=-20A, di/dt=100A/\mu s$	-	40	-	nC

**Notes:**

- 1.Repetitive Rating: Pulse width limited by maximum junction temperature.
- 2.EAS condition:  $T_J=25^\circ\text{C}, V_{DD}=15V, V_G=-10V, R_g=25\Omega, L=0.5mH$ .
- 3.Repetitive Rating: Pulse width limited by maximum junction temperature.

Typical Performance Characteristics

Figure 1: Output Characteristics

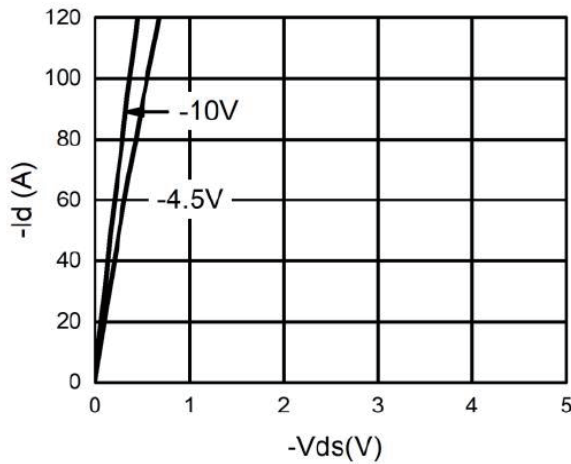


Figure 2: Transfer Characteristics

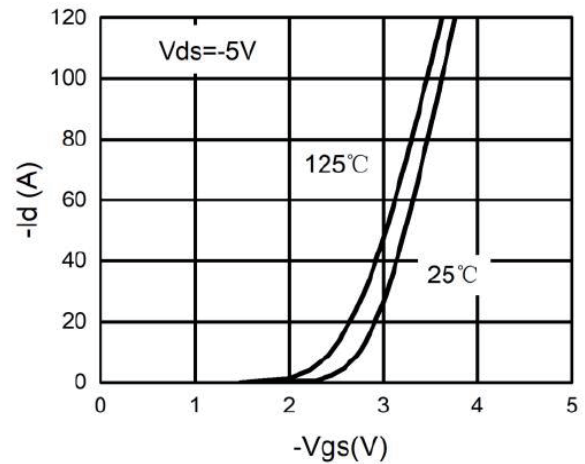


Figure 3: Power Dissipation

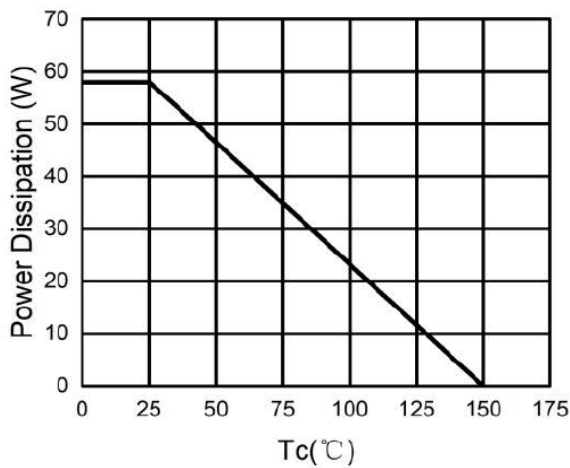


Figure 4: Drain Current

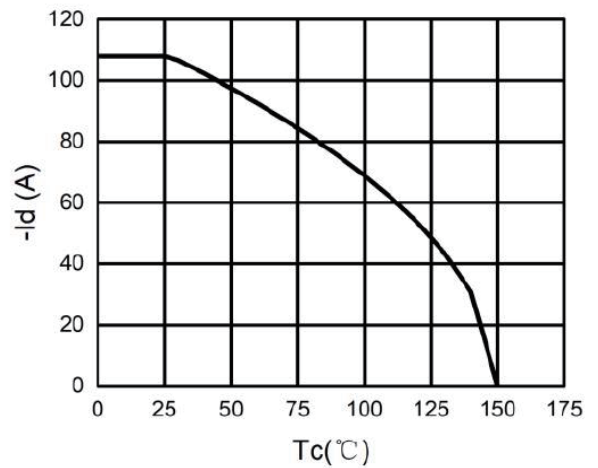


Figure 5: BVdss vs Junction Temperature

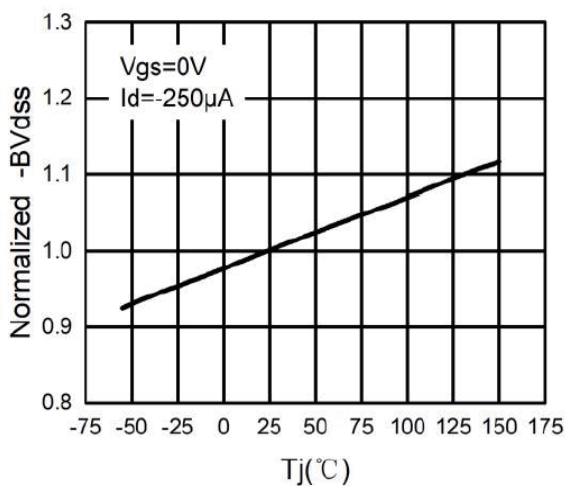
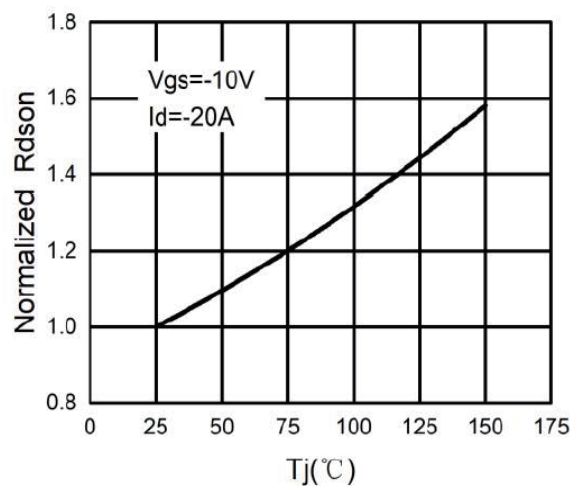


Figure 6: RDS(ON) vs Junction Temperature



Typical Performance Characteristics

Figure 7: Gate Charge Waveforms

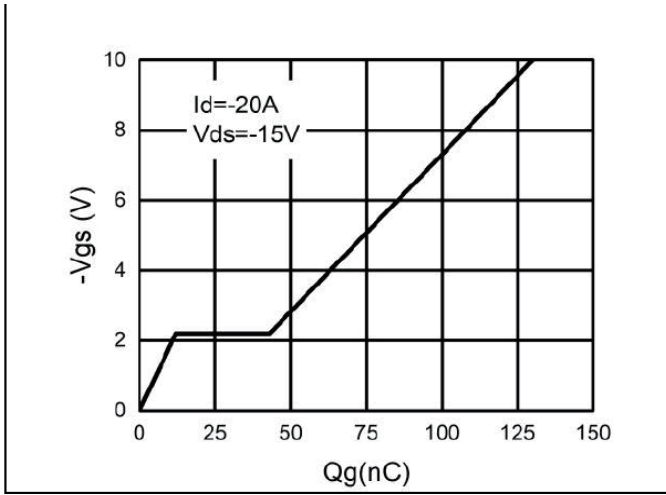


Figure 8: Capacitance

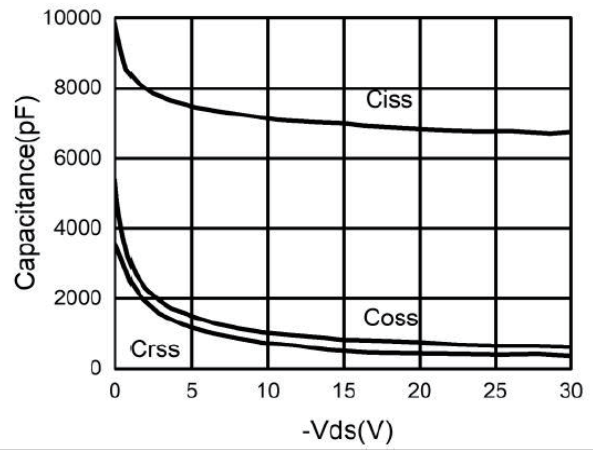


Figure 9: Body-Diode Characteristics

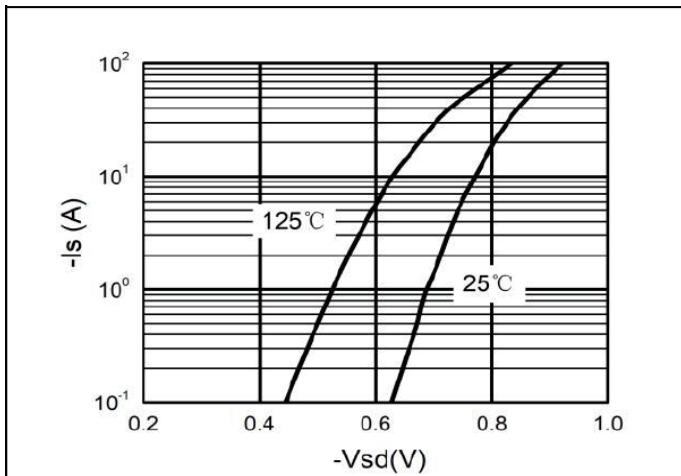
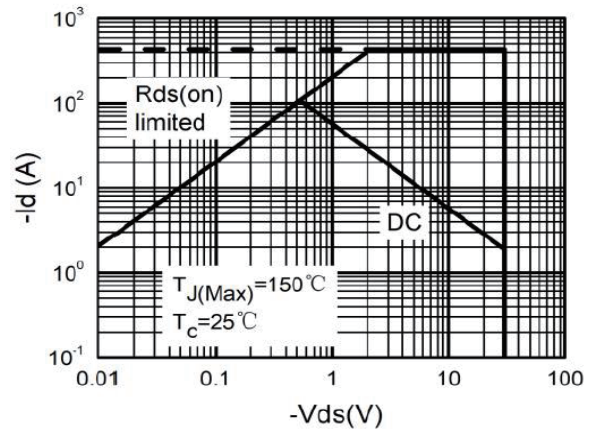
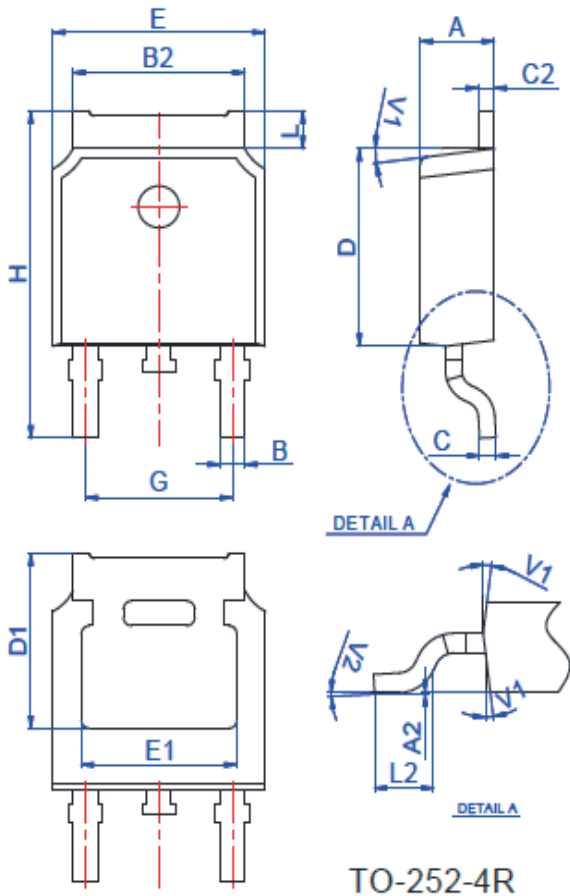


Figure 10: Maximum Safe Operating Area

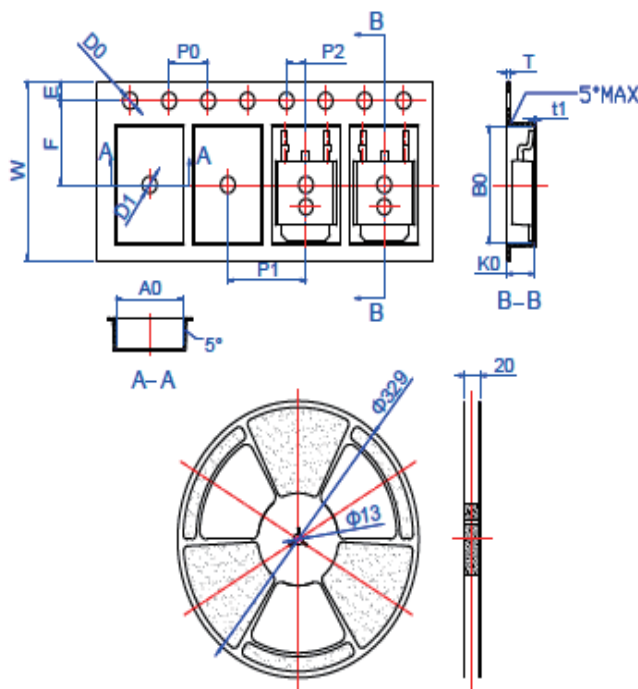


TO-252 Package outline



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Reel Specification-TO-252



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
W	15.90	16.00	16.10	0.626	0.630	0.634
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.40	7.50	7.60	0.291	0.295	0.299
D0	1.40	1.50	1.60	0.055	0.059	0.063
D1	1.40	1.50	1.60	0.055	0.059	0.063
P0	3.90	4.00	4.10	0.154	0.157	0.161
P1	7.90	8.00	8.10	0.311	0.315	0.319
P2	1.90	2.00	2.10	0.075	0.079	0.083
A0	6.85	6.90	7.00	0.270	0.271	0.276
B0	10.45	10.50	10.60	0.411	0.413	0.417
K0	2.68	2.78	2.88	0.105	0.109	0.113
T	0.24		0.27	0.009		0.011
t1	0.10			0.004		
10P0	39.80	40.00	40.20	1.567	1.575	1.583