

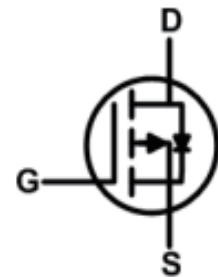
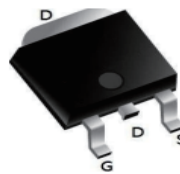
- ★ Green Device Available
- ★ Super Low Gate Charge
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology
- ★ 100% EAS Guaranteed

Product Summary



BVDSS	RDSON	ID
-60V	48mΩ	-20A

TO252 Pin Configuration



Description

The 20P06 is the high cell density trench P-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The 20P06 meet the RoHS and Green Product requirement 100% EAS guaranteed with full function reliability approved.

Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V _{DS}	Drain-Source Voltage	-60	V
V _{GS}	Gate-Source Voltage	±20	V
I _{D@Tc=25°C}	Continuous Drain Current, V _{GS} @ -10V ¹	-20	A
I _{D@Tc=100°C}	Continuous Drain Current, V _{GS} @ -10V ¹	-12	A
I _{D@TA=25°C}	Continuous Drain Current, V _{GS} @ -10V ¹	-4.5	A
I _{D@TA=70°C}	Continuous Drain Current, V _{GS} @ -10V ¹	-4	A
I _{DM}	Pulsed Drain Current ²	-30	A
EAS	Single Pulse Avalanche Energy ³	18.1	mJ
I _{AS}	Avalanche Current	-13	A
P _{D@Tc=25°C}	Total Power Dissipation ⁴	25	W
P _{D@TA=25°C}	Total Power Dissipation ⁴	2	W
T _{STG}	Storage Temperature Range	-55 to 150	°C
T _J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
R _{θJA}	Thermal Resistance Junction-Ambient ¹	---	62	°C/W
R _{θJC}	Thermal Resistance Junction-Case ¹	---	5	°C/W

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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-60	---	---	V
$\Delta BV_{DSS} / \Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , $I_D=-1\text{mA}$	---	-0.023	---	$V/^\circ\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=-10V, I_D=-10A$	---	48	58	$m\Omega$
		$V_{GS}=-4.5V, I_D=-6A$	---	56	67	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1.2	---	-2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	4	---	$mV/^\circ\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-24V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	-1	μA
		$V_{DS}=-24V, V_{GS}=0V, T_J=55^\circ\text{C}$	---	---	-5	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
g_{fs}	Forward Transconductance	$V_{DS}=-5V, I_D=-15A$	---	12	---	S
Q_g	Total Gate Charge (-4.5V)	$V_{DS}=-15V, V_{GS}=-4.5V,$ $I_D=-15A$	---	6.1	---	nC
Q_{gs}	Gate-Source Charge		---	3.1	---	
Q_{gd}	Gate-Drain Charge		---	1.8	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=-15V, V_{GS}=-10V,$ $R_G=3.3\Omega, I_D=-15A$	---	2.6	---	ns
T_r	Rise Time		---	8.6	---	
$T_{d(off)}$	Turn-Off Delay Time		---	33.6	---	
T_f	Fall Time		---	6	---	
C_{iss}	Input Capacitance	$V_{DS}=-15V, V_{GS}=0V, f=1\text{MHz}$	---	585	---	pF
C_{oss}	Output Capacitance		---	100	---	
C_{rss}	Reverse Transfer Capacitance		---	85	---	

Diode Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
I_S	Continuous Source Current ^{1,5}	$V_G=V_D=0V$, Force Current	---	---	-20	A
I_{SM}	Pulsed Source Current ^{2,5}		---	---	-30	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V, I_S=-1A, T_J=25^\circ\text{C}$	---	---	-1.2	V
t_{rr}	Reverse Recovery Time	$I_F=-15A, dI/dt=100A/\mu s,$	---	6.1	---	nS
Q_{rr}	Reverse Recovery Charge	$T_J=25^\circ\text{C}$	---	1.4	---	nC

Note :

- The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- The EAS data shows Max. rating. The test condition is $V_{DD}=-25V, V_{GS}=-10V, L=0.1\text{mH}, I_{AS}=-19A$
- The power dissipation is limited by 150°C junction temperature
- The data is theoretically the same as I_D and I_{DM} , in real applications, should be limited by total power dissipation.

Typical Performance Characteristics

Figure 1: Output Characteristics

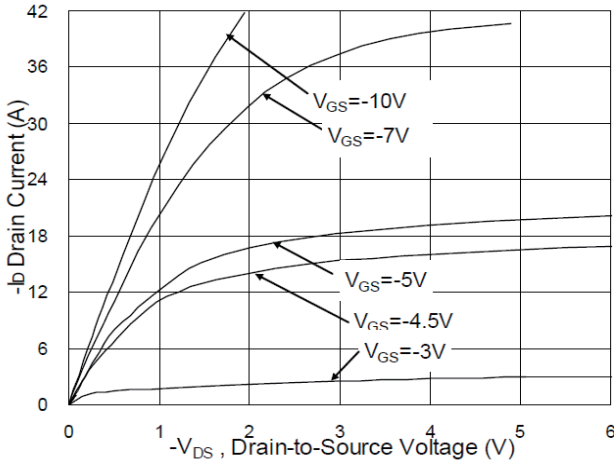


Figure 2: On-Resistance v.s Gate-Source

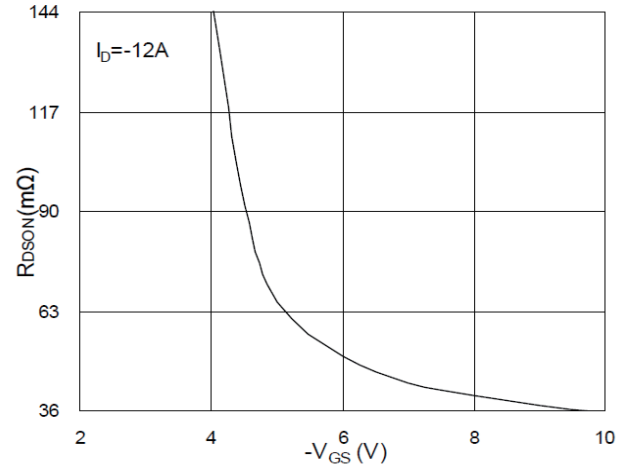


Figure 3: Forward Characteristics Of Reverse

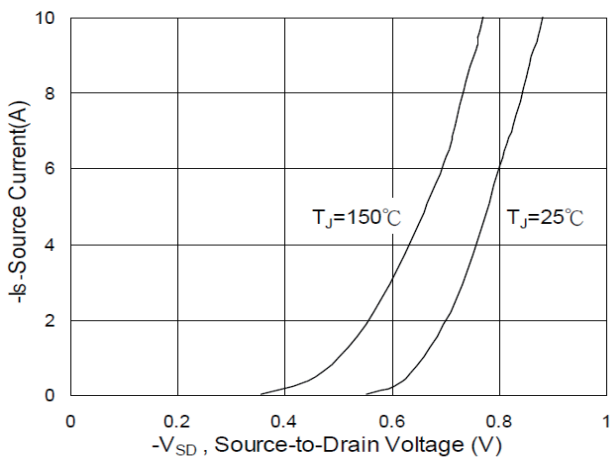


Figure 4: Gate Charge Characteristics

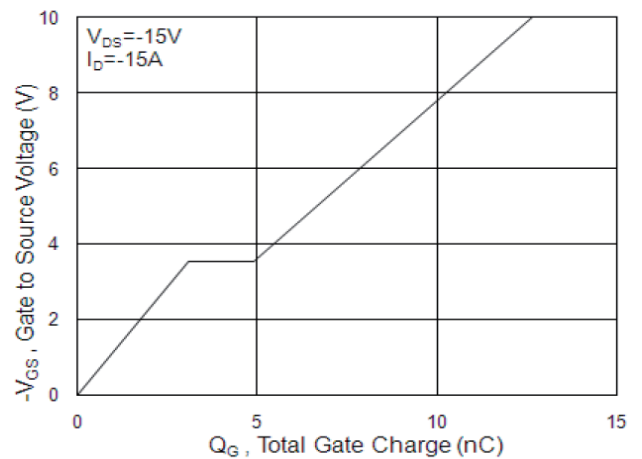


Figure 5: Normalized VGS(th) vs. TJ

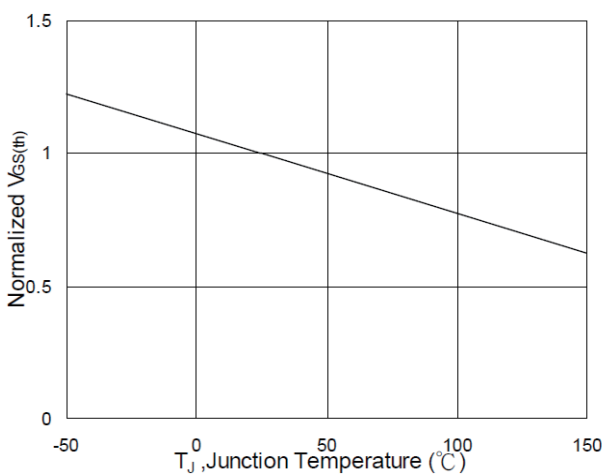
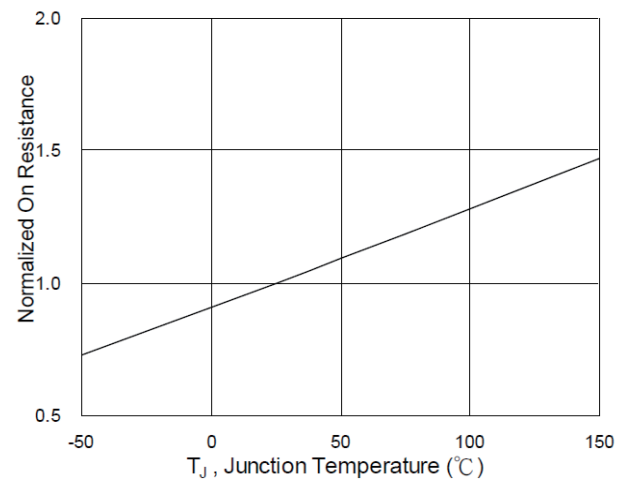


Figure 6: Normalized RDS(on) vs. TJ



Typical Performance Characteristics

Figure 7: Typical Capacitance Vs. Drain-Source Voltage

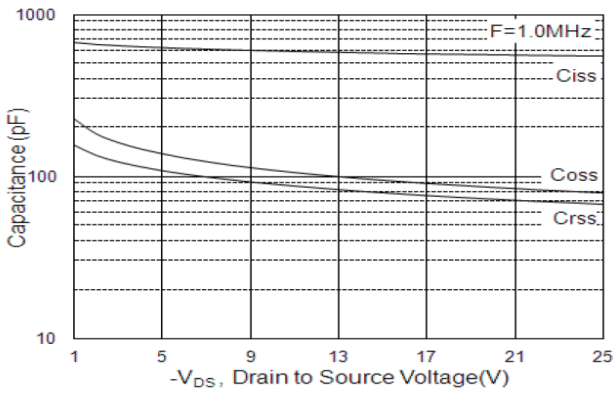


Figure 7: Safe Operating Area

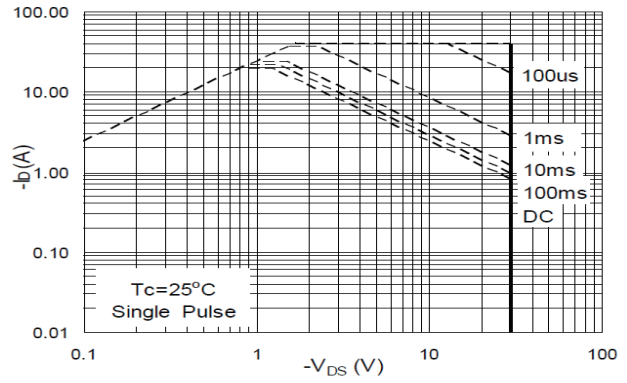


Figure 9: Normalized Maximum Transient Thermal Impedance

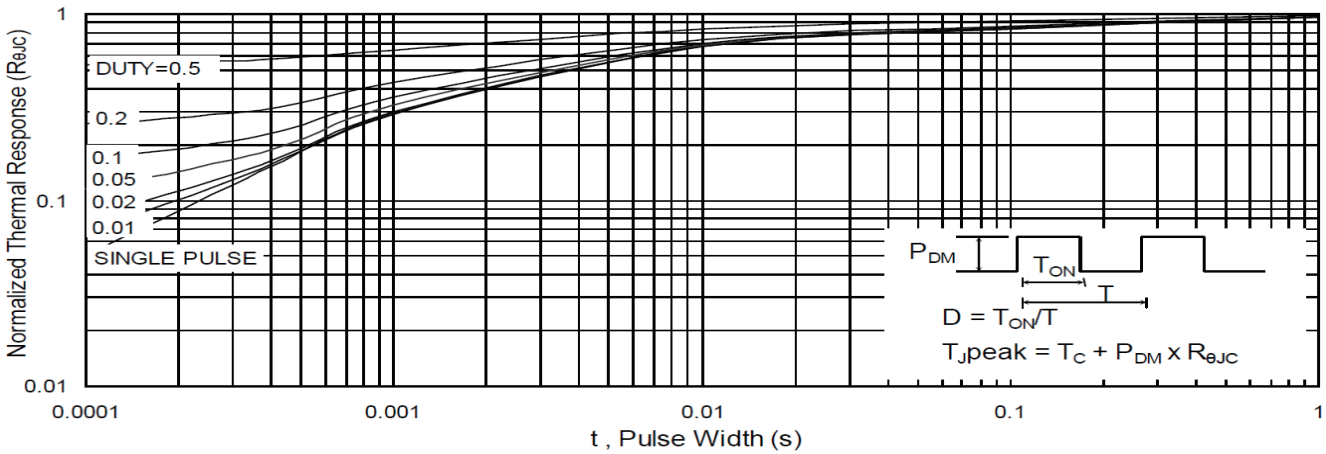
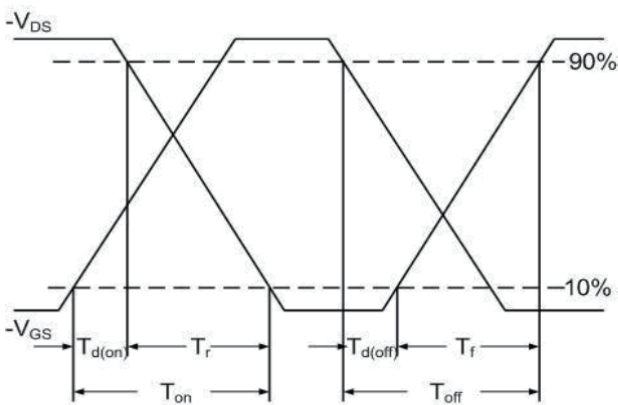
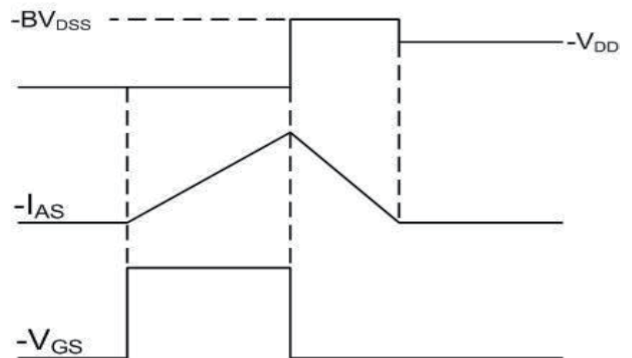


Figure 10: Switching Time Waveform

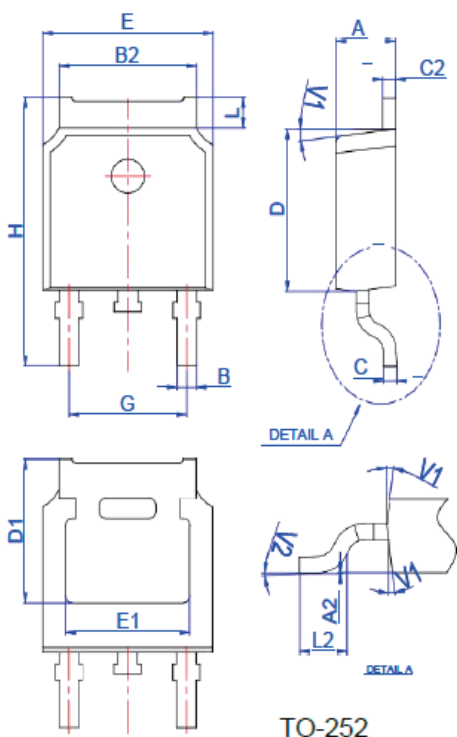


$$EAS = \frac{1}{2} L \times (-I_{AS})^2 \times \frac{-BV_{DSS}}{-BV_{DSS} - (-V_{DD})}$$



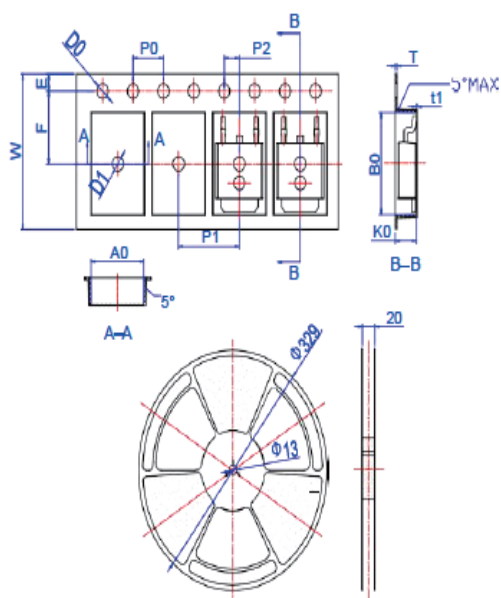
Package Mechanical Data TO 252

Package Mechanical Data TO 252



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-252-4R



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

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