

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

Product Summary

RoHS

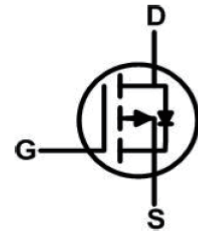
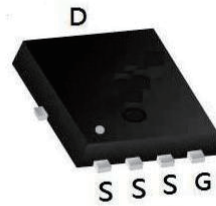
BVDSS	RDS(ON)	ID
-20V	15mΩ	-20A

Description

The 20P02D is the high cell density trenched P-ch MOSFETs, which provides excellent RDS(ON) and gate charge for most of the synchronous buck converter applications. The 20P02D meets the RoHS and Green Product requirement with full function reliability approved.

PDFN3*3

Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Max.	Units	
V _{DSS}	Drain-Source Voltage	-20	V	
V _{GSS}	Gate-Source Voltage	±12	V	
I _D	Continuous Drain Current	T _A = 25°C	-20	A
		T _A = 100°C	-12	A
I _{DM}	Pulsed Drain Current <small>note1</small>	-28	A	
P _D	Power Dissipation	5	W	
R _{θJA}	Thermal Resistance, Junction to Ambient	62.5	°C/W	
T _J , T _{STG}	Operating and Storage Temperature Range	-55 to +150	°C	

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

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Units
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D = -250\mu A$	-20	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = -20V, V_{GS}=0V,$	-	-	-1	μA
I_{GSS}	Gate to Body Leakage Current	$V_{DS}=0V, V_{GS} = \pm 12V$	-	-	± 100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D = -250\mu A$	-0.4	-0.7	-1	V
$R_{DS(on)}$	Static Drain-Source on-Resistance <small>note2</small>	$V_{GS} = -4.5V, I_D = -7A$	-	15	20	m Ω
		$V_{GS} = -2.5V, I_D = -5A$	-	21	32	
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS} = -10V, V_{GS}=0V,$ $f=1.0MHz$	-	2000	-	pF
C_{oss}	Output Capacitance		-	242	-	pF
C_{rss}	Reverse Transfer Capacitance		-	231	-	pF
Q_g	Total Gate Charge	$V_{DS} = -10V, I_D = -3A,$ $V_{GS} = -4.5V$	-	15.3	-	nC
Q_{gs}	Gate-Source Charge		-	2.2	-	nC
Q_{gd}	Gate-Drain("Miller") Charge		-	4.4	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	$V_{DD} = -10V, I_D = -7A,$ $V_{GS} = -4.5V, R_{GEN}=2.5\Omega$	-	10	-	ns
t_r	Turn-on Rise Time		-	31	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	28	-	ns
t_f	Turn-off Fall Time		-	8	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	-20	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-28	A
V_{SD}	Drain to Source Diode Forward Voltage	$V_{GS}=0V, I_S = -7A$	-	-0.8	-1.2	V

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$

Typical Electrical and Thermal Characteristics (Curves)

Figure 1: Output Characteristics

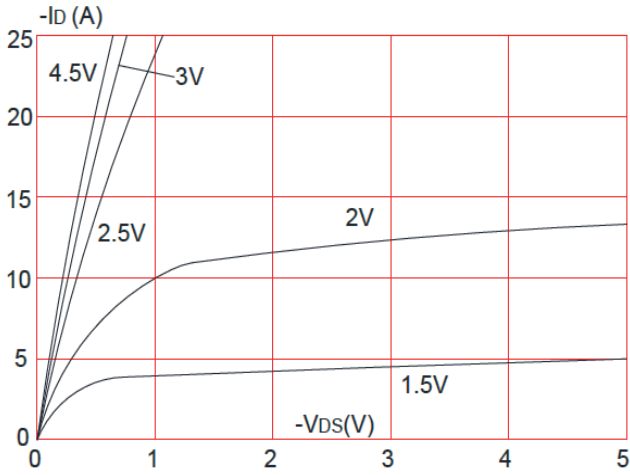


Figure 2: Typical Transfer Characteristics

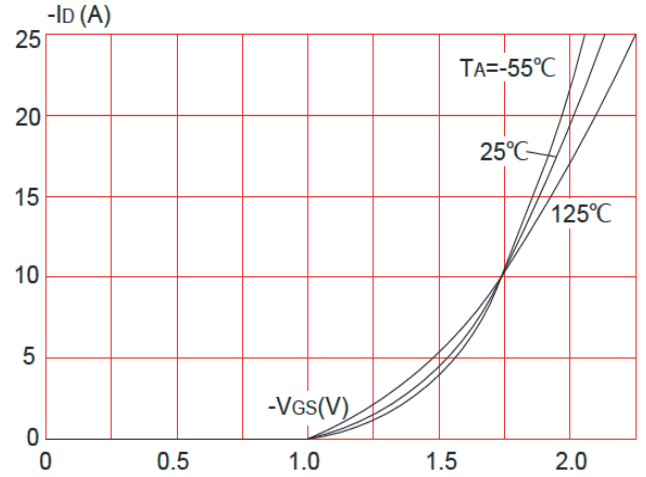


Figure 3: On-resistance vs. Drain Current

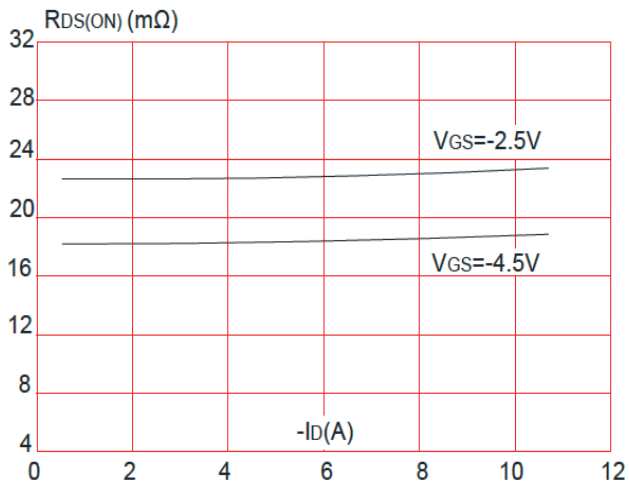


Figure 4: Body Diode Characteristics

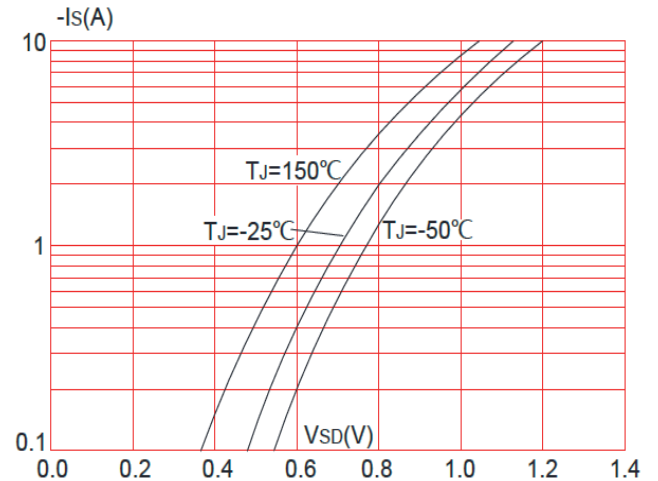


Figure 5: Gate Charge Characteristics

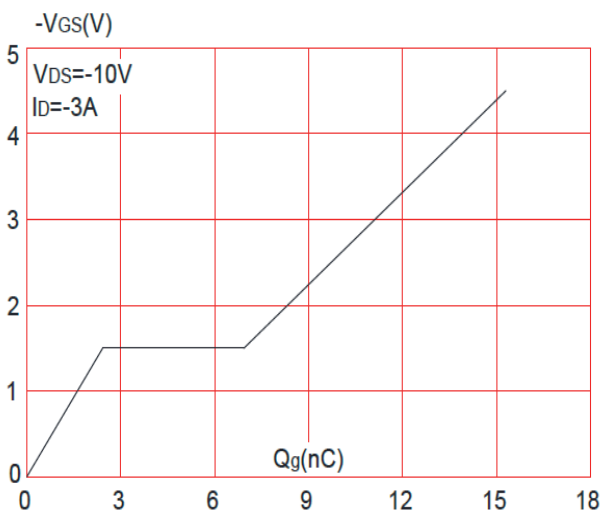
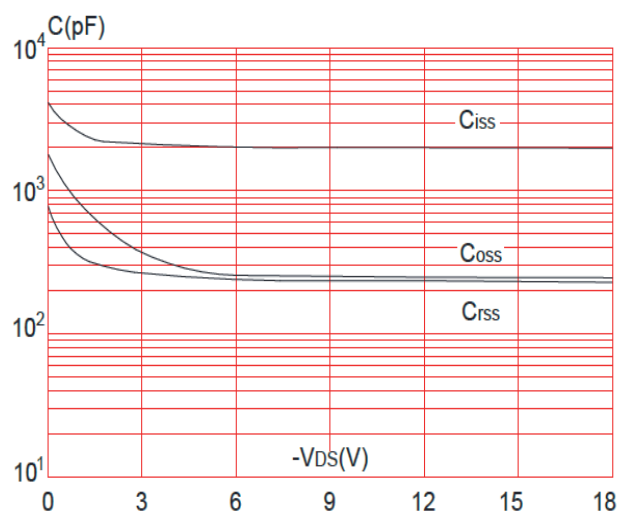


Figure 6: Capacitance Characteristics



Typical Performance Characteristics

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

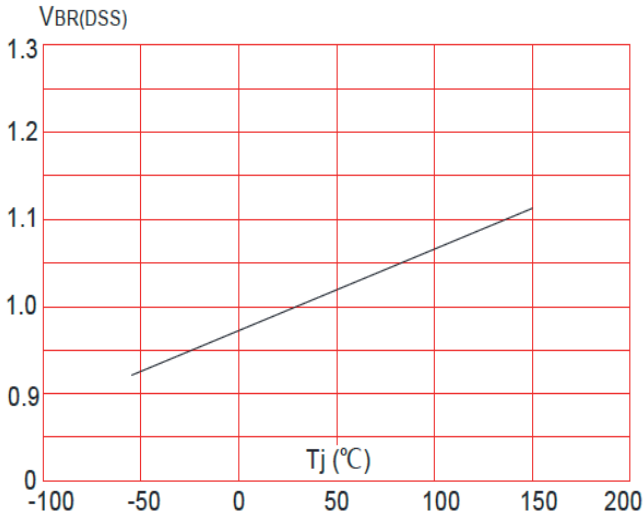


Figure 8: Normalized on Resistance vs. Junction Temperature

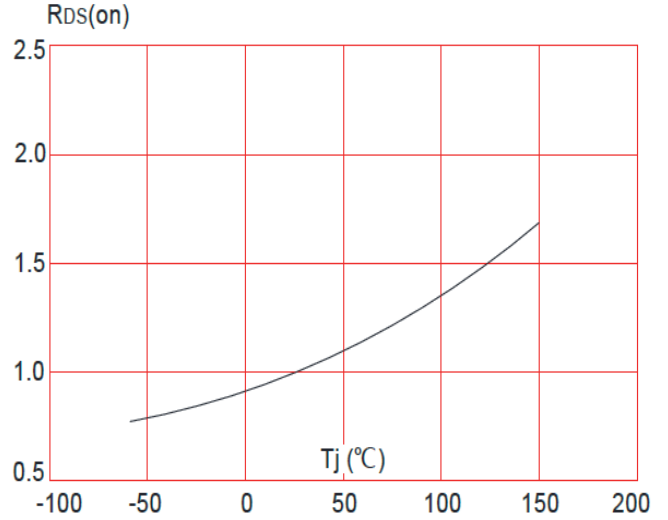


Figure 9: Maximum Safe Operating Area

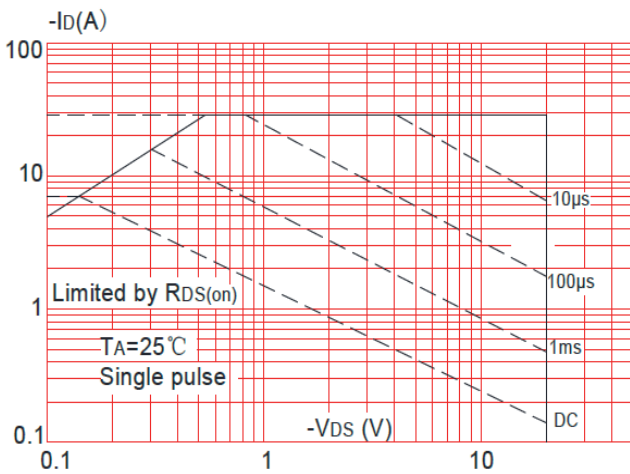


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

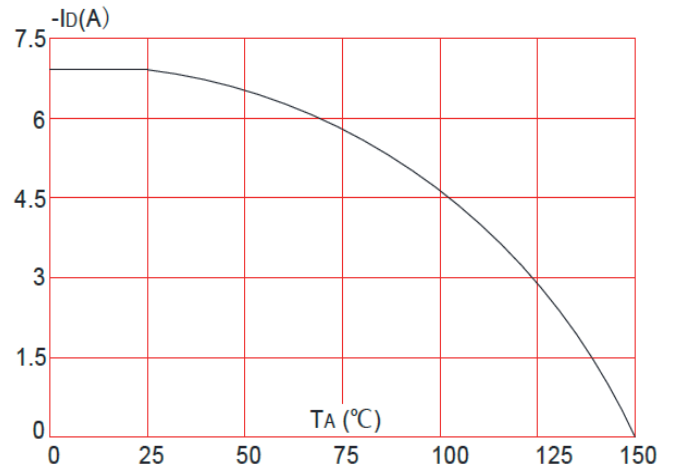
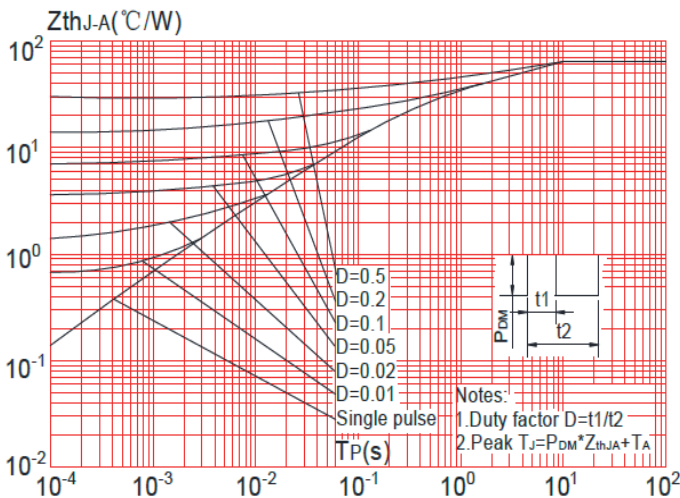
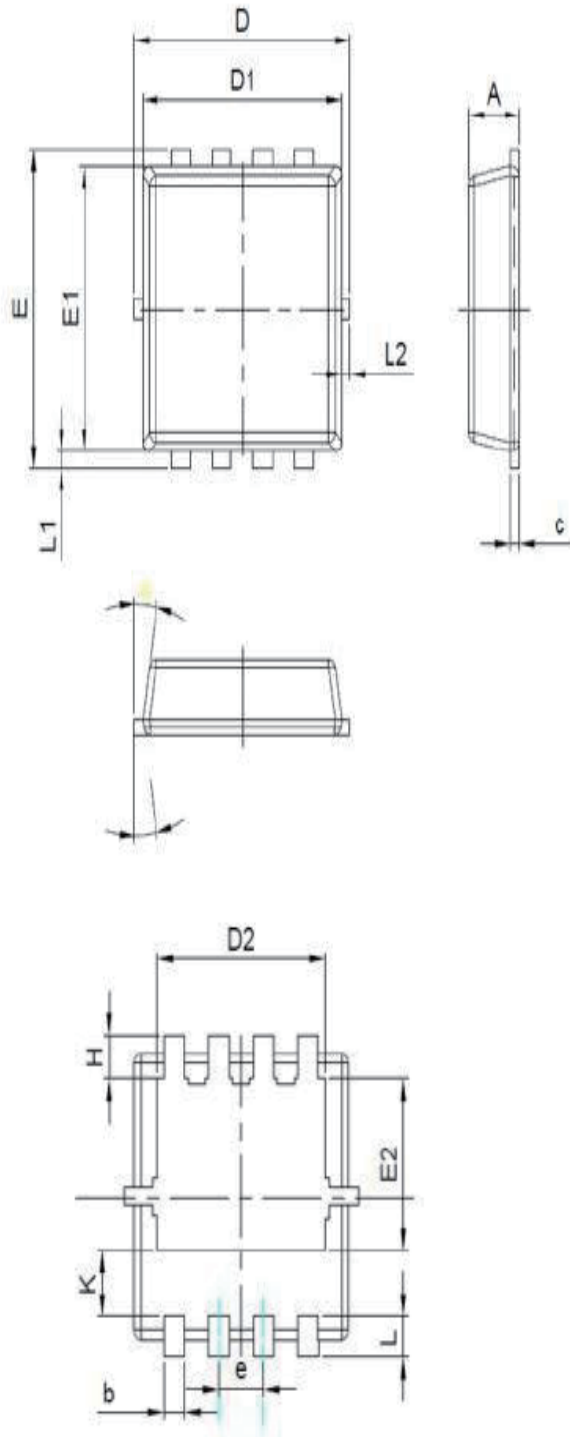


Figure 11: Maximum Effective Transient Thermal Impedance vs. Pulse Width





COMMON DIMENSIONS
(UNITS OF MEASURE = MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	0.70	0.80	0.90
b	0.25	0.30	0.39
c	0.14	0.15	0.25
D	3.20	3.30	3.40
D1	3.00	3.15	3.30
D2	2.35	2.45	2.55
e	0.65 BSC		
E	3.25	3.35	3.45
E1	2.85	3.00	3.15
E2	1.635	1.735	1.835
H	0.33	0.48	0.63
K	0.565	0.665	0.785
L	0.30	0.40	0.50
L1	0.05	0.15	0.25
L2	-	-	0.15
∅	8°	10°	12°

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