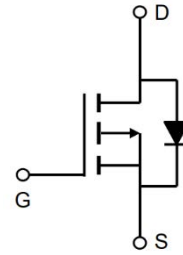


Description

The LM2D20P02 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.



General Features

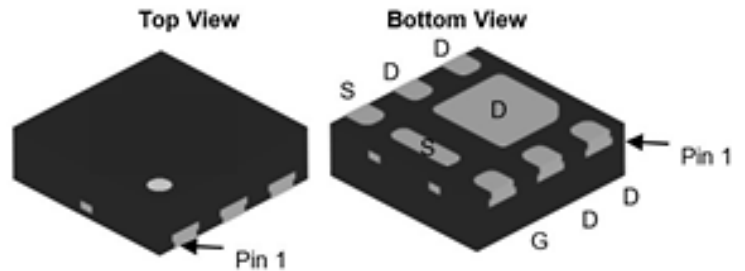
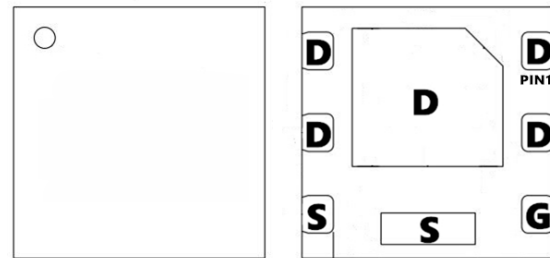
$V_{DS} = -20V$ $I_D = -20A$

$R_{DS(ON)} < 18m\Omega$ @ $V_{GS} = -4.5V$ (Typ. 12m Ω)

Application

electronic cigarette

Load switch



Package Marking and Ordering Information

Device	Device Marking	Device Package	Reel Size	Tape width	Quantity
LM2D20P02	AP20P02BF	DFN2020-6	-	-	3000 units

Absolute Maximum Ratings ($T_C = 25^\circ C$ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-Source Voltage	± 12	V
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ -4.5V^1$	-20	A
$I_D @ T_C = 70^\circ C$	Continuous Drain Current, $V_{GS} @ -4.5V^1$	-11.4	A
IDM	Pulsed Drain Current ²	-60	A
$P_D @ T_C = 25^\circ C$	Total Power Dissipation ³	2.4	W
$P_D @ T_C = 70^\circ C$	Total Power Dissipation ³	19	W
TSTG	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	52	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	6.9	$^\circ C/W$

Electrical Characteristics (T_J=25°C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
V(BR)DSS	Drain-to-Source breakdown voltage	V _{GS} = 0V, I _D = 250μA	-20	-22	—	V
R _{DS(on)}	Static Drain-to-Source on-resistance	V _{GS} = -4.5V, I _D = -10A	—	12	18	mΩ
		V _{GS} = -2.5V, I _D = -8.9A	—	18	22	
		V _{GS} = -1.8V, I _D = -4.5A	—	24	38	
V _{GS(th)}	Gate threshold voltage	V _{DS} = V _{GS} , I _D = 250μA	-0.4	0.6	-1	V
I _{DSS}	Drain-to-Source leakage current	V _{DS} = -12V, V _{GS} = 0V	—	—	-1	μA
I _{GSS}	Gate-to-Source forward leakage	V _{GS} = 8V	—	—	100	nA
		V _{GS} = -8V	—	—	-100	
g _{FS}	Forward Transconductance	V _{DS} = -5V, I _D = -10A	-3	—	—	S
Q _g	Total gate charge	I _D = -10A, V _{DD} = -6V, V _{GS} = -4.5V	—	21	—	nC
Q _{gs}	Gate-to-Source charge		—	2.5	—	
Q _{gd}	Gate-to-Drain("Miller") charge		—	6	—	
t _{d(on)}	Turn-on delay time	V _{GS} = -4.5V, V _{DD} = -6V, I _D = -10A, R _{GEN} = 6Ω	—	30	—	ns
t _r	Rise time		—	48	—	
t _{d(off)}	Turn-Off delay time		—	97	—	
t _f	Fall time		—	65	—	
C _{iss}	Input capacitance	V _{GS} = 0V V _{DS} = -6V f = 1MHz	—	2138	—	pF
C _{oss}	Output capacitance		—	685	—	
C _{rss}	Reverse transfer capacitance		—	650	—	
I _S	Continuous Source Current (Body Diode)	MOSFET symbol showing the integral reverse p-n junction diode.	—	—	-12	A
I _{SM}	Pulsed Source Current (Body Diode)		—	—	-28	A
V _{SD}	Diode Forward Voltage	I _S = -2A, V _{GS} = 0V	—	-0.77	-1.2	V
t _{rr}	Reverse Recovery Time	T _J = 25°C, I _F = -10A, di/dt = 100A/μs	—	16	—	ns
Q _{rr}	Reverse Recovery Charge		—	5.9	—	uC

Notes:

1. The maximum current rating is limited by bond-wires.
2. Repetitive rating; pulse width limited by max. junction temperature.
3. The power dissipation PD is based on max. junction temperature, using junction-to-ambient thermal resistance.
4. The value of R_{θJA} is measured with the device mounted on 1in 2 FR-4 board with 2oz. Copper, in a still air environment with TA = 25°C
5. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of T_{J(MAX)} = 150°C.

Typical Characteristics

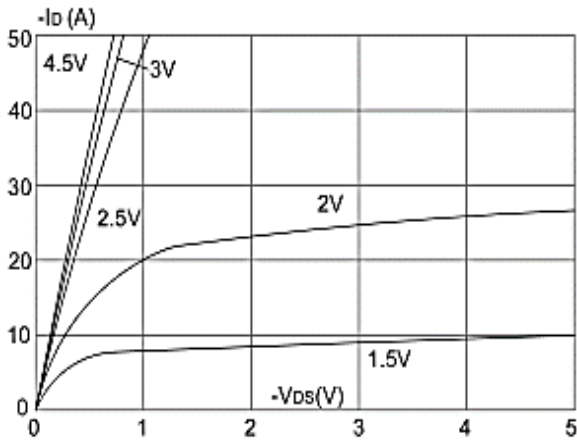


Figure1: Output Characteristics

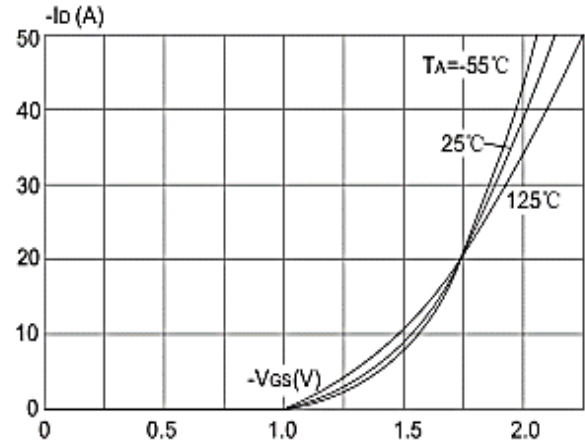


Figure 2: Typical Transfer Characteristics

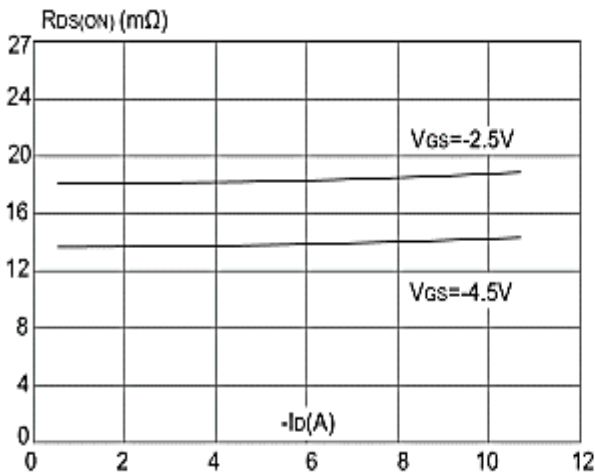


Figure 3: On-resistance vs. Drain Current

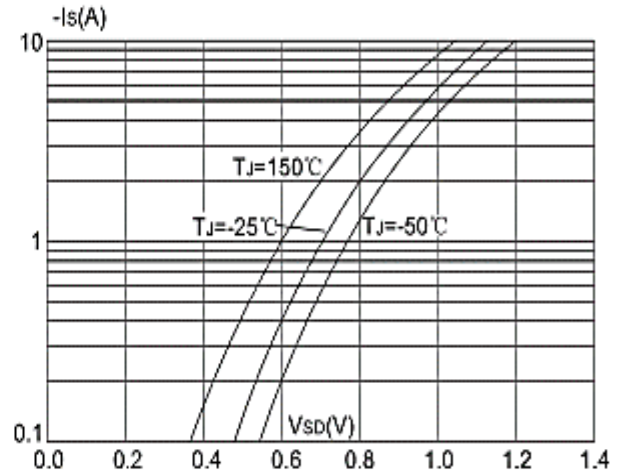


Figure 4: Body Diode Characteristics

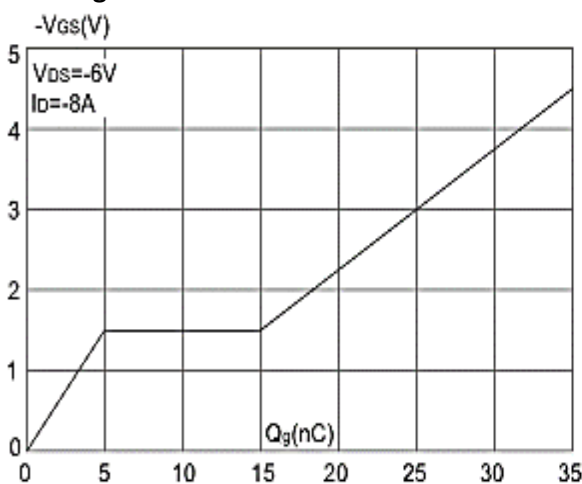


Figure 5: Gate Charge Characteristics

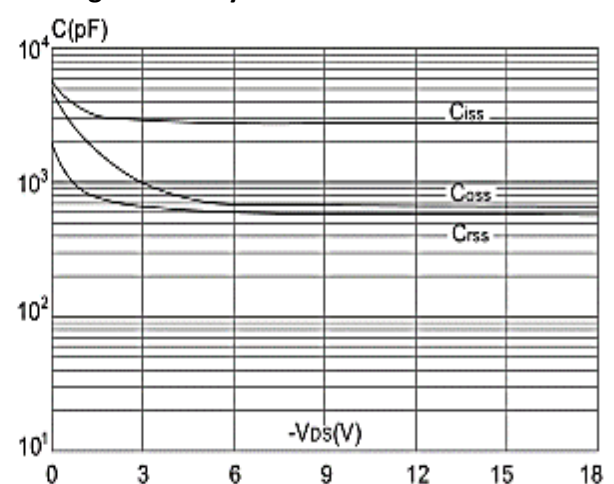


Figure 6: Capacitance Characteristics

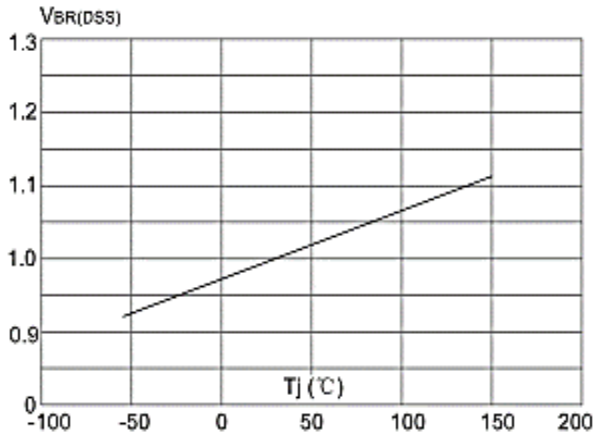


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

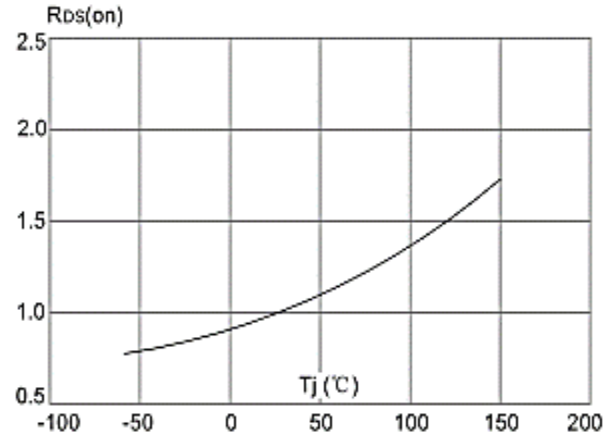


Figure 8: Normalized on Resistance vs. Junction Temperature

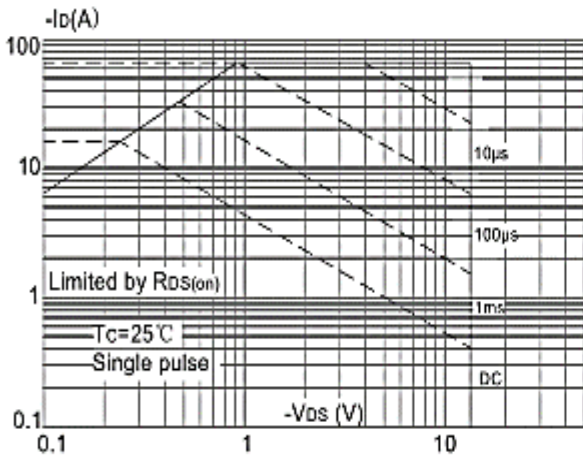


Figure 9: Maximum Safe Operating Area vs. Case Temperature

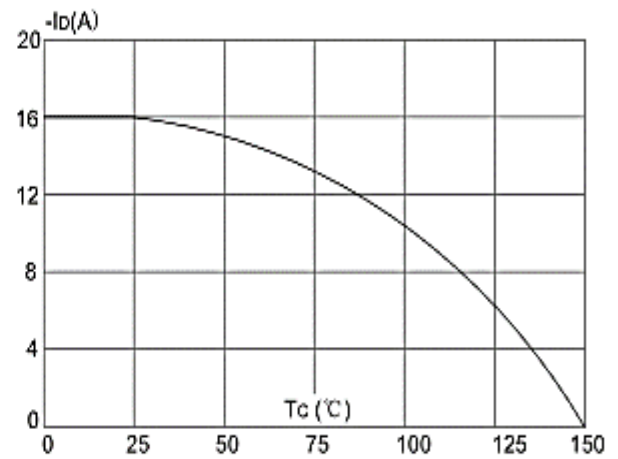


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

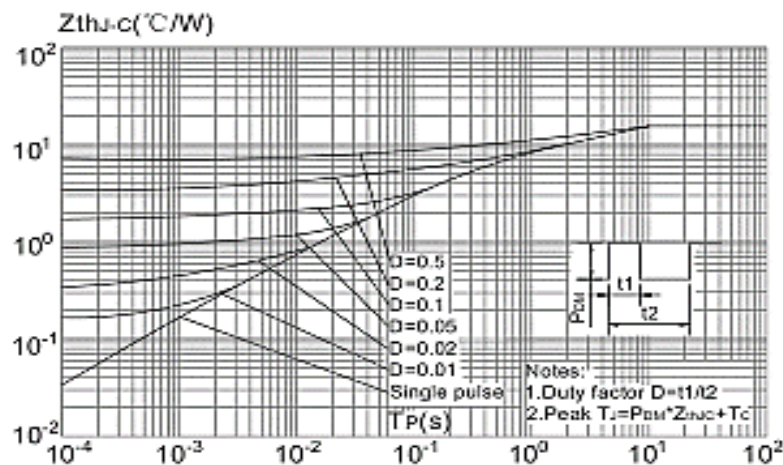
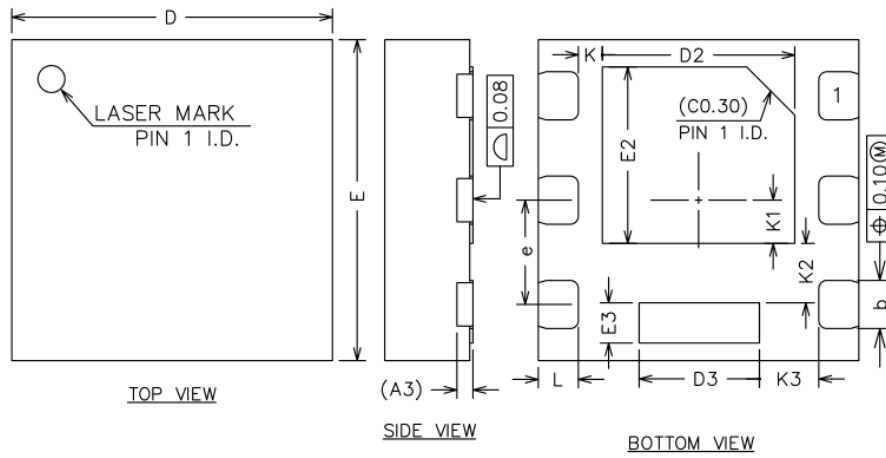


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

Package Mechanical Data: DFN2020-6



Symbol			
	Min	Nom	Max
A	0.50	--	0.54
A1	0.00	0.02	0.05
A3	0.10REF		
b	0.25	0.30	0.35
D	1.90	2.00	2.10
E	1.90	2.00	2.10
D2	1.10	1.20	1.30
E2	1.00	1.10	1.20
D3	0.65	0.75	0.85
E3	0.15	0.25	0.35
e	0.55	0.65	0.75
K	0.05	--	--
K1	0.17	--	--
K2	0.27	--	--
K3	0.28	--	--
L	0.20	0.25	0.30