ESD TVS TSS DIODES IC BJT MOS LDO

Product Specification

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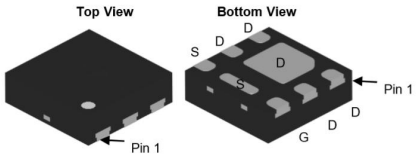
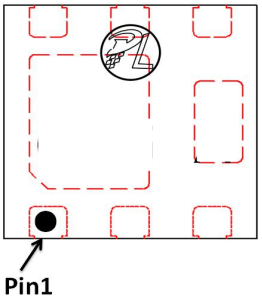
P-channel Enhancement Mode Power MOSFET

$V_{(BR)DSS}$	$R_{DS(on)}$TYP	I_D
-20V	14mΩ@10V	-12A
	18mΩ@4.5V	

DFN2020-6L



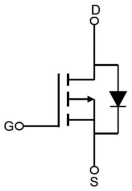


Features

- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead Free

Application

- PWM Applications
- Load Switch
- Power Management



Schematic Diagram

Package Marking and Ordering Information

Device Marking	Device	Outline	Package	Reel Size	Reel(pcs)	Per Carton (pcs)
	PMPB13UP	TAPING	DFN2020-6L	7"	3000	120000

Absolute Maximum Ratings (@ T_A = 25°C unless otherwise specified)

Symbol	Parameter		Value	Units
V_{DS}	Drain-to-Source Voltage		-20	V
V_{GS}	Gate-to-Source Voltage		±12	V
I_D	Continuous Drain Current	T_A = 25°C	-12	A
		T_A = 100°C	-6.5	
I_{DM}	Pulsed Drain Current (1)		-45	A
E_{AS}	Single Pulsed Avalanche Energy (2)		25	mJ
P_D	Power Dissipation	T_A = 25°C	2.5	W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient(3)		49	°C/W
T_J, T_{STG}	Junction & Storage Temperature Range		-55 to 150	°C

Electrical Characteristics (T_J = 25°C unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	I_D = -250μA, V_{GS} = 0V	-20	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = -20V, V_{GS} = 0V	-	-	-1.0	μA
I_{GSS}	Gate-Body Leakage Current	V_{DS} = 0V, V_{GS} = ±12V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = -250μA	-0.4	-0.62	-1.0	V
$R_{DS(ON)}$	Static Drain-Source ON-Resistance(4)	V_{GS} = -4.5V, I_D = -8A	-	14	19	mΩ
		V_{GS} = -2.5V, I_D = -5A	-	18	23	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = -10V, f = 1MHz	-	1332	-	pF
C_{oss}	Output Capacitance		-	184	-	pF
C_{rss}	Reverse Transfer Capacitance		-	162	-	pF
Q_g	Total Gate Charge	V_{GS} = 0 to -4.5V V_{DS} = -10V, I_D = -10A	-	16	-	nC
Q_{gs}	Gate Source Charge		-	4	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	3	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On DelayTime	V_{GS} = -4.5V, V_{DD} = -10V I_D= -10A, R_{GEN} = 3Ω	-	8	-	ns
t_r	Turn-On Rise Time		-	35	-	ns
$t_{d(off)}$	Turn-Off DelayTime		-	71	-	ns
t_f	Turn-Off Fall Time		-	70	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	-12	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-45	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_S = -15A	-	-	-1.2	V
trr	Body Diode Reverse Recovery Time	I_F = -10A, di/dt = 100A/us	-	10	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	3	-	nC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. EAS condition: Starting T_J=25C, V_{DD}=-15V, V_G=-10V, R_G=25ohm, L=0.5mH, I_{AS}=-10A
3. $R_{\theta JA}$ is measured with the device mounted on a 1inch^2 pad of 2oz copper FR4 PCB
4. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%.

Typical Performance Characteristics

Figure 1: Output Characteristics

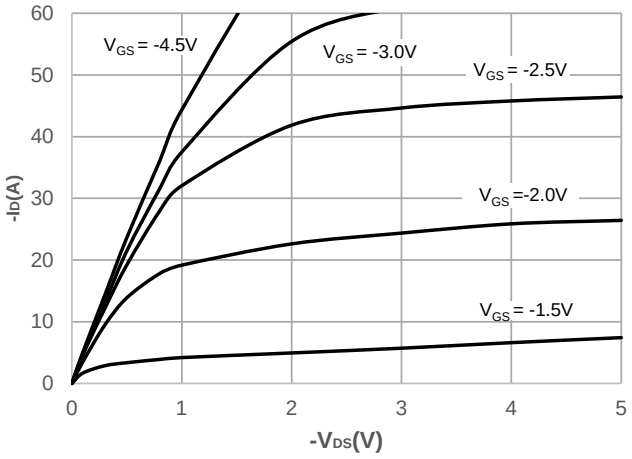


Figure 2: Typical Transfer Characteristics

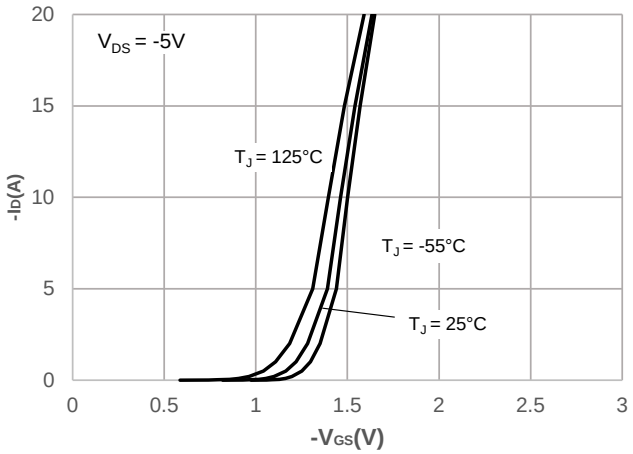


Figure 3: On-resistance vs. Drain Current

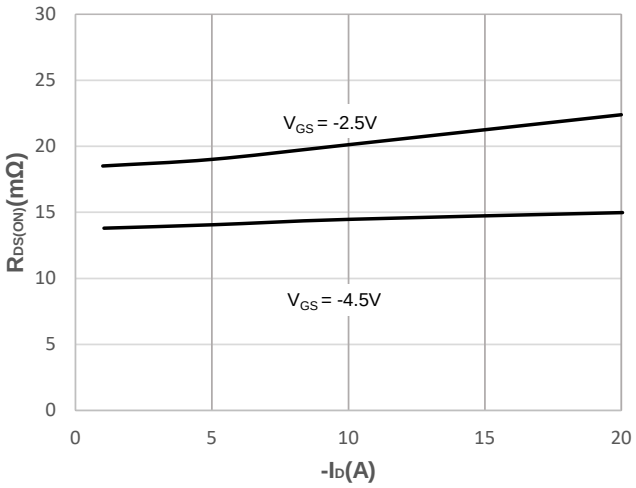


Figure 4: Body Diode Characteristics

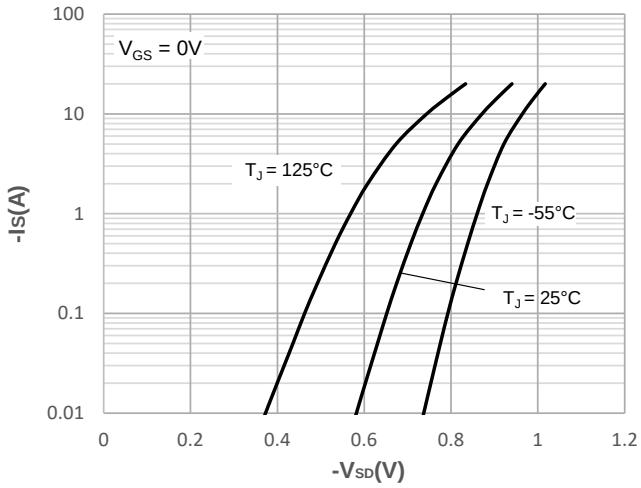


Figure 5: Gate Charge Characteristics

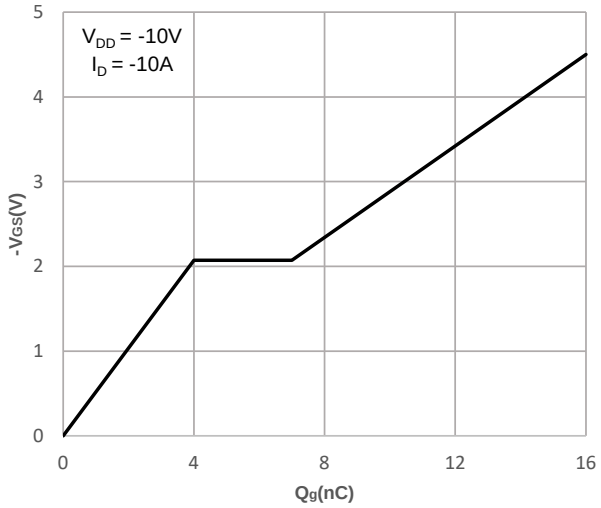
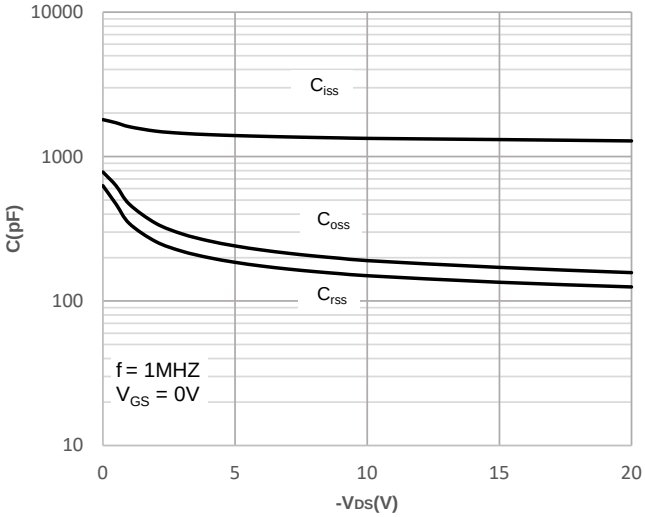


Figure 6: Capacitance Characteristics



Typical Performance Characteristics

Figure 7: Normalized Breakdown voltage vs. Junction Temperature

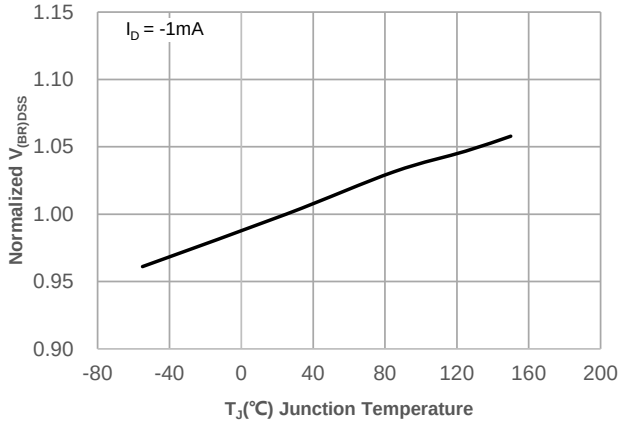


Figure 8: Normalized on Resistance vs. Junction Temperature

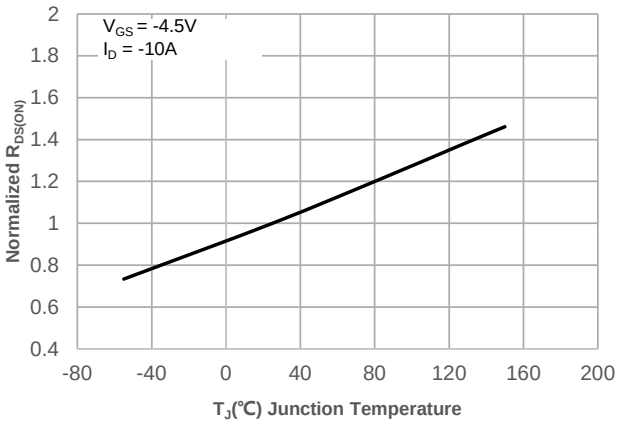


Figure 9: Maximum Safe Operating Area

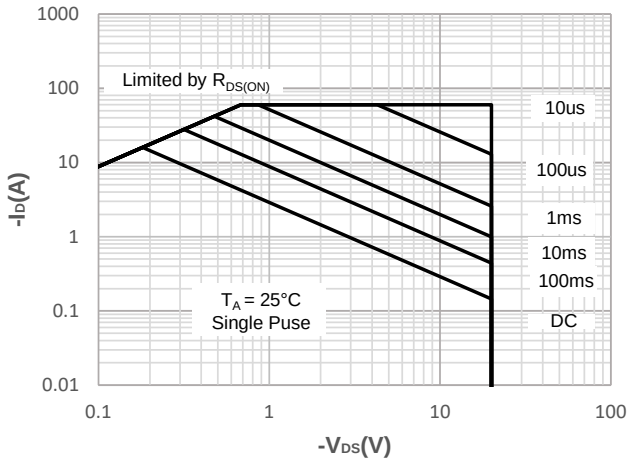


Figure 10: Maximum Continuous Drian Current vs. Ambient Temperature

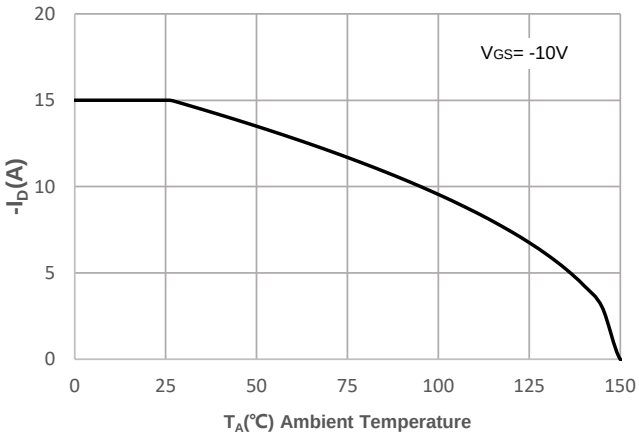


Figure 11: Normalized Maximum Transient Thermal Impedance

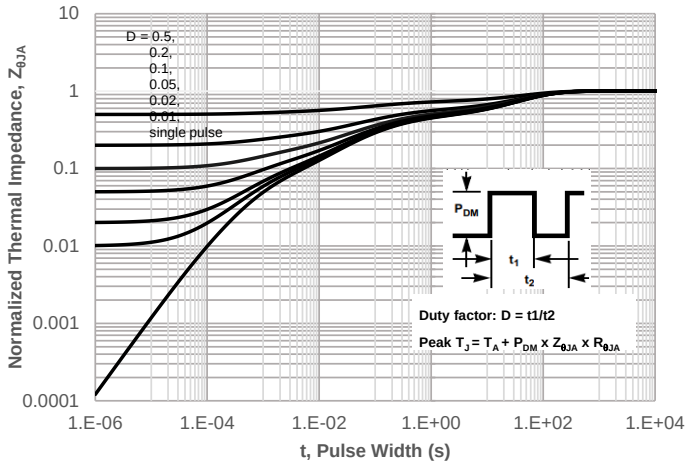
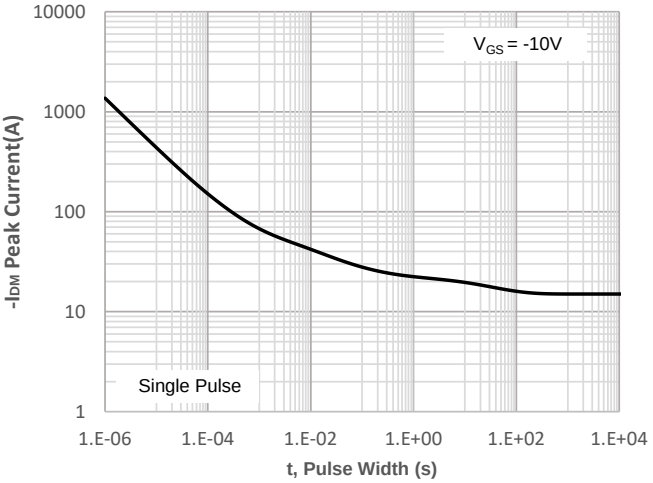


Figure 12: Peak Current Capacity



Test Circuit

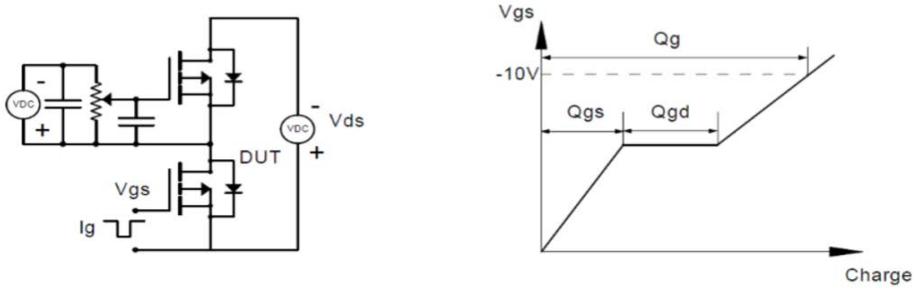


Figure 1: Gate Charge Test Circuit & Waveform

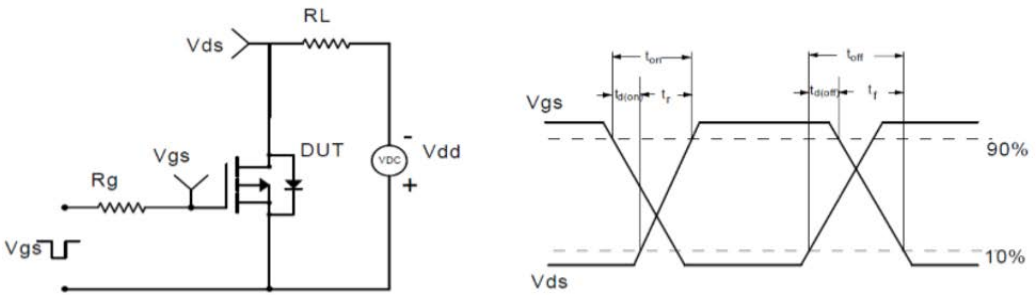


Figure 2: Resistive Switching Test Circuit & Waveform

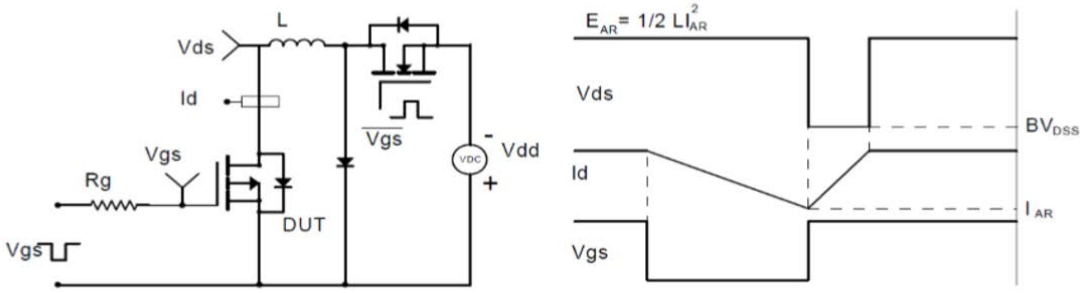


Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

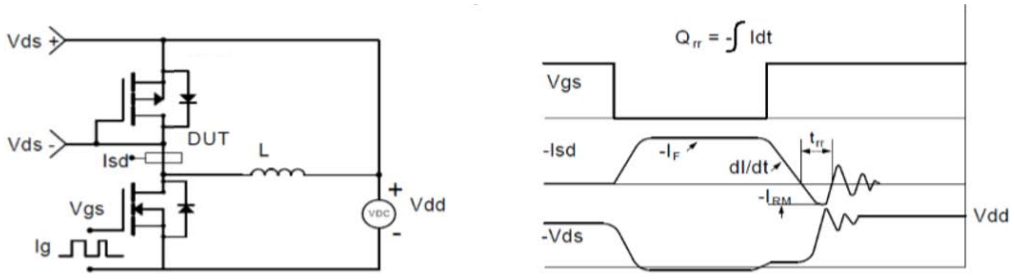
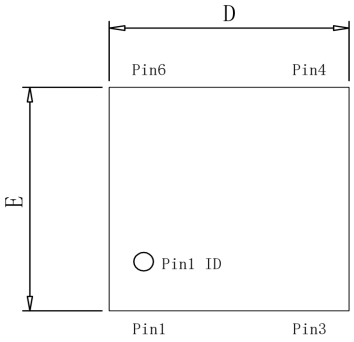
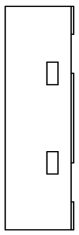


Figure 4: Diode Recovery Test Circuit & Waveform

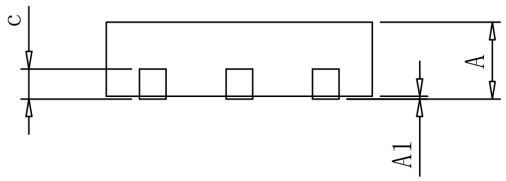
Package Mechanical Data(DFN2020-6L)



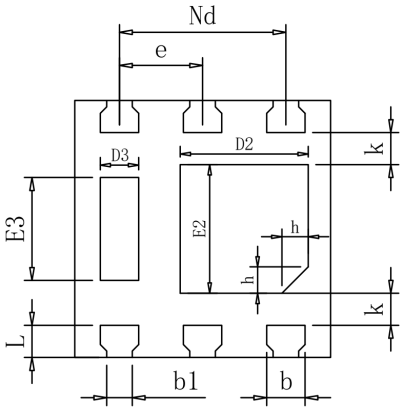
Top View



Side View



Side View



Bottom View

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.50	0.55	0.60
A1	--	0.02	0.05
b	0.25	0.30	0.35
b1	0.15	0.20	0.25
c	0.203 REF		
D	1.90	2.00	2.10
D2	0.90	1.00	1.10
D3	0.20	0.30	0.40
Nd	1.30 BSC		
e	0.65 BSC		
E	1.90	2.00	2.10
E2	0.90	1.00	1.10
E3	0.70	0.80	0.90
h	0.155	0.205	0.255
k	0.20	0.25	0.30
L	0.20	0.25	0.30