

N-Channel Enhancement Mode MOSFET

Features:

- TrenchFET Power MOSFET
- Low $R_{DS(ON)}$
- Typical ESD Protection

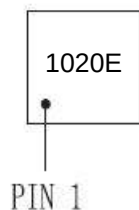
Applications:

- Ideal for Load Switch and Battery
- Protection Applications

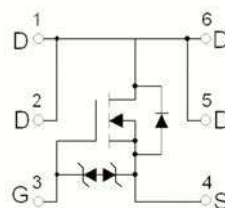
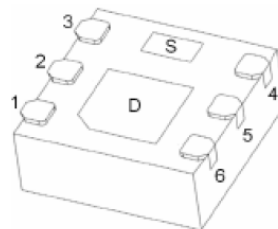
General Features

- $V_{DS} = 20V$ $I_D = 10A$
- $R_{DS(ON)} < 18 m\Omega$ @ $V_{GS} = 4.5V$

MARKING



DFN2020-6



ABSOLUTE MAXIMUM RATINGS ($T_a = 25^\circ C$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 10	V
Continuous Drain Current	I_D	10	A
Pulsed Drain Current	I_{DM}^*	30	A
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	250	$^\circ C/W$
Operation Junction and Storage Temperature Range	T_J, T_{STG}	-55~+150	$^\circ C$

*Repetitive rating: Pluse width limited by junction temperature.

MOSFET ELECTRICAL CHARACTERISTICS $T_a=25^\circ\text{C}$ unless otherwise specified

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
STATIC PARAMETERS						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	30			V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 30V, V_{GS} = 0V$			1	μA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 10V, V_{DS} = 0V$			± 10	μA
Gate threshold voltage(note 1)	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	0.5		1.1	V
Drain-source on-resistance (note 1)	$R_{DS(on)}$					
		$V_{GS} = 4.5V, I_D = 6A$		12	18	m Ω
		$V_{GS} = 2.5V, I_D = 4A$		16	23	m Ω
Forward tranconductance (note 1)	g_{FS}	$V_{DS} = 5V, I_D = 4A$		15		S
Diode forward voltage (note 1)	V_{SD}	$I_S = 1A, V_{GS} = 0V$			1	V
DYNAMIC PARAMETERS (note2)						
Input Capacitance	C_{iss}	$V_{DS} = 15V, V_{GS} = 0V, f = 1MHz$		300		pF
Output Capacitance	C_{oss}			50		pF
Reverse Transfer Capacitance	C_{rss}			30		pF
SWITCHING PARAMETERS (note 2)						
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 15V, V_{GS} = 10V$ $R_L = 3.75\Omega, R_{GEN} = 3\Omega$		2		ns
Turn-on rise time	t_r			3.5		ns
Turn-off delay time	$t_{d(off)}$			22		ns
Turn-off fall time	t_f			3.5		ns
Total Gate Charge	Q_g	$V_{DS} = 15V, V_{GS} = 10V, I_D = 4A$			10	nC
Gate-Source Charge	Q_{gs}			0.5		nC
Gate-Drain Charge	Q_{gd}			1		nC

Notes : 1. Pulse Test : Pulse width $\leq 300\mu s$, duty cycle $\leq 0.5\%$.
2. Guaranteed by design, not subject to production testing.

Typical Electrical and Thermal Characteristics Diagrams

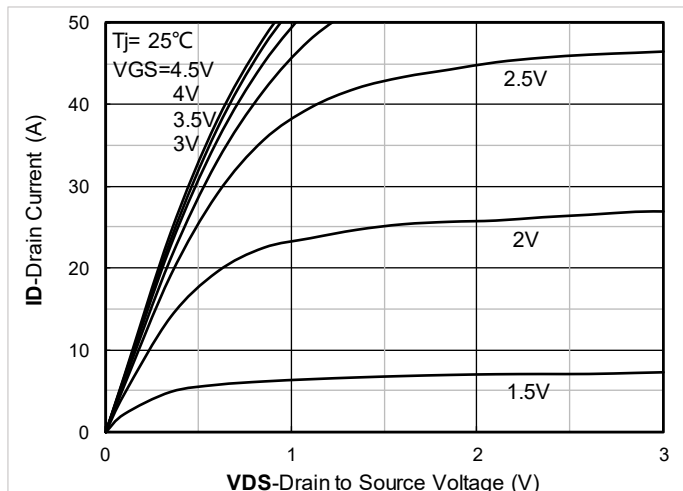


Figure 1. Output Characteristics

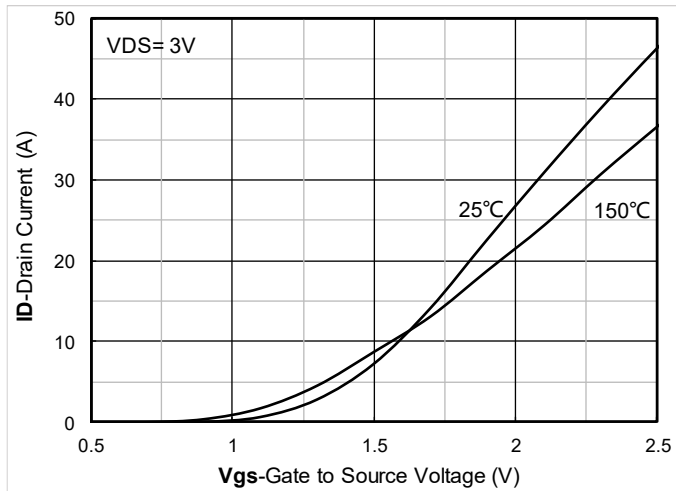


Figure 2. Transfer Characteristics

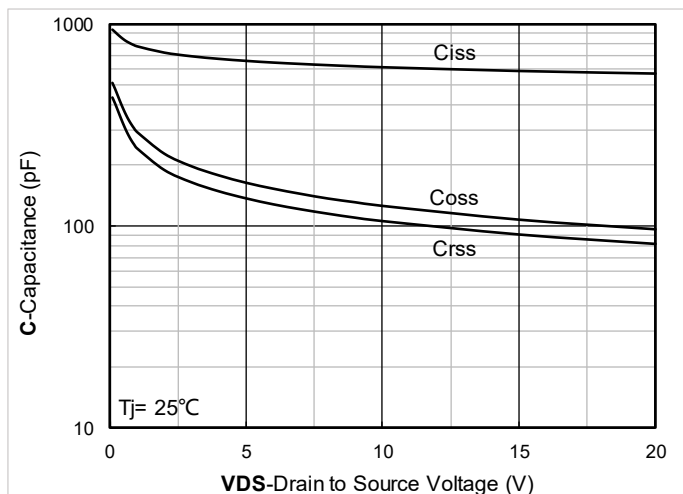


Figure 3. Capacitance Characteristics

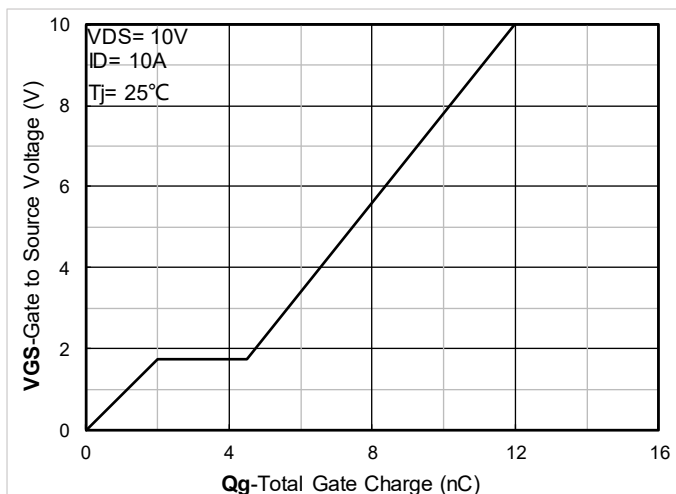


Figure 4. Gate Charge

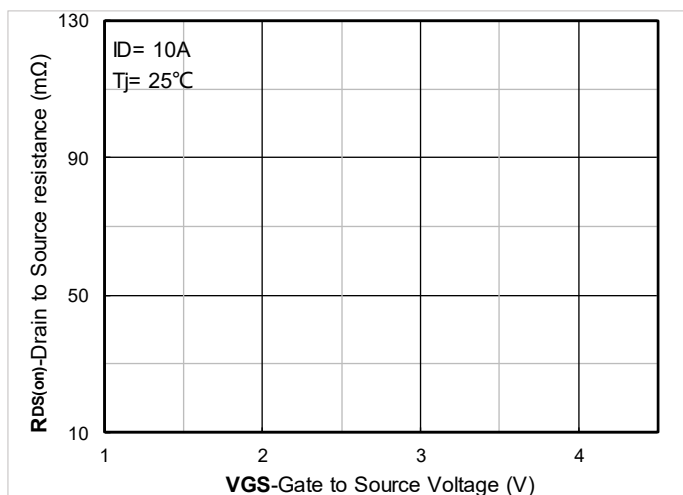


Figure 5. On-Resistance vs Gate to Source Voltage

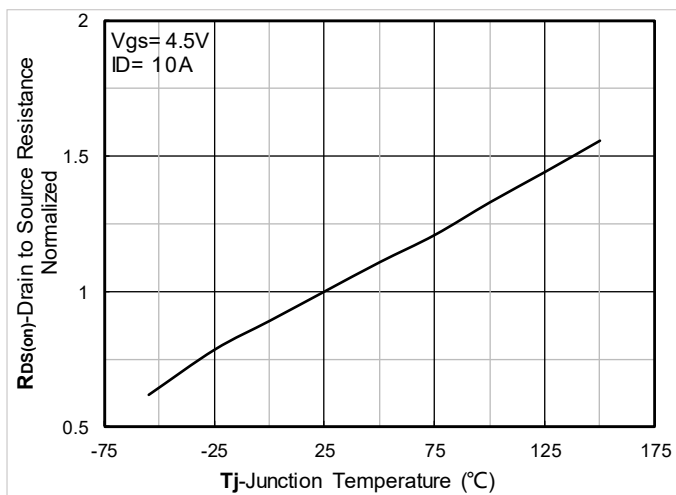


Figure 6. Normalized On-Resistance

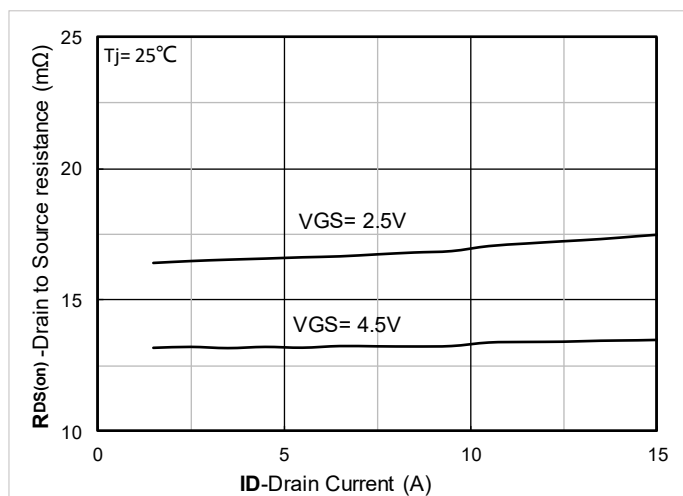


Figure 7. $R_{DS(on)}$ VS Drain Current

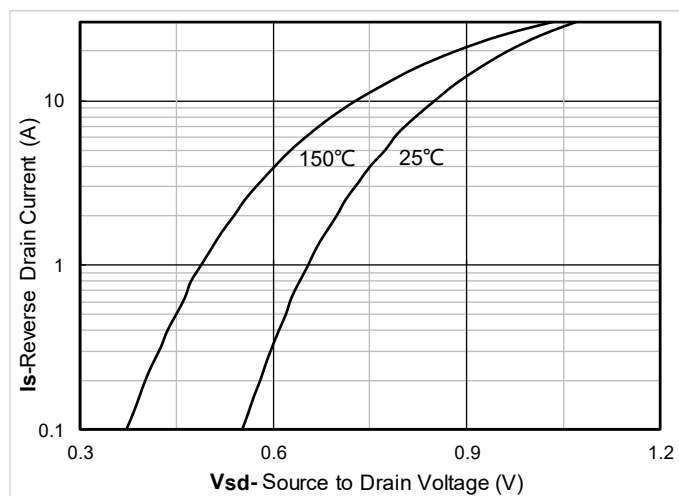


Figure 8. Forward characteristics of reverse diode

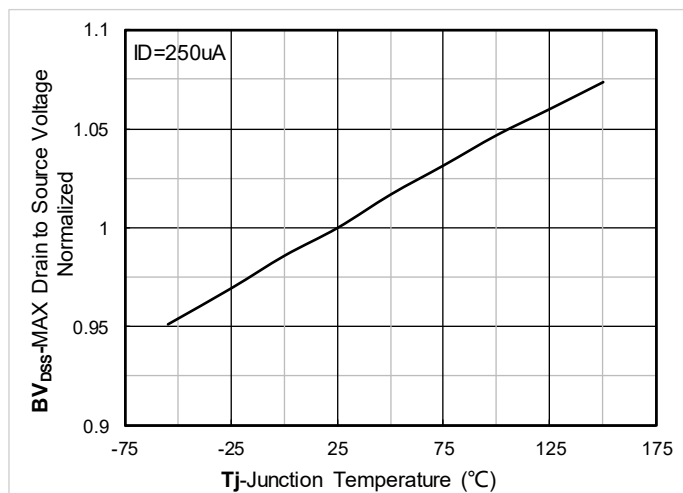


Figure 9. Normalized breakdown voltage

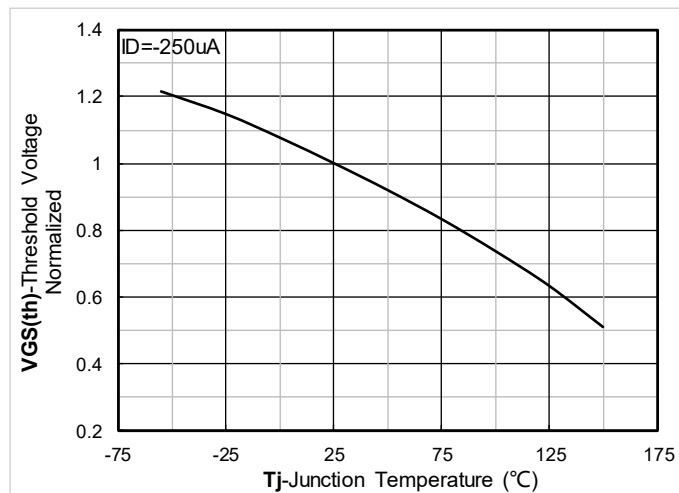


Figure 10. Normalized Threshold voltage

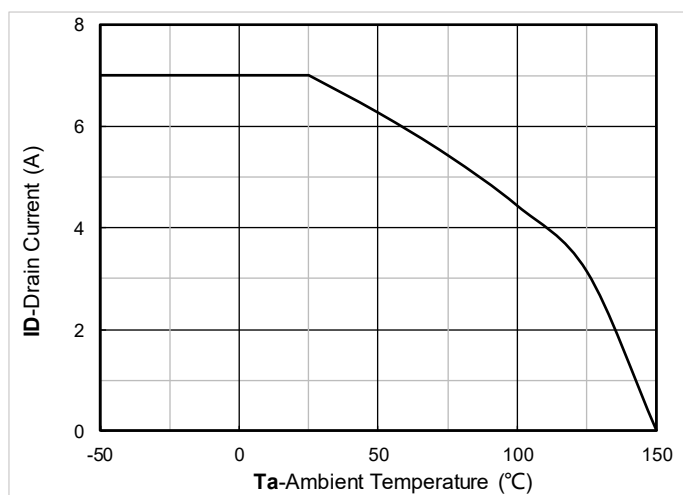


Figure 11. Current dissipation

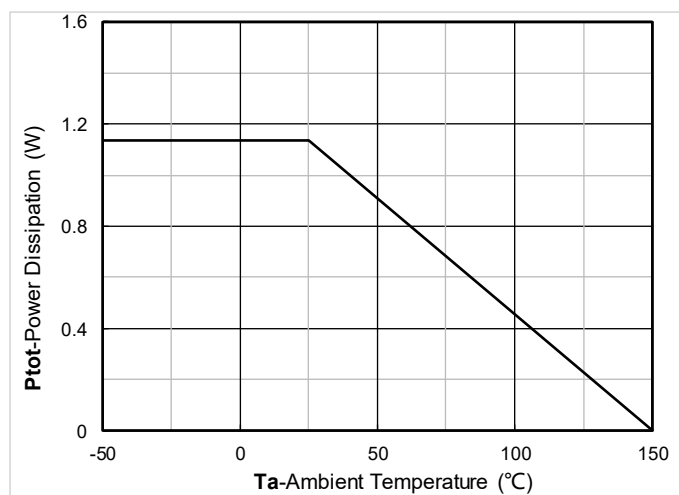


Figure 12. Power dissipation

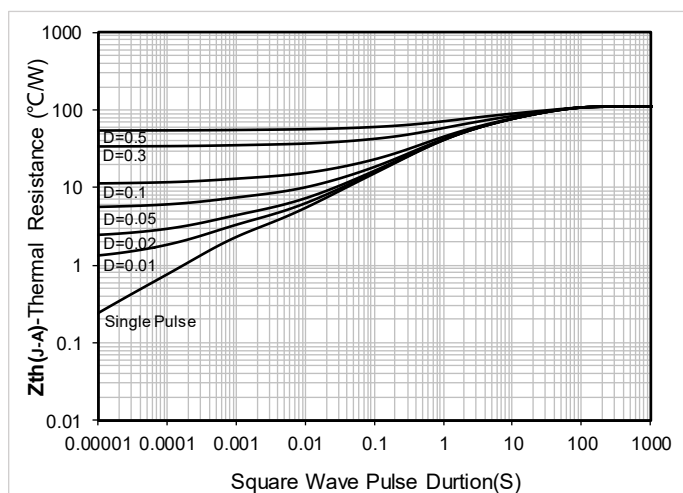


Figure 13. Maximum Transient Thermal Impedance

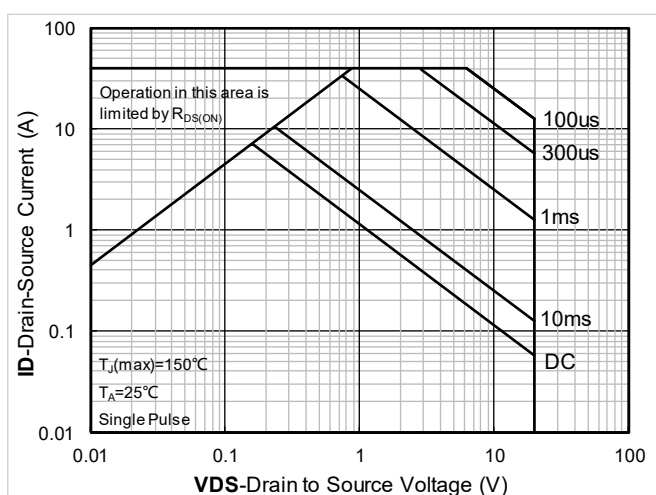
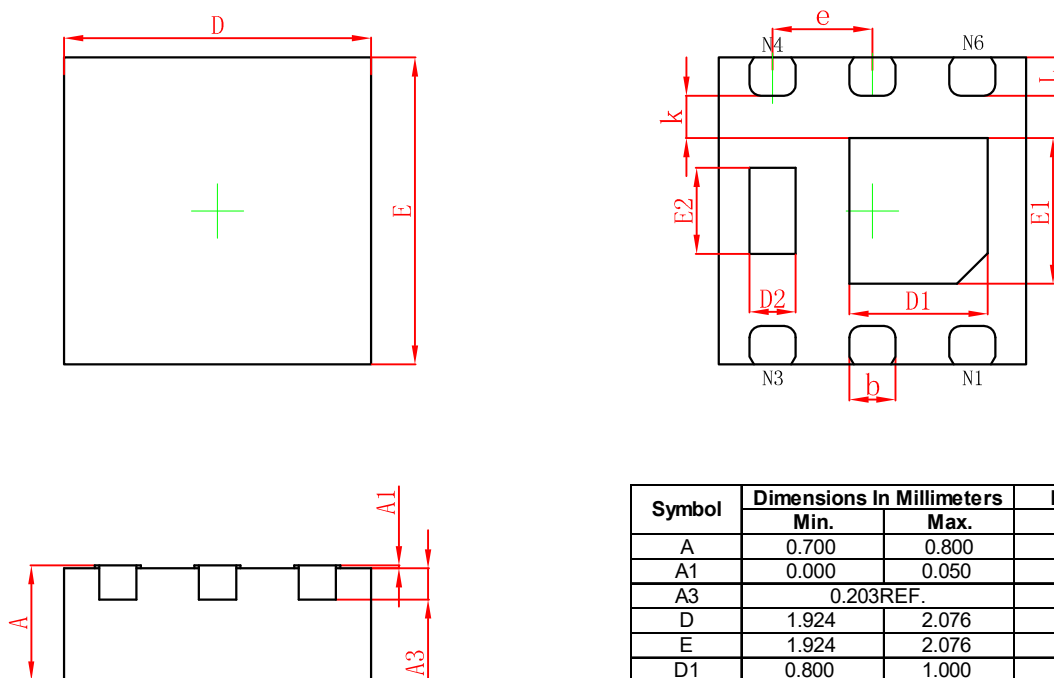


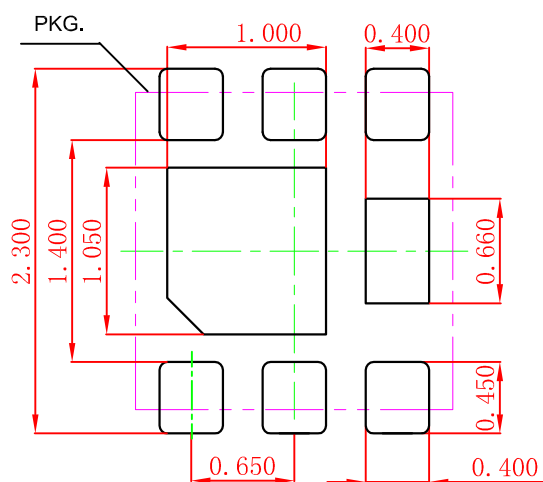
Figure 14. Safe Operation Area

DFN2020-6 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.700	0.800	0.028	0.032
A1	0.000	0.050	0.000	0.002
A3	0.203REF.		0.008REF.	
D	1.924	2.076	0.076	0.082
E	1.924	2.076	0.076	0.082
D1	0.800	1.000	0.031	0.039
E1	0.850	1.050	0.033	0.041
D2	0.200	0.400	0.008	0.016
E2	0.460	0.660	0.018	0.026
k	0.200MIN.		0.008MIN.	
b	0.250	0.350	0.010	0.014
e	0.650TYP.		0.026TYP.	
L	0.174	0.326	0.007	0.013

DFN2020-6 Suggested Pad Layout



Note:
 1. Controlling dimension: in millimeters.
 2. General tolerance: ± 0.050 mm.
 3. The pad layout is for reference purposes only.