AP02500R

20V P-Channel MOSFET

Features

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

Product Summary

V_{DS}	-20	V
I_D	-50	A
$R_{DS(ON)}$ (at V_{GS}=-4.5V)	6	mΩ
$R_{DS(ON)}$ (at V_{GS}=-2.5V)	9	mΩ

Applications

- High Frequency Point-of-Load,Synchronous Buck Converter
- Networking DC-DC Power System
- Load Switch

DFN3X3-8L Top View

Top View

Absolute Maximum Ratings(T$_C$=25℃, unless otherwise noted)

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	±12	V
Continuous Drain Current[1]	I_D@T$_C$=25℃	-50	A
Continuous Drain Current[1]	I_D@T$_C$=100℃	-35	A
Pulsed Drain Current[2]	I_{DM}	-200	A
Total Power Dissipation[3]	P_D	80	W
Storage Temperature Range	T_{STG}	-55 to 150	℃
Operating Junction Temperature Range	T_J	-55 to 150	℃

Thermal Characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance Junction-Case[1]	$R_{\theta JC}$	---	1.6	℃/W

Electrical Characteristics (T$_J$=25℃, unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV$_{DSS}$	V$_{GS}$=0V , I$_D$=-250uA	-20	---	---	V
Static Drain-Source On-Resistance[2]	R$_{DS(ON)}$	V$_{GS}$=-4.5V , I$_D$=-20A	---	5.2	6	mΩ
		V$_{GS}$=-2.5V , I$_D$=-20A	---	7.2	9	mΩ
		V$_{GS}$=-1.8V , I$_D$=-20A	---	9	12	mΩ
Gate Threshold Voltage	V$_{GS(th)}$	V$_{GS}$=V$_{DS}$, I$_D$ =-250uA	-0.4	-0.6	-1.0	V
Drain-Source Leakage Current	I$_{DSS}$	V$_{DS}$=-16V, V$_{GS}$=0V, T$_J$=25℃	---	---	1	uA
Gate-Source Leakage Current	I$_{GSS}$	V$_{GS}$=±12V , V$_{DS}$=0V	---	---	±100	nA
Forward Transconductance	gfs	V$_{DS}$=-5V , I$_D$=-20A	80	---	---	S
Total Gate Charge	Q$_g$	V$_{DS}$=-10V , V$_{GS}$=-4.5V , I$_D$=-20A	---	55	---	nC
Gate-Source Charge	Q$_{gs}$		---	10	---	
Gate-Drain Charge	Q$_{gd}$		---	15	---	
Turn-On Delay Time	T$_{d(on)}$	V$_{DD}$=-10V , V$_{GS}$=-4.5V , R$_G$=3Ω, R$_L$=0.5Ω	---	18	---	ns
Rise Time	T$_r$		---	42	---	
Turn-Off Delay Time	T$_{d(off)}$		---	85	---	
Fall Time	T$_f$		---	23	---	
Input Capacitance	C$_{iss}$	V$_{DS}$=-10V, V$_{GS}$=0V, f=1MHz	---	3500	---	pF
Output Capacitance	C$_{oss}$		---	577	---	
Reverse Transfer Capacitance	C$_{rss}$		---	445	---	

Drain-Source Diode Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Continuous Source Current[1]	I$_S$	T$_C$=25℃	---	---	-45	A
Diode Forward Voltage[2]	V$_{SD}$	V$_{GS}$=0V , I$_S$=-20A , T$_J$=25℃	---	---	-1.2	V
Reverse Recovery Time	t$_{rr}$	I$_F$=-10A ,di/dt=100A/μs，T$_J$=25℃	---	47	---	nS
Reverse Recovery Charge	Q$_{rr}$		---	53	---	nC

Note:

1.The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.

2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%

3.The power dissipation is limited by 150℃ junction temperature

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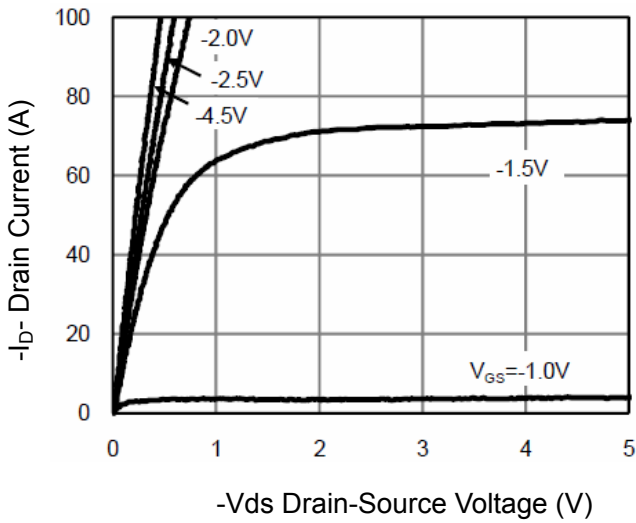## Typical Characteristics

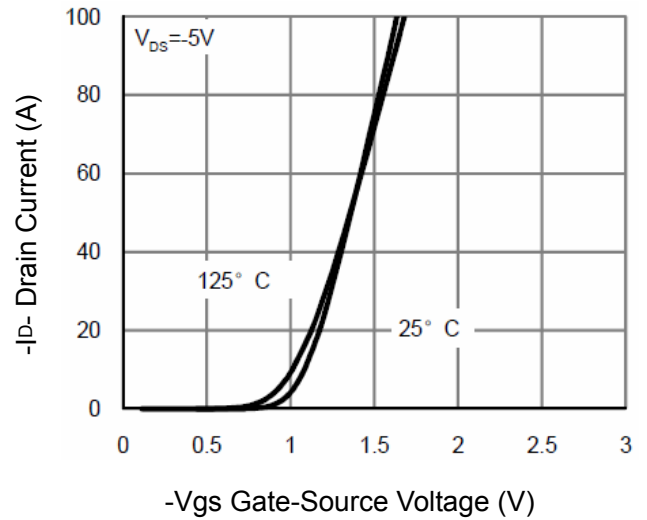**Figure 1 Output Characteristics**
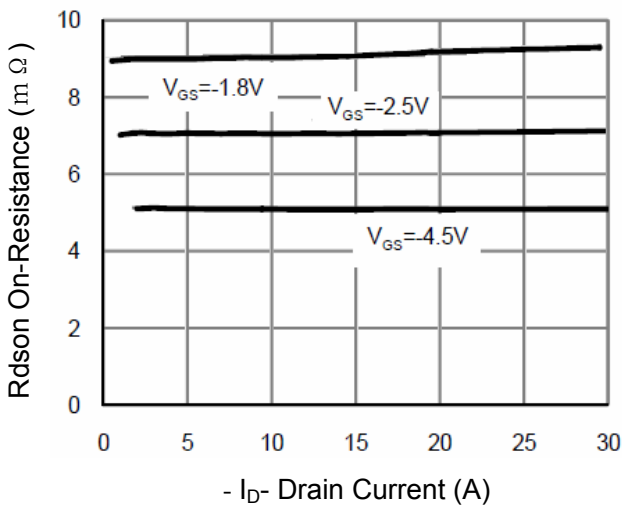

Figure 2 Transfer Characteristics

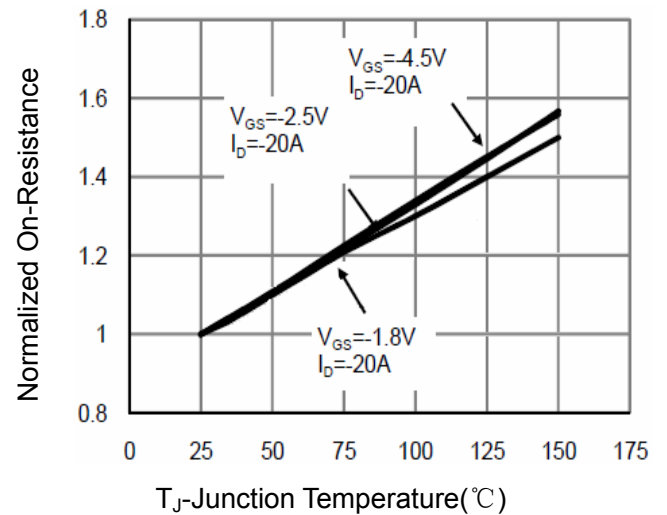**Figure 3 Rdson- Drain Current**

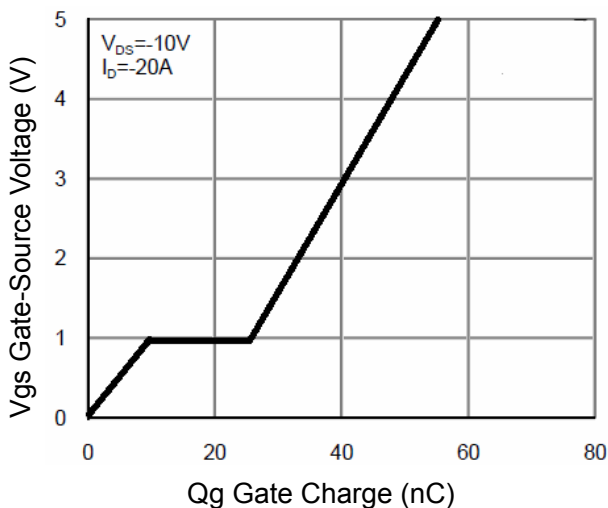**Figure 4 Rdson-Junction Temperature**
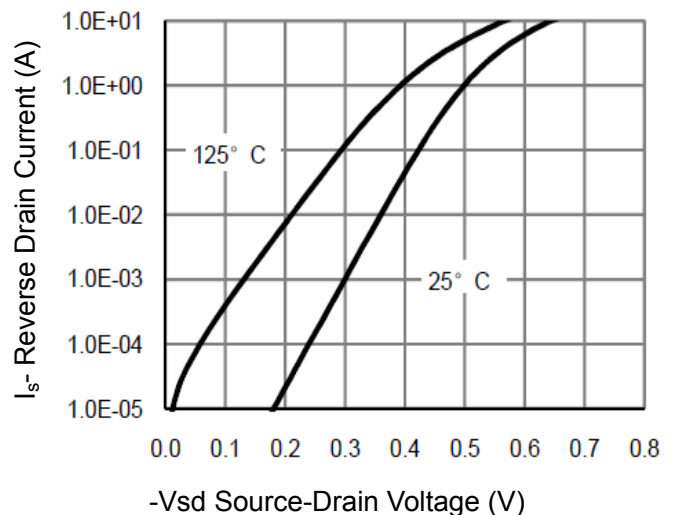

Figure 5 Gate Charge
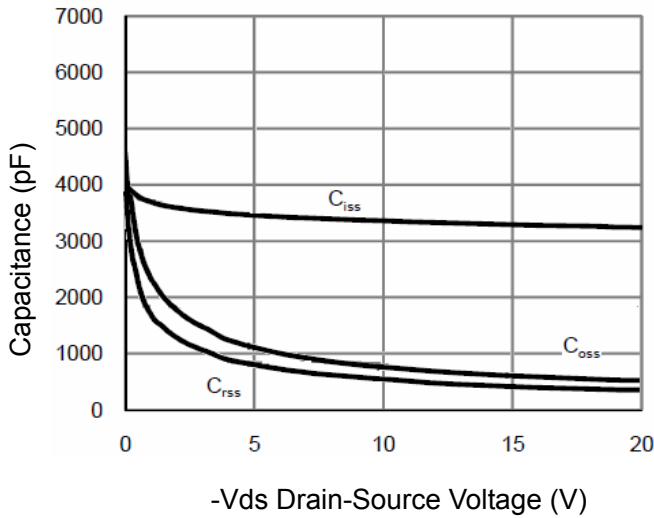

Figure 6 Source- Drain Diode Forward
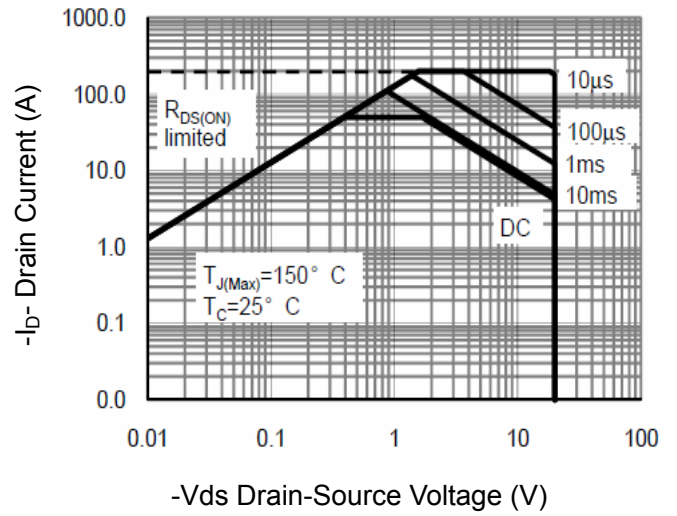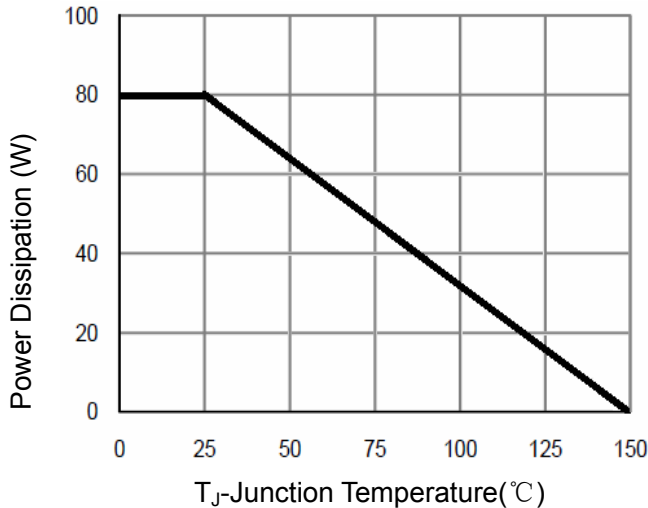
Figure 7 Capacitance vs Vds

Figure 8 Safe Operation Area
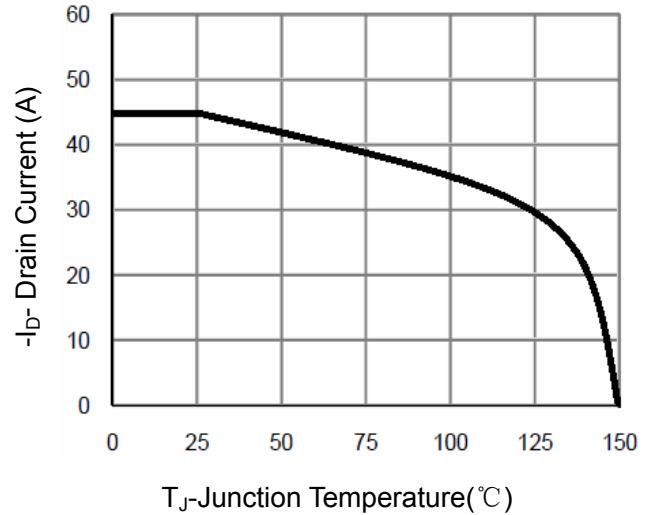
Figure 9 Power De-rating
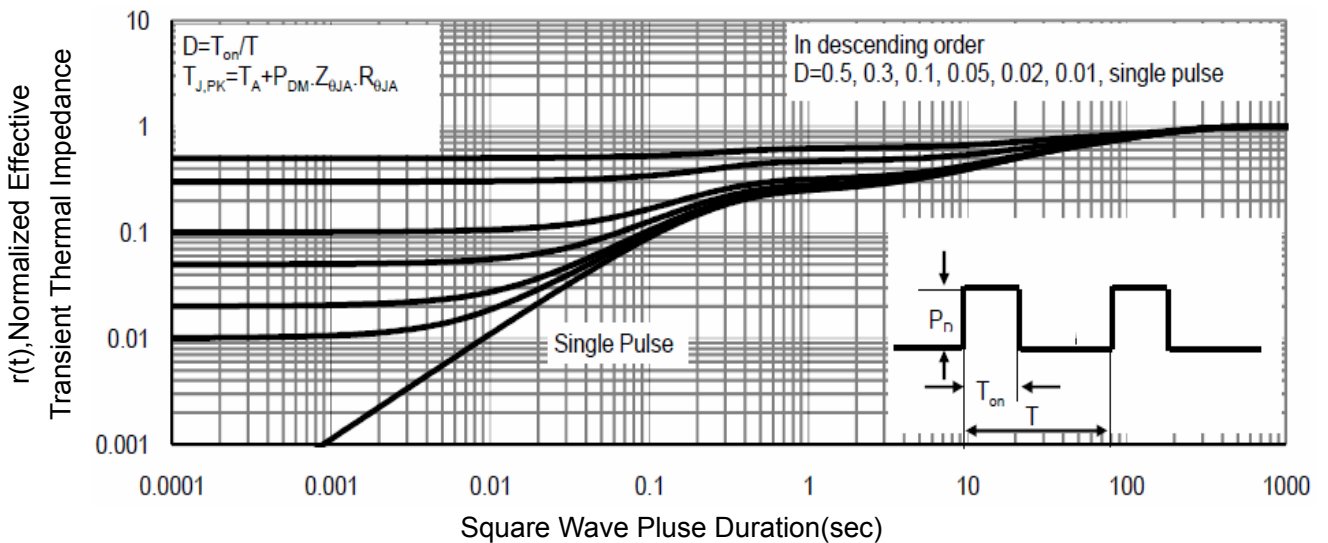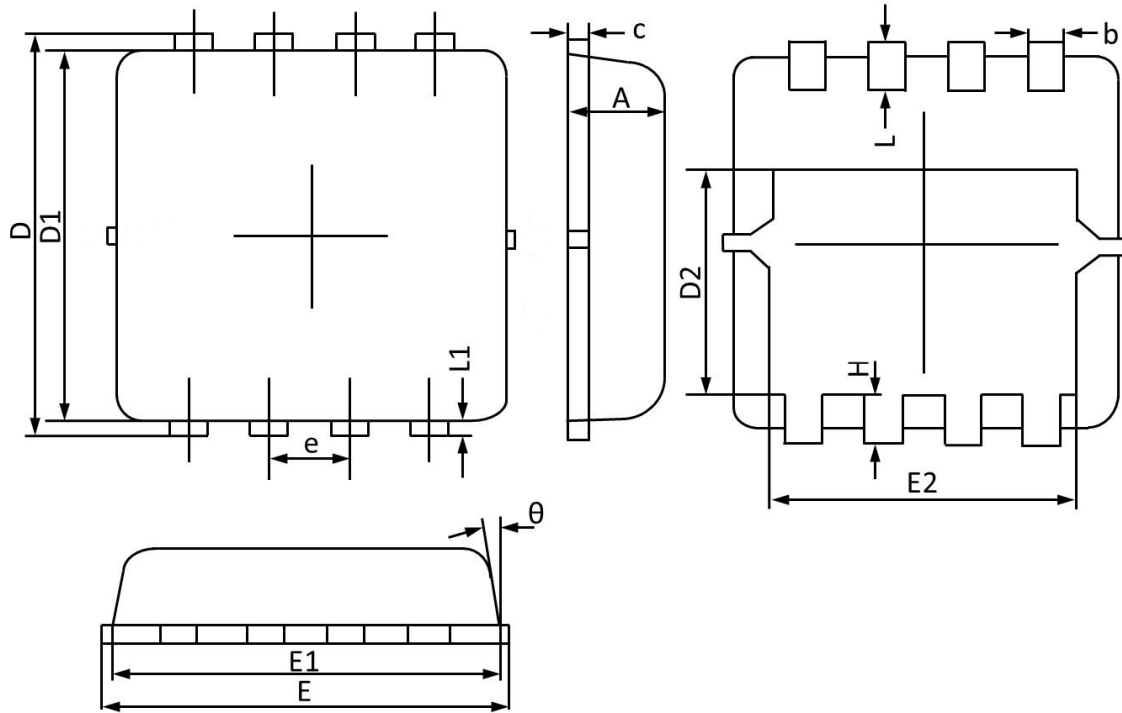
Figure 10 -Current De-rating

Figure 11 Normalized Maximum Transient Thermal Impedance

DFN3X3-8L Package Outline Dimensions

Symbol	Dimensions (unit:mm)			Symbol	Dimensions (unit:mm)		
	Min	Typ	Max		Min	Typ	Max
A	0.70	0.75	0.85	E1	2.90	3.10	3.25
b	0.24	0.30	0.35	E2	2.35	2.50	2.60
c	0.10	0.17	0.25	e	0.65 BSC		
D	3.10	3.30	3.45	H	0.30	0.40	0.50
D1	2.90	3.05	3.20	L	0.30	0.40	0.50
D2	1.45	1.70	1.95	L1	--	0.13	--
E	3.05	3.25	3.40	θ	0°		14°