

- ★ Green Device Available
- ★ Super Low Gate Charge
- ★ Advanced Trench MOS Technology
- ★ 100% EAS Guaranteed

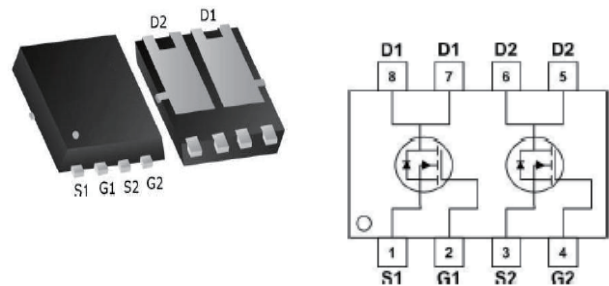
Product Summary

BVDSS	R _{DS(on)}	I _D
40V	13mΩ	33A

Description

- ★ Power Management Functions.
- ★ DC-DC Converters.
- ★ Backlighting.

PDFN3* 3 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V _{DS}	Drain-Source Voltage	40	V
V _{GS}	Gate-Source Voltage	±20	V
I _D @T _C =25°C	Continuous Drain Current, V _{GS} @ 10V ¹	33	A
I _D @T _C =100°C	Continuous Drain Current, V _{GS} @ 10V ¹	21	A
I _{DM}	Pulsed Drain Current ²	55	A
EAS	Single Pulse Avalanche Energy ³	22.1	mJ
I _{AS}	Avalanche Current	10	A
P _D @T _C =25°C	Total Power Dissipation ⁴	31.3	W
P _D @T _A =25°C	Total Power Dissipation ⁴	2	W
T _{STG}	Storage Temperature Range	-55 to 150	°C
T _J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Units
R _{θJA}	Thermal Resistance Junction-ambient (Steady State) ¹	---	60	°C/W
R _{θJC}	Thermal Resistance Junction-Case ¹	---	5.5	°C/W

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

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	40	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=10V, I_D=6A$	---	13	15	m Ω
		$V_{GS}=4.5V, I_D=5A$	---	19	23	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.2	1.7	2.4	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=32V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	uA
		$V_{DS}=32V, V_{GS}=0V, T_J=55^\circ\text{C}$	---	---	5	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
g_{fs}	Forward Transconductance	$V_{DS}=5V, I_D=12A$	---	30	---	S
R_g	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1\text{MHz}$	---	2.1	---	Ω
Q_g	Total Gate Charge (4.5V)	$V_{DS}=32V, V_{GS}=4.5V, I_D=6A$	---	3.8	---	nC
Q_{gs}	Gate-Source Charge		---	2.8	---	
Q_{gd}	Gate-Drain Charge		---	1.1	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=20V, V_{GS}=10V, R_G=3.3\Omega, I_D=1A$	---	12.2	---	ns
T_r	Rise Time		---	5.3	---	
$T_{d(off)}$	Turn-Off Delay Time		---	18	---	
T_f	Fall Time		---	9	---	
C_{iss}	Input Capacitance	$V_{DS}=15V, V_{GS}=0V, f=1\text{MHz}$	---	376	---	pF
C_{oss}	Output Capacitance		---	240	---	
C_{rss}	Reverse Transfer Capacitance		---	19	---	

Thermal Data

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Units
I_s	Continuous Source Current ^{1,5}	$V_G=V_D=0V, \text{Force Current}$	---	---	33	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V, I_s=1A, T_J=25^\circ\text{C}$	---	---	1.2	V
t_{rr}	Reverse Recovery Time	$I_F=6A, dI/dt=100A/\mu s,$	---	20	---	nS
Q_{rr}	Reverse Recovery Charge	$T_J=25^\circ\text{C}$	---	35	---	nC

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
- 2.The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3.The EAS data shows Max. rating . The test condition is $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=10A$
- 4.The power dissipation is limited by 150°C junction temperature
- 5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Performance Characteristics

Figure 1: Output Characteristics

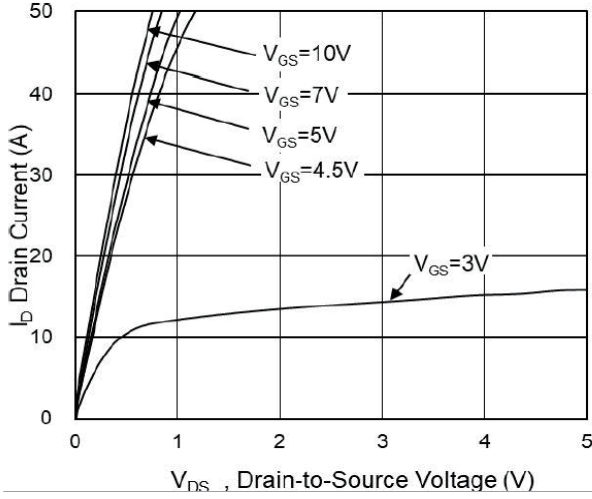


Figure 2: On-Resistance vs G-S Voltage

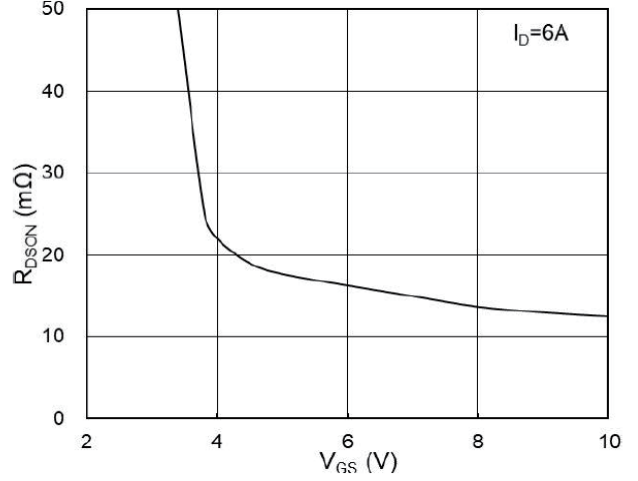


Figure 3: Source Drain Forward Characteristic

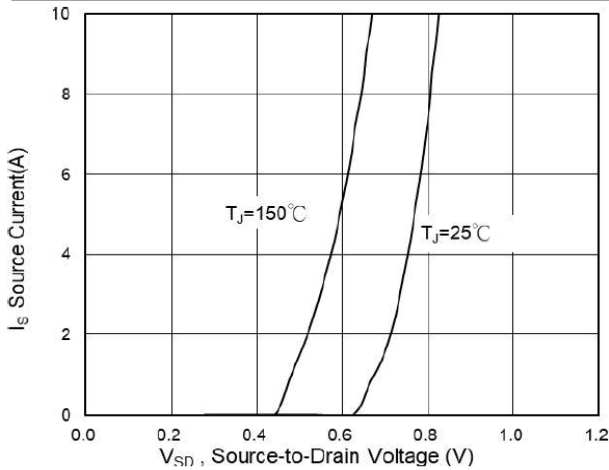


Figure 4: Gate-Charge Characteristics

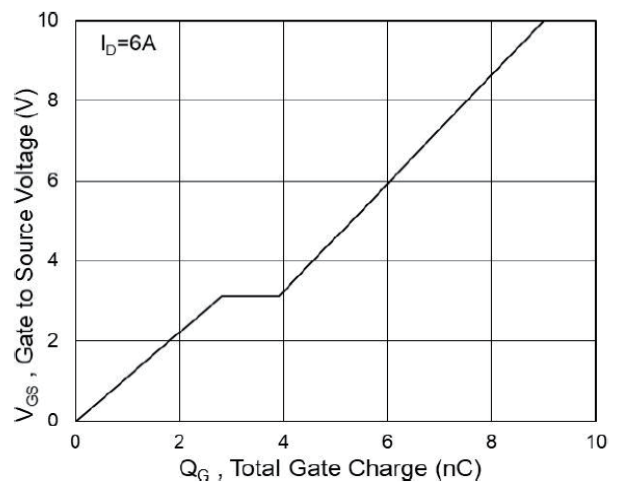


Figure 5: Normalized VGS(th) vs TJ

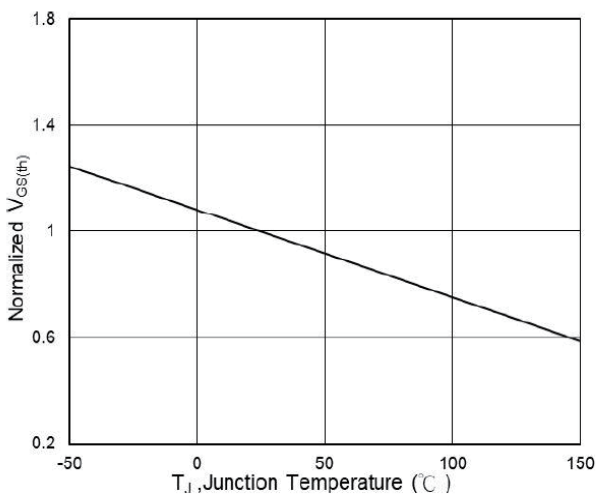
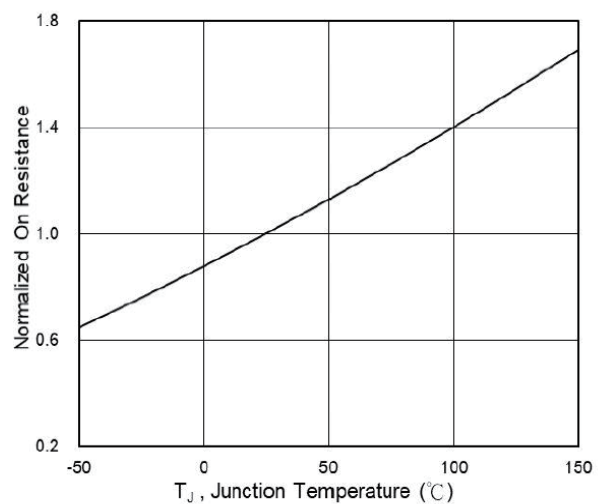


Figure 6: Normalized RDS(on) vs TJ



Typical Performance Characteristics

Figure 7: Capacitance

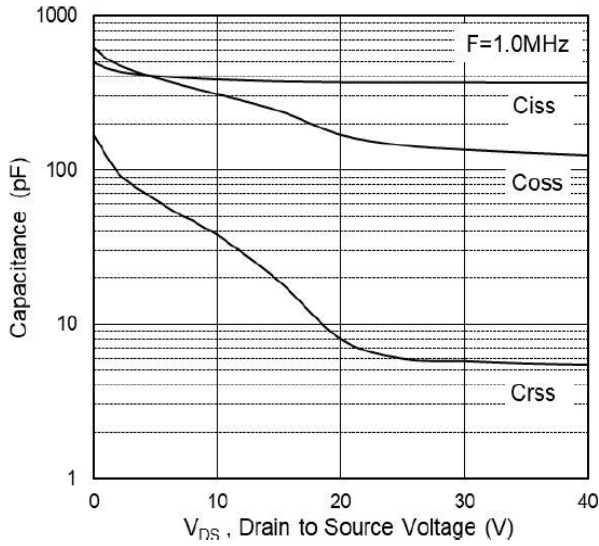


Figure 8: Safe Operating Area

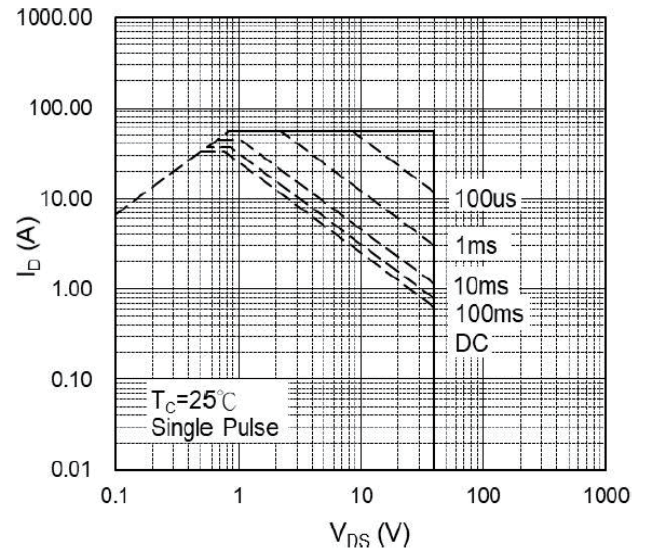


Figure 9: Normalized Maximum Transient Thermal Response

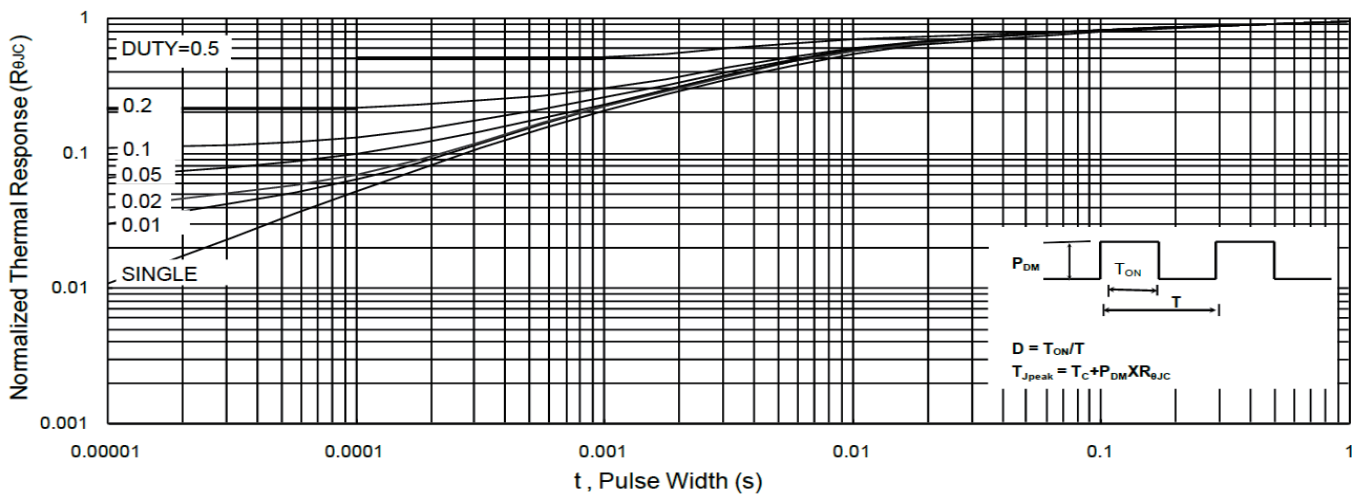


Figure.10: Switching Time Waveform

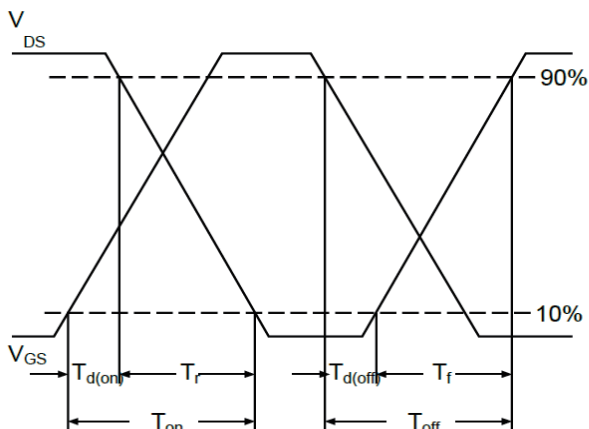
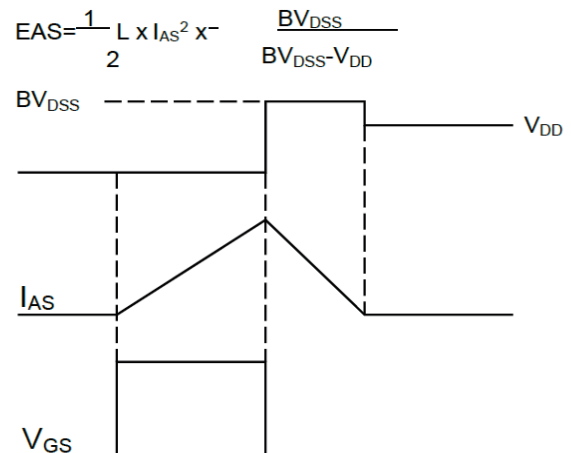
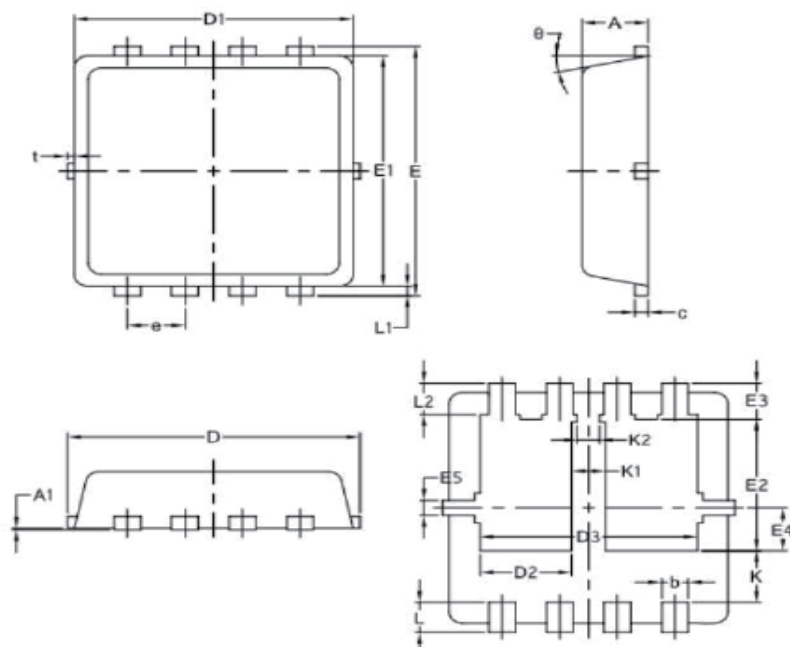


Figure.11: Unclamped Inductive Switching

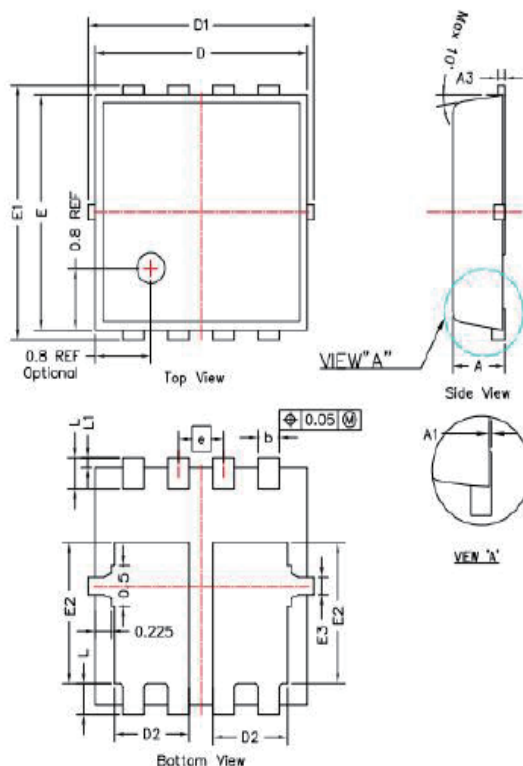


Package Mechanical Data-PDFN3x3-8L-D-Type A



SYMBOL	COMMON		
	MM		
	MIN	NOM	MAX
A	0.70	0.75	0.85
A1	/	/	0.05
b	0.25	0.30	0.39
c	0.14	0.152	0.20
D	3.20	3.30	3.45
D1	3.05	3.15	3.25
D2	0.84	1.04	1.24
D3	2.30	2.45	2.60
E	3.20	3.30	3.40
E1	2.95	3.05	3.15
E2	1.60	1.74	1.90
E3	0.28	0.48	0.65
E4	0.37	0.57	0.77
E5	0.10	0.20	0.30
e	0.60	0.65	0.70
K	0.50	0.69	0.80
K1	0.30	0.38	0.53
K2	0.15	0.25	0.35
L	0.30	0.40	0.50
L1	0.06	0.125	0.20
L2	0.27	0.42	0.57
t	0	0.075	0.13
θ	10°	12°	14°

Package Mechanical Data-PDFN3x3-8L-D-Type B



SYMBOLS	DIMENSION IN MM			DIMENSION IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.700	0.750	0.800	0.028	0.030	0.031
A1	---	---	0.050	---	---	0.002
A3	0.144	0.152	0.202	0.006	0.006	0.008
b	0.250	0.300	0.350	0.010	0.012	0.014
e	0.65 BSC			0.026 BSC		
D	2.950	3.050	3.150	0.116	0.120	0.124
E	2.950	3.050	3.150	0.116	0.120	0.124
D1	3.200	3.300	3.400	0.126	0.130	0.134
E1	3.200	3.300	3.400	0.126	0.130	0.134
D2	0.970	1.070	1.170	0.038	0.042	0.046
E2	1.700	1.800	1.900	0.067	0.071	0.075
E3	0.150	0.200	0.250	0.006	0.008	0.010
L	0.300	0.400	0.500	0.012	0.016	0.020
L1	0.075	0.125	0.175	0.003	0.005	0.007