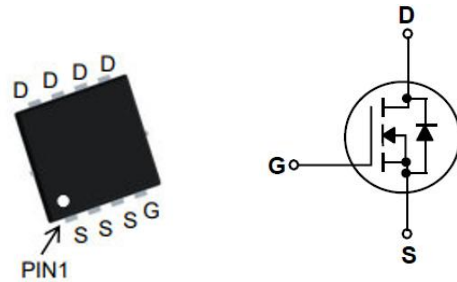


Features

- ◆ 40V, 40A, $R_{DS(on)}(Typ.) = 5.5m\Omega @ V_{GS} = 10V$
- ◆ Excellent $R_{DS(on)}$ and Low Gate Charge
- ◆ Advanced Trench Technology
- ◆ 100% E_{AS} Guaranteed

Application

- ◆ Load Switch
- ◆ PWM Application
- ◆ Power Management



Absolute Maximum Ratings $T_c = 25^\circ C$ unless otherwise noted

Symbol	Parameter	Rating	Unit
V_{DS}	Drain-Source Voltage ^a	40	V
V_{GS}	Gate-Source Voltage	± 20	
I_D	Drain Current-Continuous	$T_C = 25^\circ C$	A
		$T_C = 100^\circ C$	
I_{DM}	Drain Current-Pulsed ^b	160	
P_D	Maximum Power Dissipation, $T_C = 25^\circ C$	113	W
E_{AS}	Single Pulsed Avalanche Energy ^c	100	mJ
T_J, T_{STG}	Operating and Store Temperature Range	150, -55 to 150	$^\circ C$

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case	1.1	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	45	

Electrical Characteristics $T_J = 25^\circ C$ unless otherwise noted

■ Off Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 40V, V_{GS} = 0V$	-	-	1.0	μA
I_{GSS}	Forward Gate Body Leakage Current	$V_{DS} = 0V, V_{GS} = \pm 20V$	-	-	± 100	nA

■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.0	-	2.5	V
$R_{DS(on)}$	Static Drain-Source On-Resistance ^d	$V_{GS} = 10V, I_D = 30A$	-	5.5	7.0	mΩ
		$V_{GS} = 4.5V, I_D = 20A$	-	6.8	8.5	

■ Dynamic Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
R_G	Gate Resistance	$V_{DS} = V_{GS} = 0V,$ $f = 1.0MHz$	-	TBD	-	Ω
C_{iss}	Input Capacitance	$V_{DS} = 20V,$ $V_{GS} = 0V,$ $f = 1.0MHz$	-	2443	-	pF
C_{oss}	Output Capacitance		-	167	-	
C_{rss}	Reverse Transfer Capacitance		-	138	-	

■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 20V,$ $V_{GS} = 10V,$ $I_D = 20A,$ $R_{GEN} = 3.0\Omega$	-	10	-	ns
t_r	Turn-On Rise Time		-	28	-	
$t_{d(off)}$	Turn-Off Delay Time		-	40	-	
t_f	Turn-Off Fall Time		-	7	-	
Q_g	Total Gate Charge	$V_{DS} = 20V,$ $V_{GS} = 0 \text{ to } 10V,$ $I_D = 20A$	-	48	-	nC
Q_{gs}	Gate-Source Charge		-	10	-	
Q_{gd}	Gate-Drain Charge		-	10	-	

■ Drain-Source Diode Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
I_S	Drain-Source Diode Forward Continuous Current	$V_G = V_D = 0V,$ Force Current	-	-	40	A
I_{SM}	Maximum Pulsed Current		-	-	160	
V_{SD}	Drain-Source Diode Forward Voltage	$V_{GS} = 0V, I_S = 30A$	-	-	1.2	V
T_{rr}	Body Diode Reverse Recovery Time	$I_F = 20A,$ $dl_F/dt = 100A/\mu s$	-	11	-	ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F = 20A,$ $dl_F/dt = 100A/\mu s$	-	5	-	nC

Notes:

- $T_J = +25^\circ C$ to $+150^\circ C$.
- Repetitive rating: pulse width limited by maximum junction temperature.
- $L = 0.5mH, V_{DD} = 25V, I_{AS} = 20A, R_G = 25\Omega$ Starting $T_J = 25^\circ C$.
- Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.

■ Characteristic Curve

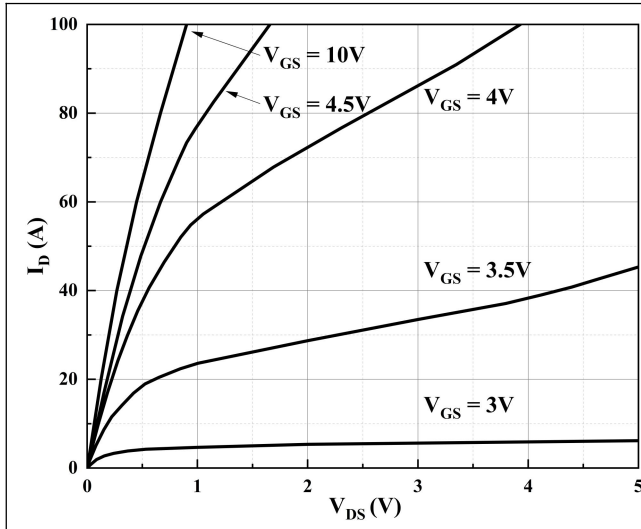


Figure 1. Typical Output Characteristics

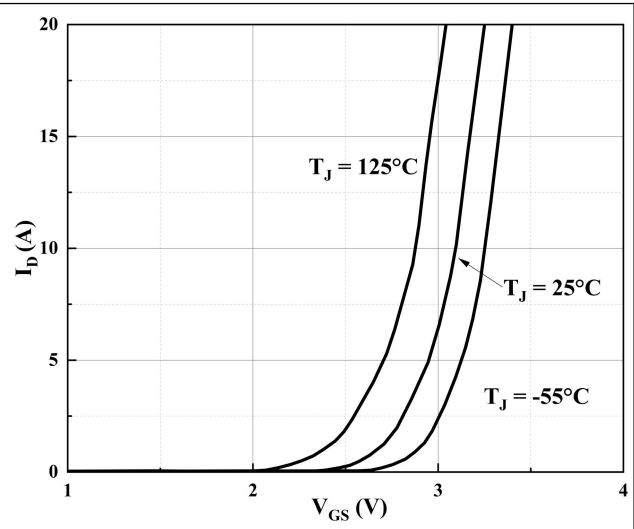


Figure 2. Typical Transfer Characteristics

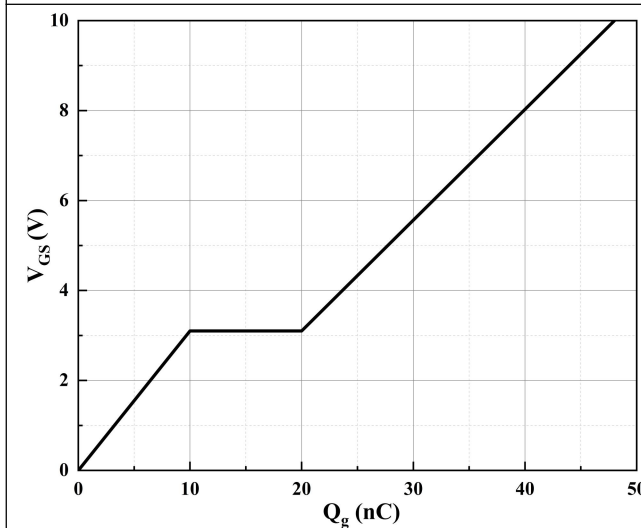


Figure 3. Typical Gate Charge

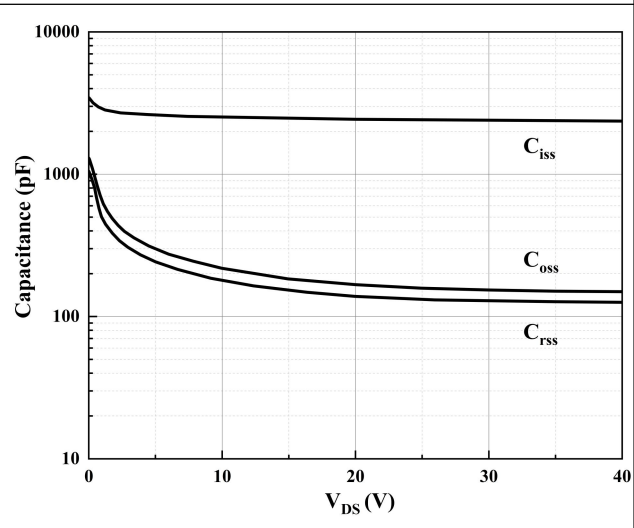


Figure 4. Typical Capacitance

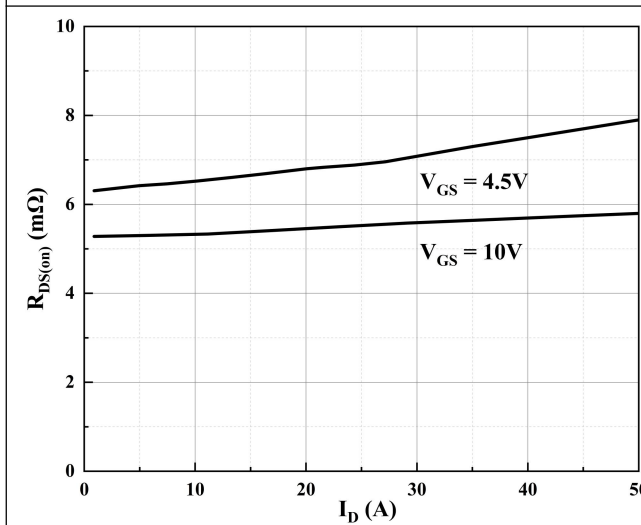


Figure 5. Static Drain-Source On-Resistance vs. Drain Current

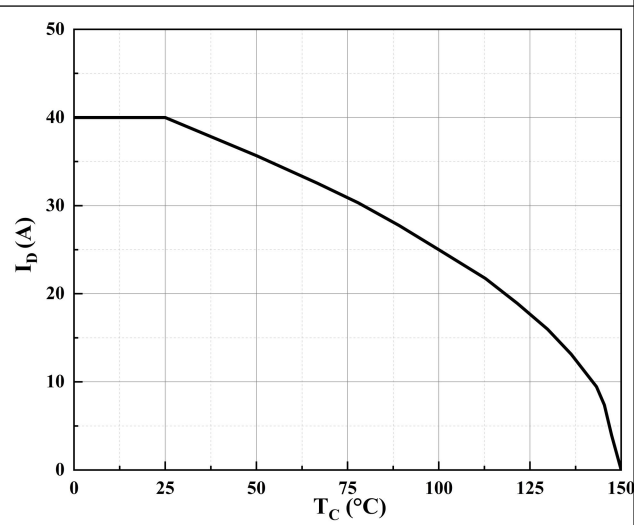


Figure 6. Maximum Continuous Drain Current vs. Case Temperature

■ Characteristic Curve

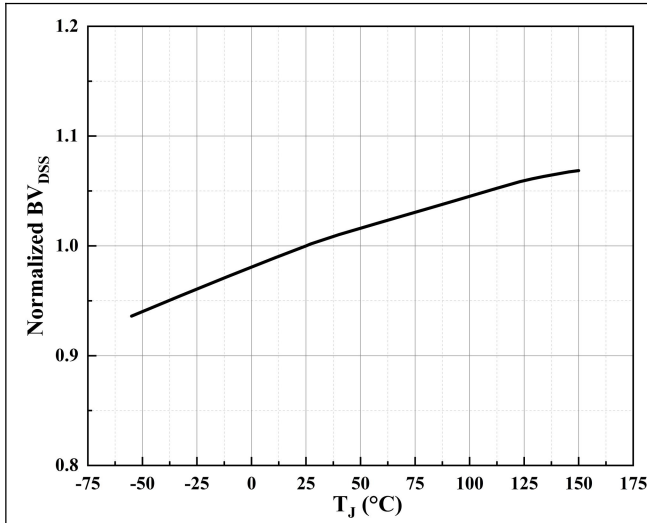


Figure 7. Normalized Drain-Source Breakdown Voltage vs. Junction Temperature

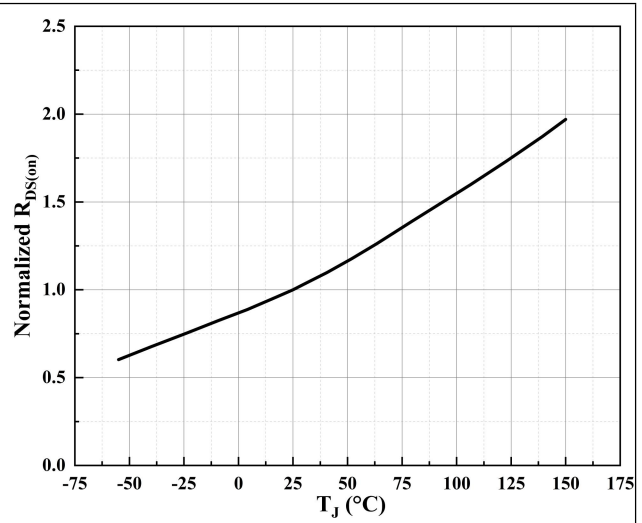


Figure 8. Normalized Static Drain-Source On-Resistance vs. Junction Temperature

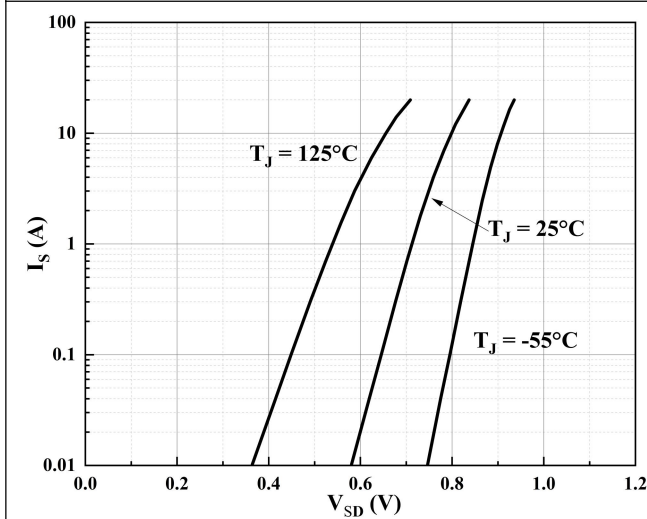


Figure 9. Body Diode Characteristics

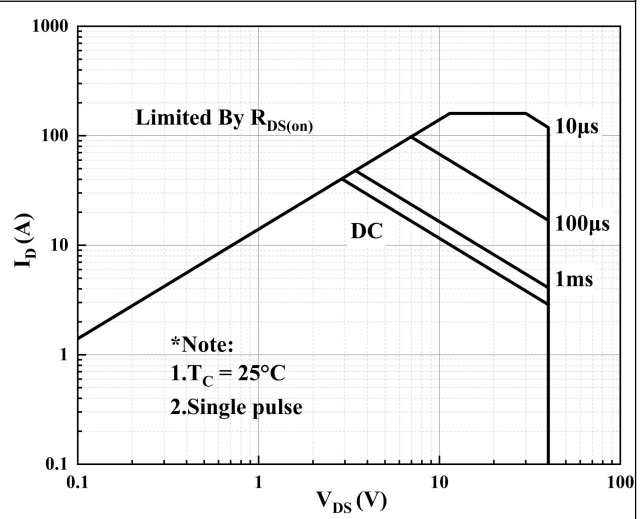


Figure 10. Maximum Safe Operating Area

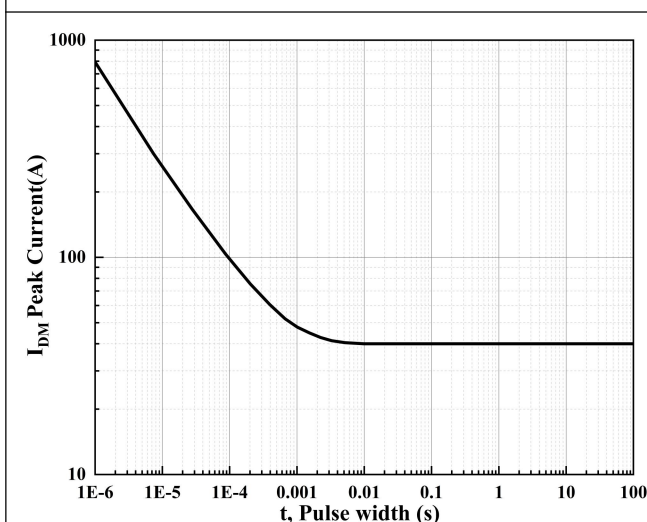


Figure 11. Peak Current Capacity

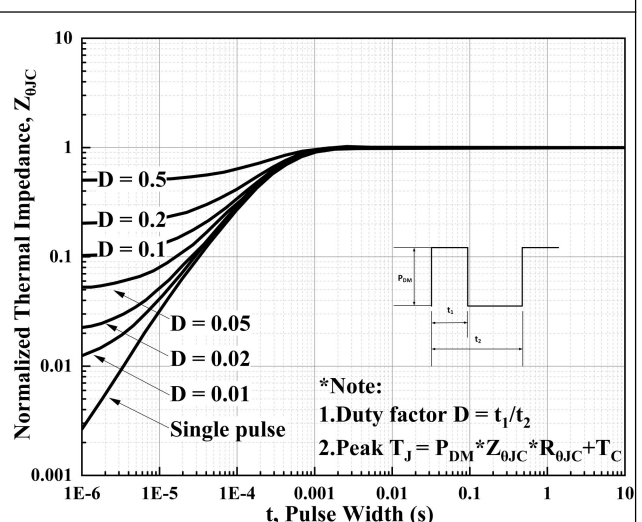
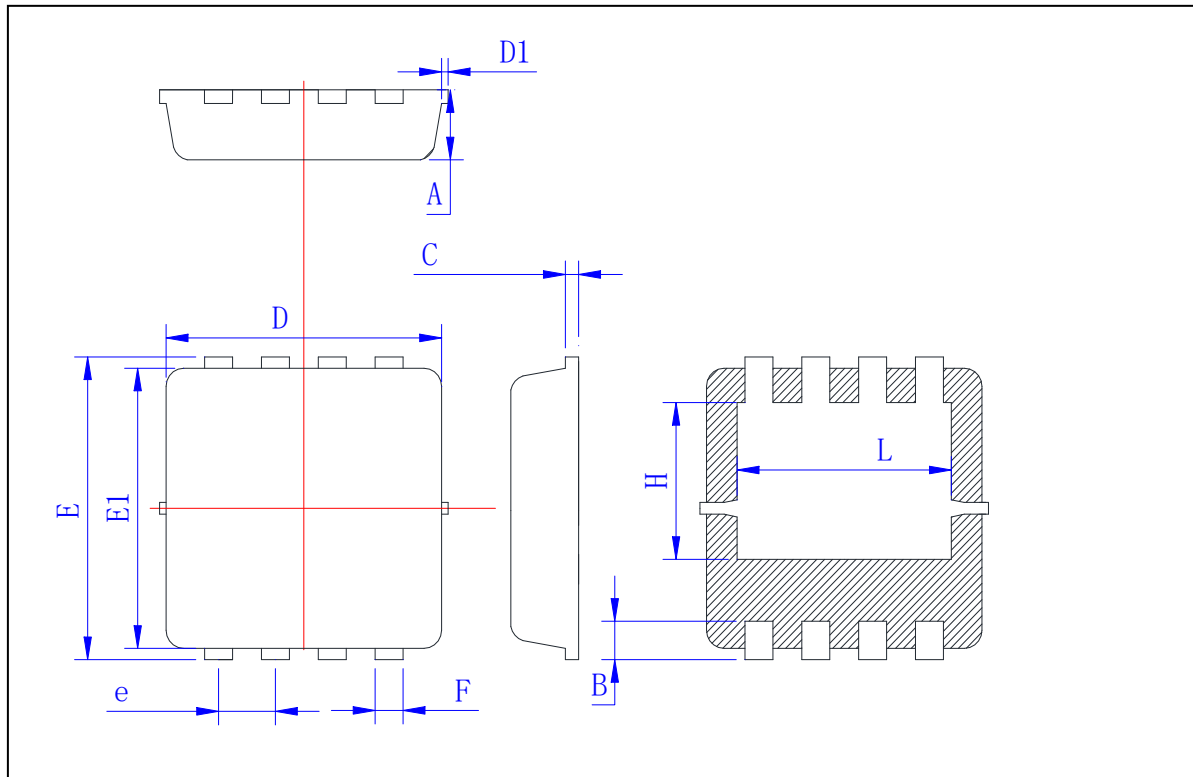


Figure 12. Normalized Maximum Transient Thermal Impedance

■ Package Information

PDFN3×3



Symbol	Min	Typ	Max
A	0.725	0.775	0.825
B	0.28	0.38	0.48
C	0.13	0.15	0.20
D	3.05	3.15	3.25
D1			0.10
E	3.25	3.35	3.45
E1	3.0	3.1	3.2
e	0.60	0.65	0.70
F	0.25	0.30	0.35
H	1.63	1.73	1.83
L	2.35	2.45	2.55