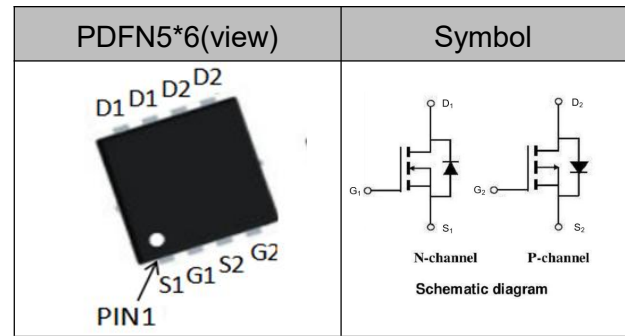


Features

- ◆ N-MOS 40V, 40A
 $R_{DS(on)} = 12.5m\Omega(Typ.)@V_{GS} = 10V$
 $R_{DS(on)} = 17.5m\Omega(Typ.)@V_{GS} = 4.5V$
- ◆ P-MOS -40V, -40A
 $R_{DS(on)} = 10.0m\Omega(Typ.)@V_{GS} = -10V$
 $R_{DS(on)} = 12.5m\Omega(Typ.)@V_{GS} = -4.5V$
- ◆ Advanced Trench Technology
- ◆ Excellent $R_{DS(on)}$ and Low Gate Charge


Application

- ◆ Motor Driver
- ◆ Wireless Charging
- ◆ Power Management

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

Symbol	Parameter	Max.N-MOS	Max.P-MOS	Unit
V_{DS}	Drain-Source Voltage	40	-40	V
V_{GS}	Gate-Source Voltage	± 20	± 20	
I_D	Drain Current-Continuous, $T_C = 25^\circ C$	40	-40	A
	Drain Current-Continuous, $T_C = 100^\circ C$	25	-26	
I_{DM}	Drain Current-Pulsed ^a	160	-140	
E_{AS}	Avalanche Energy, Single pulse ^b	60	144	mJ
P_D	Total Power Dissipation, $T_C = 25^\circ C$	35	38	W
T_J, T_{STG}	Junction and Storage Temperature Range	150, -55 to 150		$^\circ C$

Thermal Characteristics

Symbol	Parameter	Max.N-MOS	Max.P-MOS	Unit
$R_{\theta JC}$	Thermal Resistance Junction-Case	3.6	3.3	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ^c	37	37	

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	$V_{GS} = 0V, I_D = 250\mu A$	N	40	-	-	V
		$V_{GS} = 0V, I_D = -250\mu A$	P	-40	-	-	
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 40V, V_{GS} = 0V$	N	-	-	1.0	μA
		$V_{DS} = -40V, V_{GS} = 0V$	P	-	-	1.0	
I_{GSS}	Forward Gate Body Leakage Current	$V_{DS} = 0V, V_{GS} = \pm 20V$	N	-	-	± 100	nA
		$V_{DS} = 0V, V_{GS} = \pm 20V$	P	-	-	± 100	

■ On Characteristics

Symbol	Parameter	Test Condition		Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	N	1.0	2.0	2.5	V
		$V_{DS} = V_{GS}, I_D = -250\mu A$	P	-1.0	-1.6	-2.5	
$R_{DS(on)}$	Static Drain-Source On-Resistance ^d	$V_{GS} = 10V, I_D = 20A$	N	-	12.5	16.0	mΩ
		$V_{GS} = -10V, I_D = -20A$	P	-	10.0	12.5	
		$V_{GS} = 4.5V, I_D = 10A$	N	-	17.5	22.0	
		$V_{GS} = -4.5V, I_D = -10A$	P	-	12.5	15.0	

■ Dynamic Characteristics

Symbol	Parameter	Test Condition		Min.	Typ.	Max.	Unit
R _g	Gate Resistance	V _{GS} = 0V, V _{DS} = 0V f = 1.0MHz	N	-	TBD	-	Ω
			P	-	TBD	-	
C _{iss}	Input Capacitance	N-MOS V _{DS} = 20V, V _{GS} = 0V, f = 1.0MHz P-MOS V _{DS} = -20V, V _{GS} = 0V, f = 1.0MHz	N	-	1913	-	pF
C _{oss}	Output Capacitance		P	-	3800	-	
			N	-	125	-	
C _{rss}	Reverse Transfer Capacitance		P	-	329	-	
		N	-	104	-		
		P	-	289	-		

■ On Characteristics

Symbol	Parameter	Test Condition		Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-On Delay Time	N-MOS $V_{DD} = 20V, I_D = 20A,$ $V_{GS} = 10V,$ $R_{GEN} = 3.0\Omega$	N	-	9.0	-	ns
			P	-	11	-	
t_r	Turn-On Rise Time		N	-	29	-	
			P	-	83	-	
$t_{d(off)}$	Turn-Off Delay Time	P-MOS $V_{DD} = -20V, I_D = -20A,$ $V_{GS} = -10V,$ $R_{GEN} = 2.4\Omega$	N	-	38	-	
			P	-	95	-	
t_f	Turn-Off Fall Time		N	-	8.0	-	
			P	-	78	-	
Q_g	Total Gate Charge	N-MOS $V_{DS} = 20V, I_D = 20A,$ $V_{GS} = 10V$	N	-	37	-	nC
			P	-	68	-	
Q_{gs}	Gate-Source Charge	P-MOS $V_{DS} = -20V, I_D = -20A,$ $V_{GS} = -10V$	N	-	8.0	-	
			P	-	10	-	
Q_{gd}	Gate-Drain Charge		N	-	7.0	-	
			P	-	14	-	

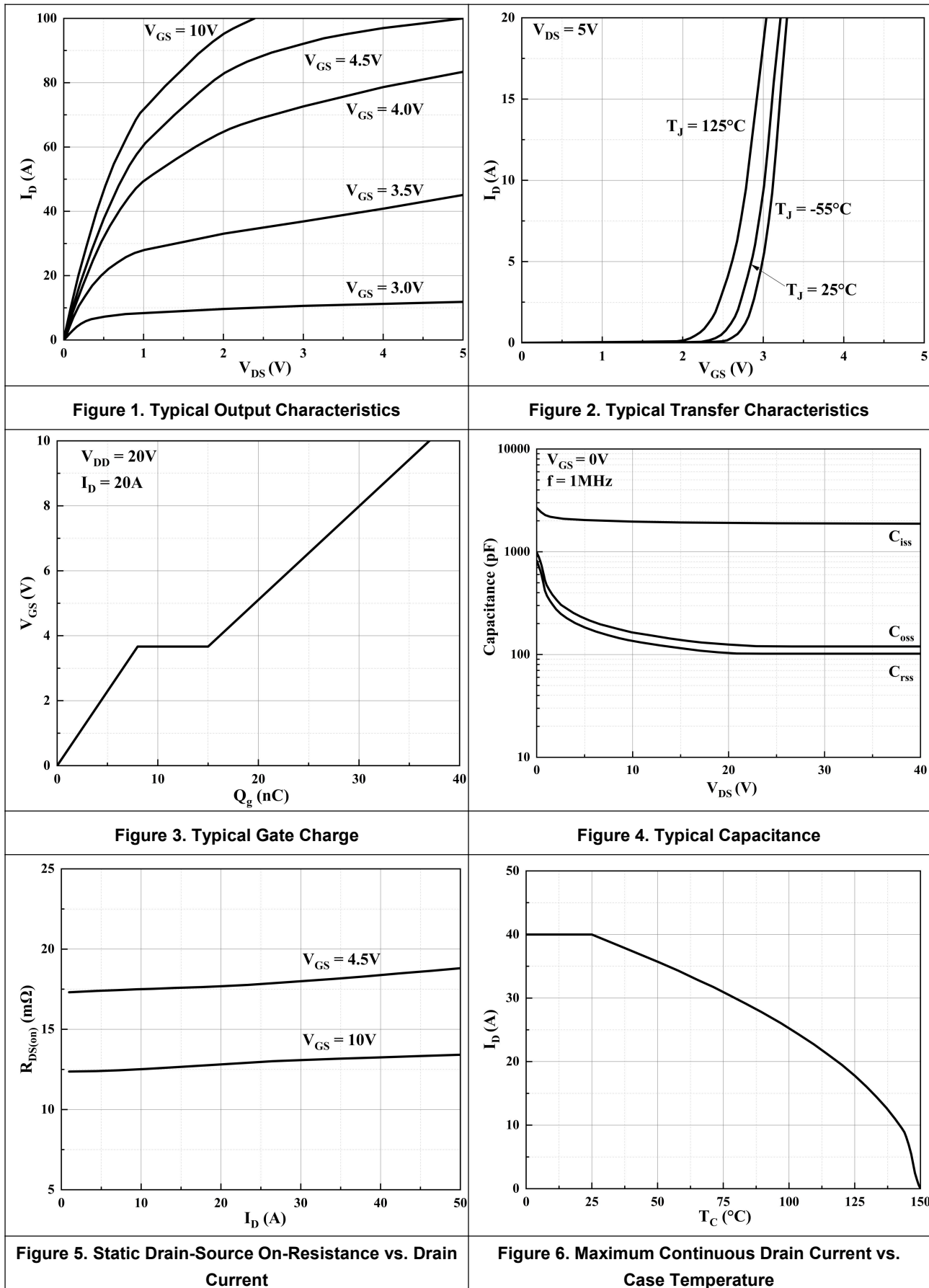
■ Drain-Source Diode Characteristics

Symbol	Parameter	Test Condition		Min.	Typ.	Max.	Unit
I _S	Continuous Source Current	V _G = V _D = 0V, Force Current	N	-	-	40	A
I _{SM}	Pulse Source Current		P	-	-	-40	
			N	-	-	160	
			P	-	-	-160	
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} = 0V, I _{SD} = 30A	N	-	-	1.2	V
		V _{GS} = 0V, I _{SD} = -35A	P	-	-	-1.2	
T _{rr}	Body Diode Reverse Recovery Time	N-MOS I _F = 20A, dI _F /dt = 100A/μs	N	-	10	-	ns
			P		20		
Q _{rr}	Body Diode Reverse Recovery Charge	P-MOS I _F = -30A, dI _F /dt = 100A/μs	N	-	5.0	-	nC
			P		13		

Notes:

- a: Max. current is limited by junction temperature.
- b: The EAS data shows Max. Rating. The test condition:
N-MOS: $V_{DD} = 25V$, $V_{GS} = 10V$, $L = 0.5mH$, $I_{AS} = 15.5A$.
P-MOS: $V_{DD} = -25V$, $V_{GS} = -10V$, $L = 0.5mH$, $I_{AS} = -24A$.
- c: Surface Mounted on 1in2 FR-4 board with 1oz.
- d: Pulse test (pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$).
- e: Guaranteed by design, not subject to production testing.

■ N-channel Characteristic Curve



■ N-channel Characteristic Curve

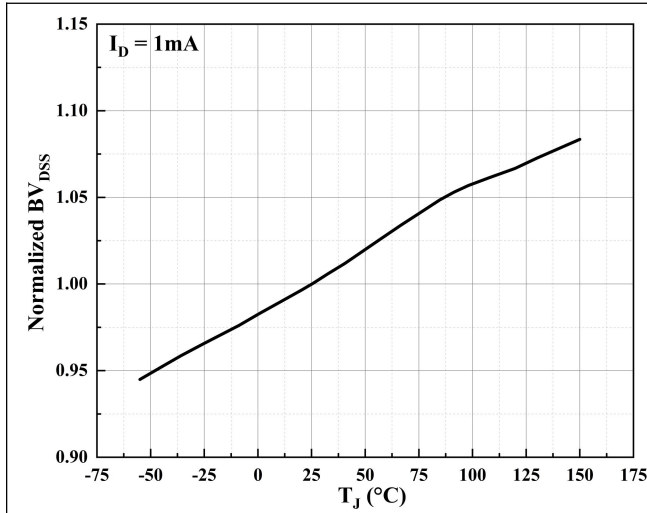


Figure 7. Normalized Drain-Source Breakdown Voltage vs. Junction Temperature

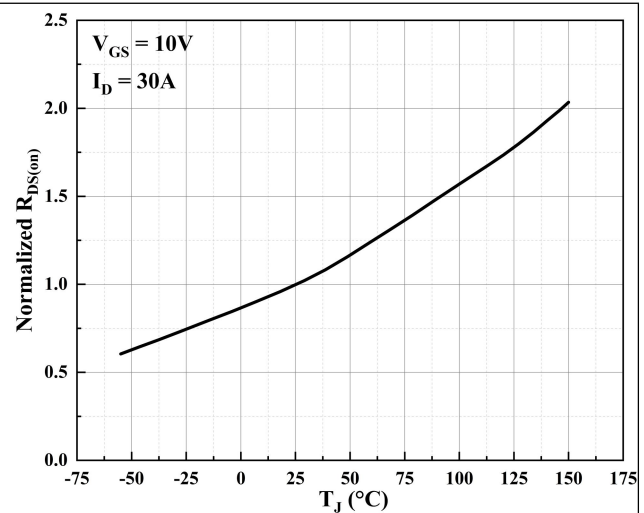


Figure 8. Normalized Static Drain-Source On-Resistance vs. Junction Temperature

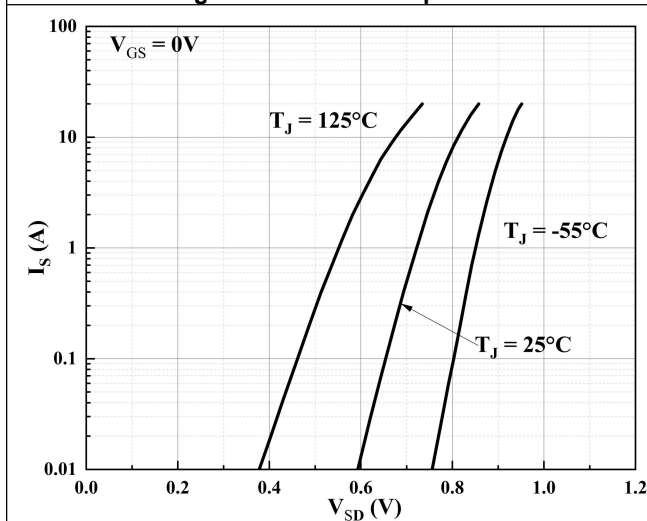


Figure 9. Body Diode Characteristics

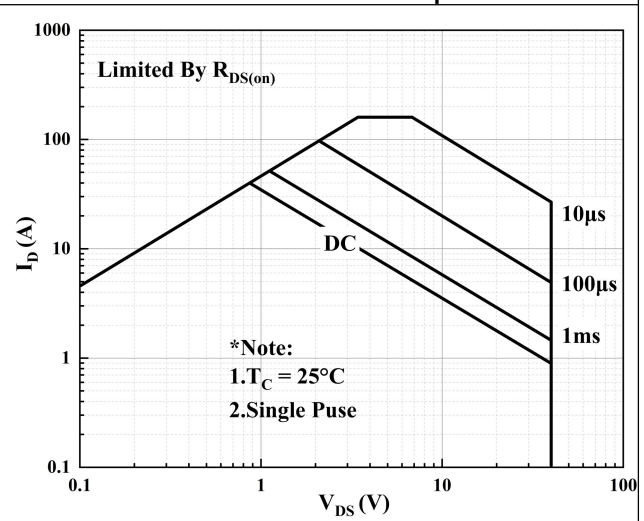


Figure 10. Maximum Safe Operating Area

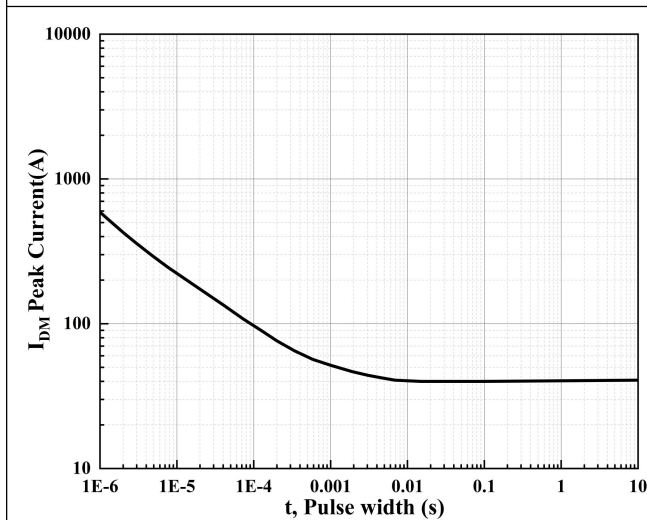


Figure 11. Peak Current Capacity

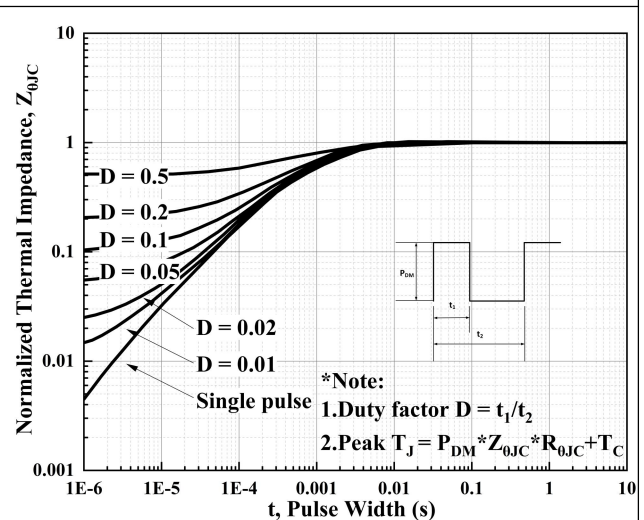


Figure 12. Normalized Maximum Transient Thermal Impedance

■ P-channel Characteristic Curve

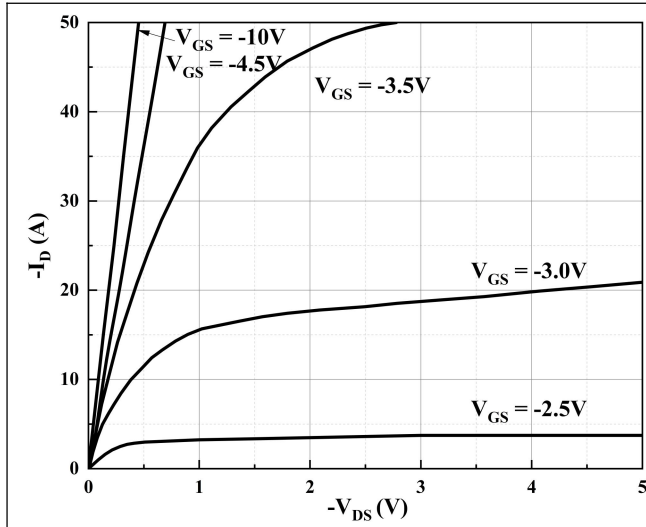


Figure 1. Typical Output Characteristics

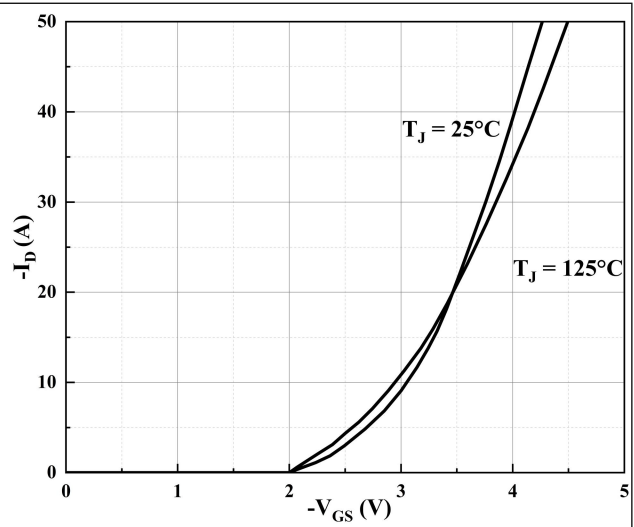


Figure 2. Typical Transfer Characteristics

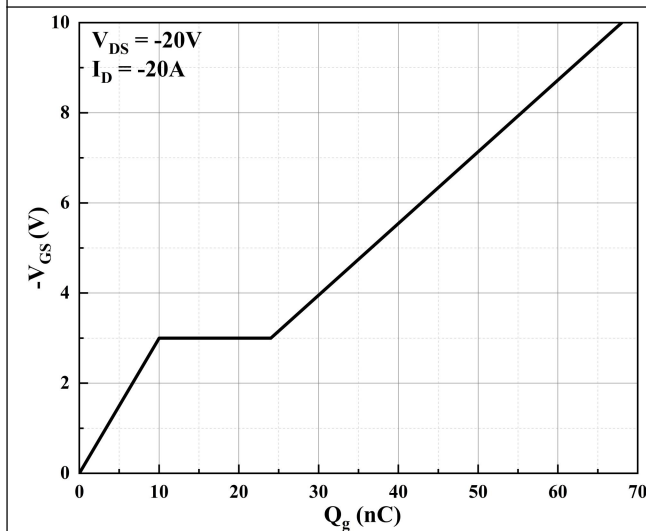


Figure 3. Typical Gate Charge

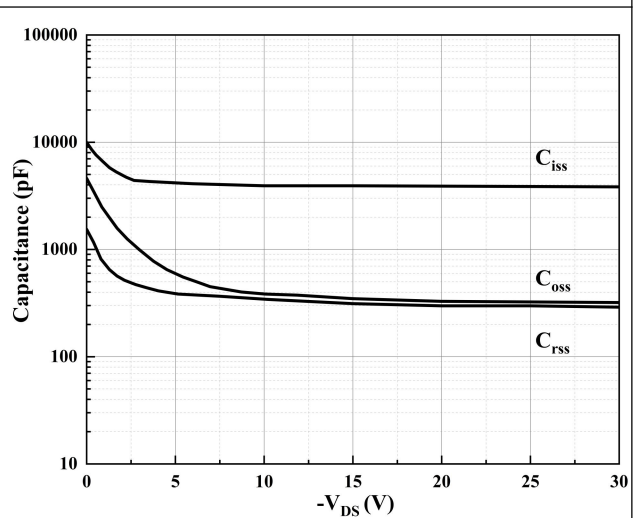


Figure 4. Typical Capacitance

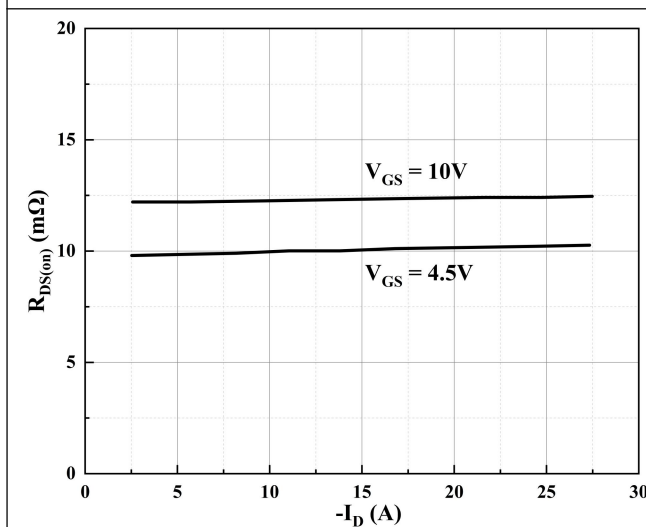


Figure 5. Static Drain-Source On-Resistance vs. Drain Current

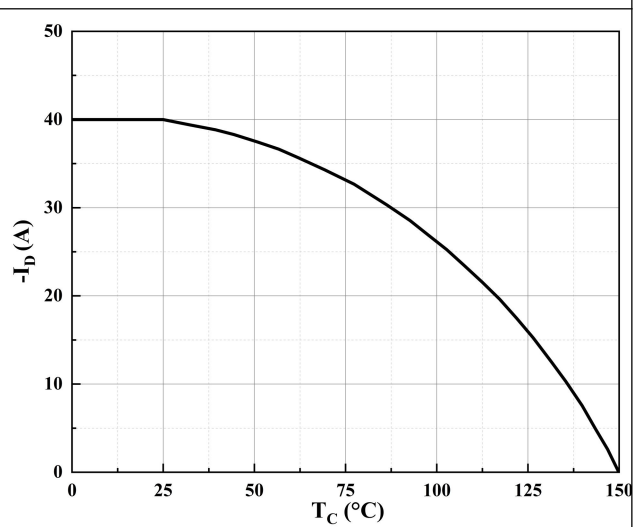


Figure 6. Static Drain-Source On-Resistance vs. Gate-Source Voltage

■ P-channel Characteristic Curve

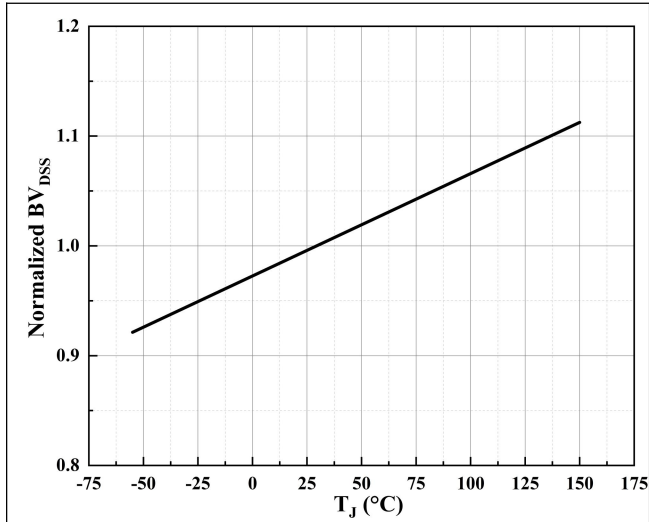


Figure 7. Normalized Drain-Source Breakdown Voltage vs. Junction Temperature

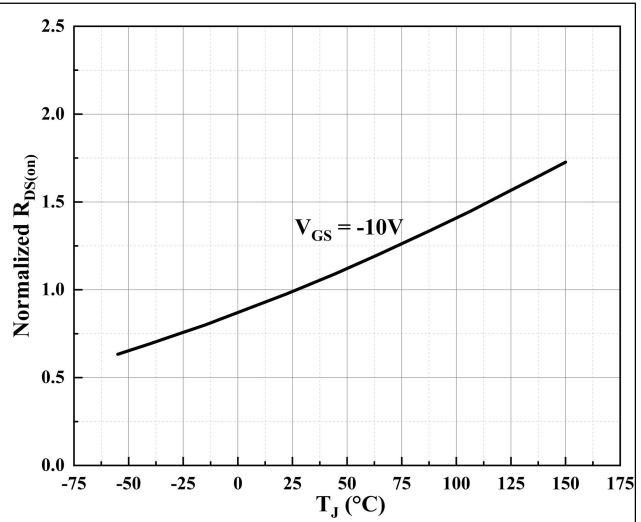


Figure 8. Normalized Static Drain-Source On-Resistance vs. Junction Temperature

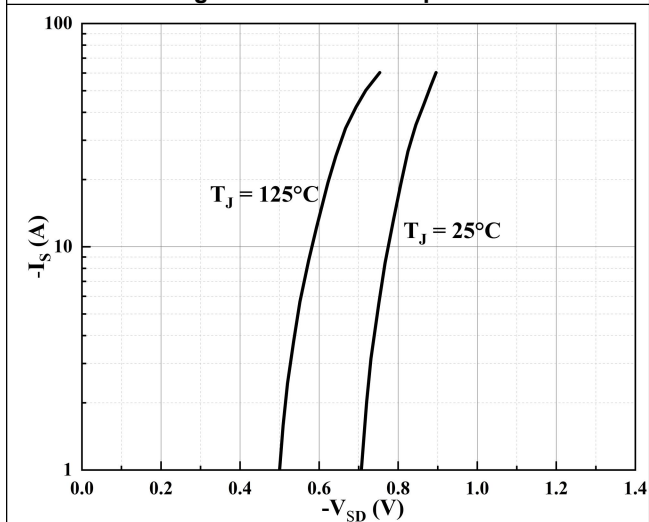


Figure 9. Body Diode Characteristics

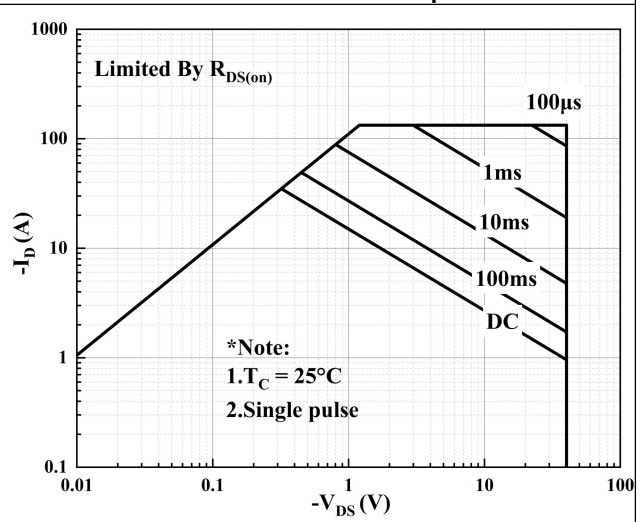


Figure 10. Maximum Safe Operating Area

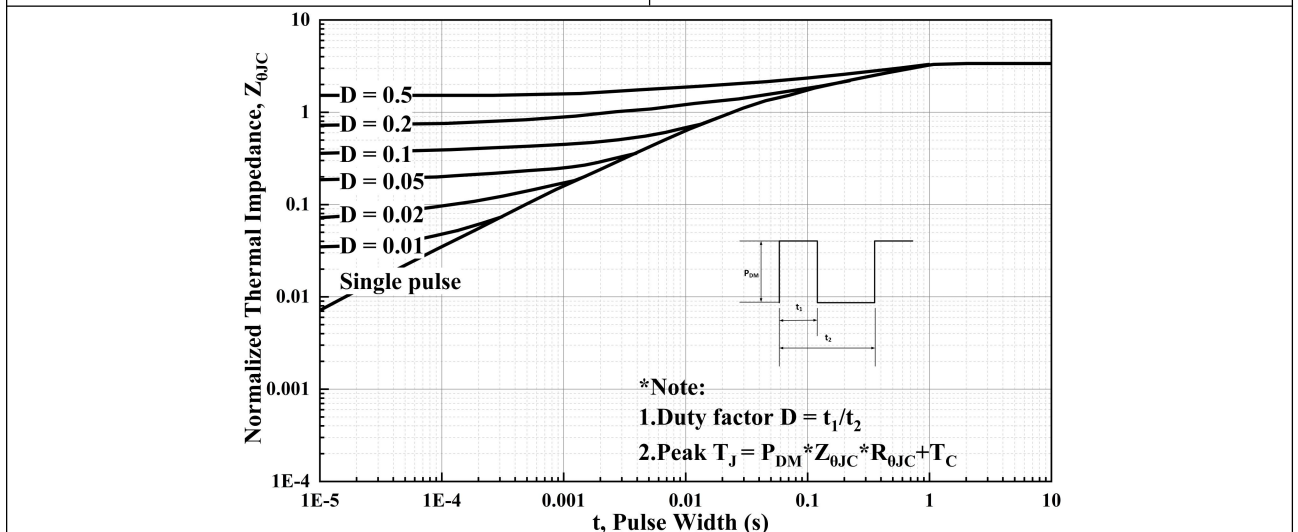
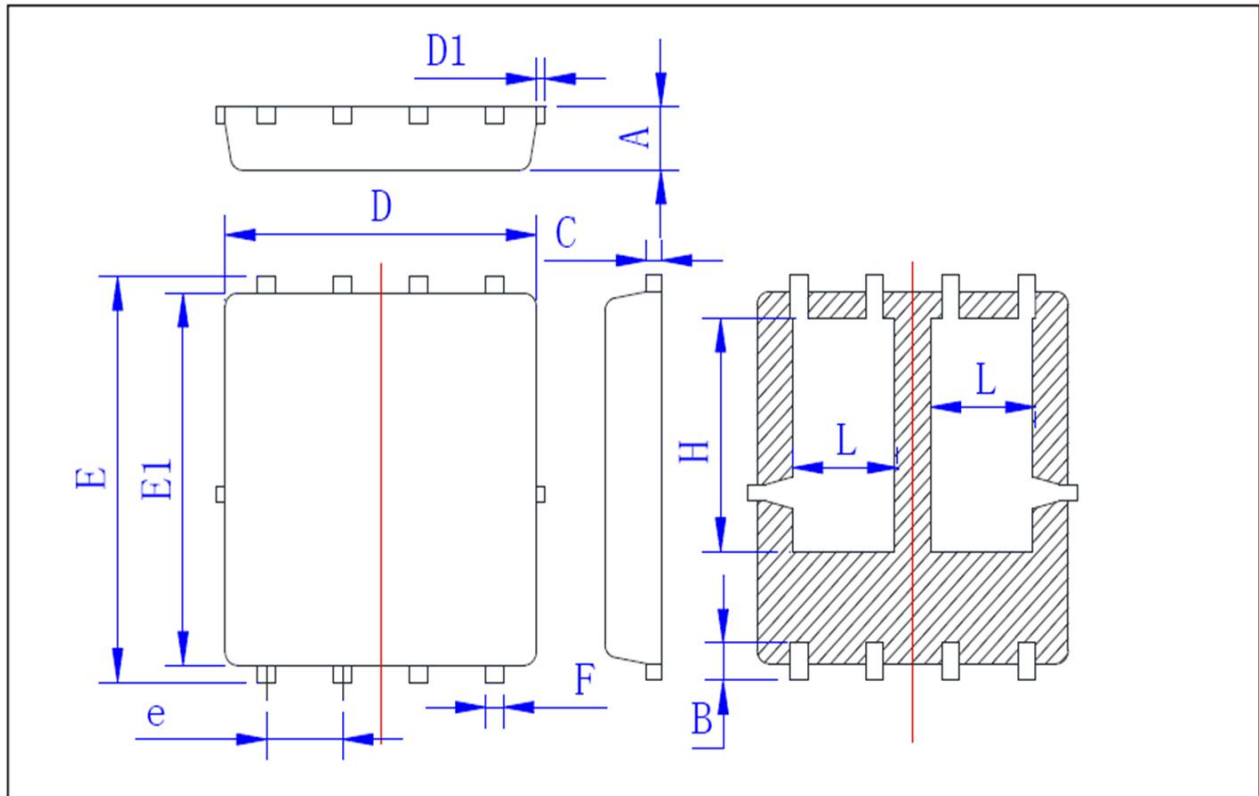


Figure 11. Normalized Thermal Impedance vs. Junction Temperature

■ Package Information

PDFN5*6 双基岛



Symbol	Min	Typ	Max
A	0.90	0.95	1.00
B	0.48	0.58	0.68
C	0.20	0.254	0.30
D	5.00	5.20	5.40
D1	5.10	5.20	0.15
E	5.90	6.05	6.20
E1			0.15
e	1.22	1.27	1.32
F	0.25	0.30	0.35
H	3.27	3.47	3.67
L	1.50	1.70	1.90