- ★ Super Low Gate Charge
- ★ 100% EAS Guaranteed
- ★ Green Device Available
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology

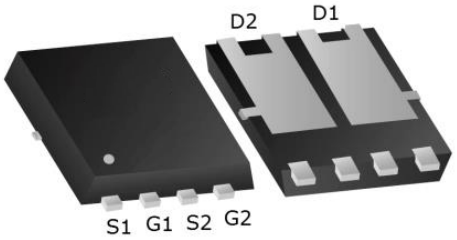
Description

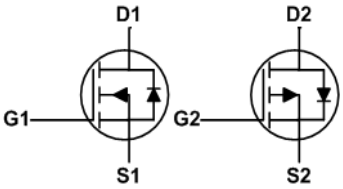
The UD60G25F is the high performance complementary N-ch and P-ch MOSFETs with high cell density, whichprovide excellent RDSON and gate charge for most of the synchronous buck converter applications . The UD60G25F meet the RoHS and Green Product requirement 100% EAS guaranteed with full function reliability approved.

Product Summary

BVDSS	RDSON	ID
60V	23mΩ	25A
-60V	35mΩ	-25A

PDFN5060-8L Pin Configuration





Absolute Maximum Ratings (T_C=25℃ unless otherwise specified)

Symbol	Parameter		Max. N-Channel	Max. P-Channel	Units
V_{DSS}	Drain-Source Voltage		60	60	V
V_{GSS}	Gate-Source Voltage		±30	±20	V
I_D	Continuous Drain Current	T_C = 25℃	25	-25	A
		T_C = 100℃	13	-13	A
I_{DM}	Pulsed Drain Current note1		100	-100	A
E_{AS}	Single Pulsed Avalanche Energy note2		39	90	mJ
P_D	Power Dissipation	T_C = 25℃	41.7	89	W
$R_{\theta JA}$	Thermal Resistance, Junction to Case		50	47	℃/W
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to +150		℃

N-Channel Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Parameter		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics							
Drain-Source Breakdown Voltage		$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	60	-	-	V
Gate-Body Leakage Current		I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
Zero Gate Voltage Drain Current	T_J=25℃	I_{DSS}	V_{DS} = 60V, V_{GS} = 0V	-	-	1	μA
	T_J=100℃			-	-	100	
Gate-Threshold Voltage		$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1.2	1.7	2.5	V
Drain-Source on-Resistance[4]		$R_{DS(on)}$	V_{GS} = 10V, I_D = 10A	-	23	32	mΩ
			V_{GS} = 4.5V, I_D = 5A	-	31.5	40	
Forward Transconductance[4]		g_{fs}	V_{DS} = 5V, I_D = 10A	-	15.5	-	S
Dynamic Characteristics[5]							
Input Capacitance		C_{iss}	V_{DS} = 30V, V_{GS} =0V, f =1MHz	-	1355	-	pF
Output Capacitance		C_{oss}		-	60	-	
Reverse Transfer Capacitance		C_{rss}		-	49	-	
Gate Resistance		R_G	f =1MHz	-	1.2	-	Ω
Switching Characteristics[5]							
Total Gate Charge		Q_g	V_{GS} = 10V, V_{DD} = 30V, I_D= 10A	-	22	-	nC
Gate-Source Charge		Q_{gs}		-	4.2	-	
Gate-Drain Charge		Q_{gd}		-	6.9	-	
Turn-on Delay Time		$t_{d(on)}$	V_{GS} =10V, V_{DD} = 30V, R_G = 3Ω, I_D= 10A	-	6.4	-	ns
Rise Time		t_r		-	15.3	-	
Turn-off Delay Time		$t_{d(off)}$		-	25	-	
Fall Time		t_f		-	7.6	-	
Body Diode Reverse Recovery Time		t_{rr}	I_F=10A, dI_F/dt=100A/μs	-	26	-	ns
Body Diode Reverse Recovery Charge		Q_{rr}		-	45	-	nC
Drain-Source Body Diode Characteristics							
Diode Forward Voltage[4]		V_{SD}	I_S = 10A, V_{GS} = 0V	-	-	1.2	V
Continuous Source Current	T_C=25℃	I_S	-	-	-	25	A

Notes:

1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C
2. The EAS data shows Max. rating . The test condition is V_{DD}=25V, V_{GS}=10V, L=0.4mH, I_{AS}=14A
3. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
4. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
5. This value is guaranteed by design hence it is not included in the production test.

P-Channel Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Parameter		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics							
Drain-Source Breakdown Voltage		$V_{(BR)DSS}$	V_{GS} = 0V, I_D = -250μA	-60	-	-	V
Gate-Body Leakage Current		I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
Zero Gate Voltage Drain Current	T_J=25℃	I_{DSS}	V_{DS} = -60V, V_{GS} = 0V	-	-	1	μA
	T_J=100℃			-	-	100	
Gate-Threshold Voltage		$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	-1.2	-1.7	-2.5	V
Drain-Source on-Resistance[4]		$R_{DS(on)}$	V_{GS} = -10V, I_D = -20A	-	35	46	mΩ
			V_{GS} = -4.5V, I_D = -10A	-	42	53	
Forward Transconductance[4]		g_{fs}	V_{DS} = 5V, I_D = 10A	-	-	-	S
Dynamic Characteristics[5]							
Input Capacitance		C_{iss}	V_{DS} = -30V, V_{GS} =0V, f =1MHz	-	862	-	pF
Output Capacitance		C_{oss}		-	163	-	
Reverse Transfer Capacitance		C_{rss}		-	8	-	
Gate Resistance		R_G	f =1MHz	-	13	-	Ω
Switching Characteristics[5]							
Total Gate Charge		Q_g	V_{GS} =-10V, V_{DD} =-30V, I_D= -10A	-	13.4	-	nC
Gate-Source Charge		Q_{gs}		-	3.35	-	
Gate-Drain Charge		Q_{gd}		-	1.82	-	
Turn-on Delay Time		$t_{d(on)}$	V_{GS} =-10V, V_{DD} = -30V, R_G = 5Ω, I_D= -10A	-	10	-	ns
Rise Time		t_r		-	6	-	
Turn-off Delay Time		$t_{d(off)}$		-	23	-	
Fall Time		t_f		-	11	-	
Body Diode Reverse Recovery Time		t_{rr}	I_F=-10A, dI_F/dt=100A/μs	-	18	-	ns
Body Diode Reverse Recovery Charge		Q_{rr}		-	27	-	nC
Drain-Source Body Diode Characteristics							
Diode Forward Voltage[4]		V_{SD}	I_S = 10A, V_{GS} = 0V	-	-	-1.2	V
Continuous Source Current	T_C=25℃	I_S	-	-	-	-25	A

Notes:

1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C
2. The EAS data shows Max. rating . The test condition is V_{DD}=-25V, V_{GS}=-10V, L=0.4mH, I_{AS}=-14A
3. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
4. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
5. This value is guaranteed by design hence it is not included in the production test.

N-Channel Typical Characteristics

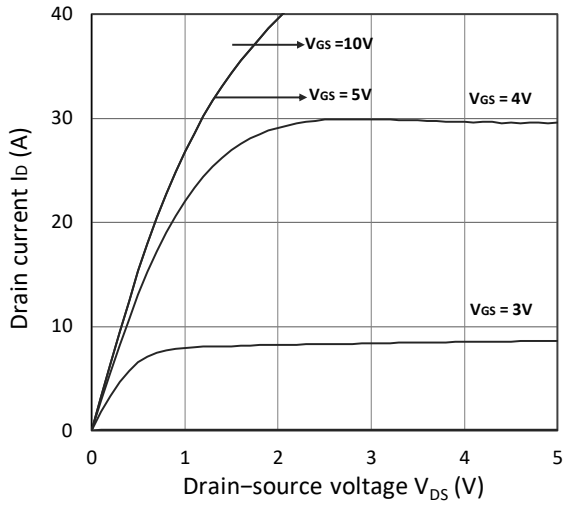


Figure 1. Output Characteristics

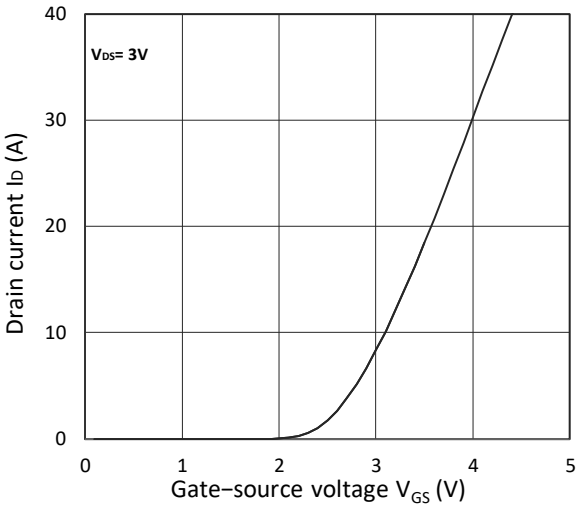


Figure 2. Transfer Characteristics

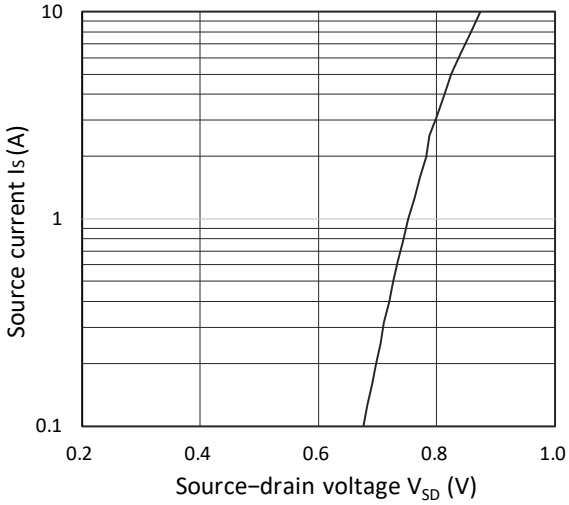


Figure 3. Forward Characteristics of Reverse

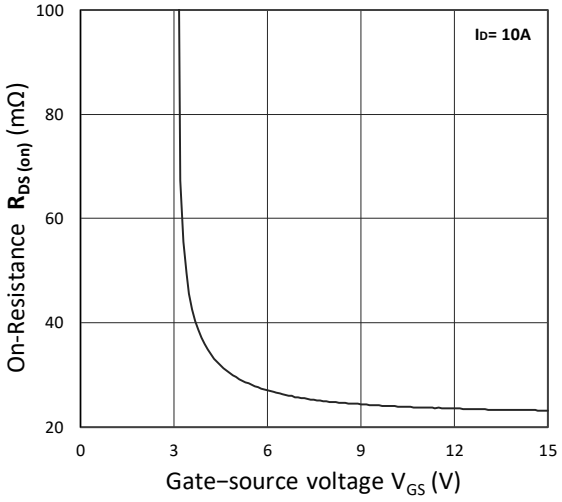


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

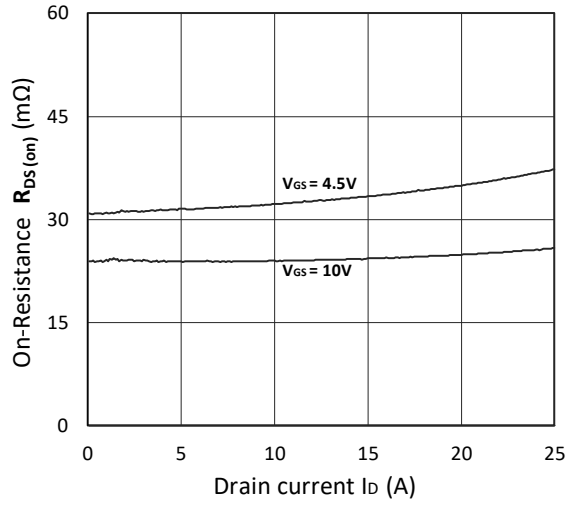


Figure 5. $R_{DS(ON)}$ vs. I_D

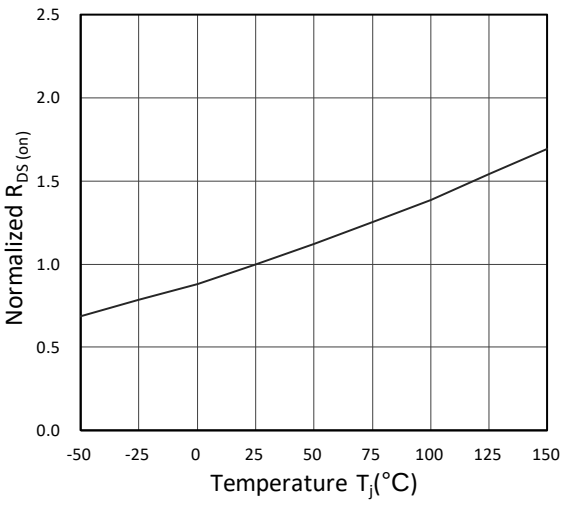


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

N-Channel Typical Characteristics

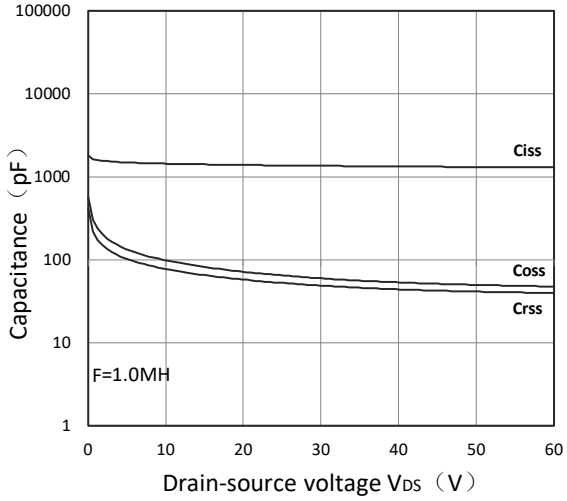


Figure 7. Capacitance Characteristics

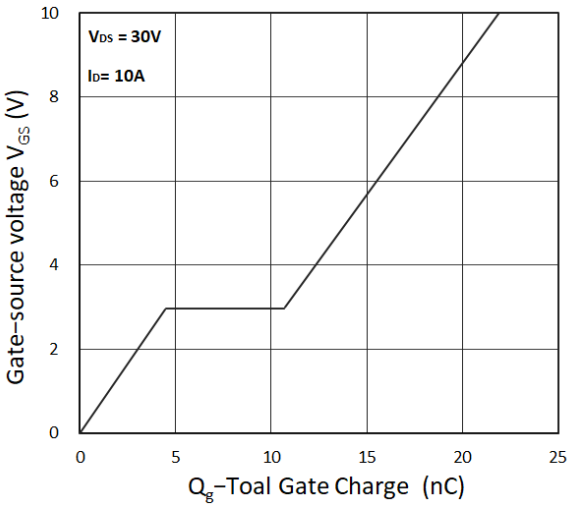


Figure 8. Gate Charge Characteristics

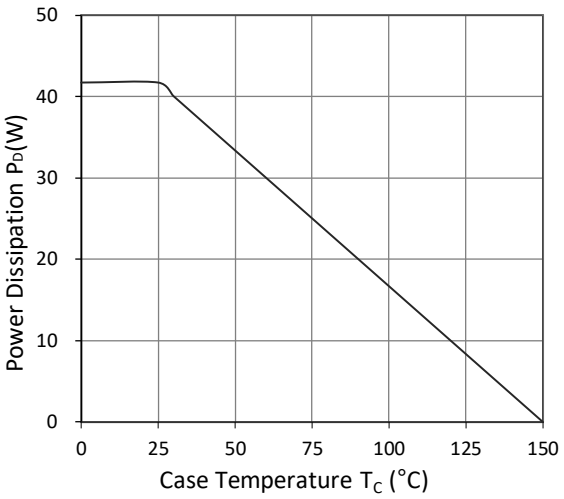


Figure 9. Power Dissipation

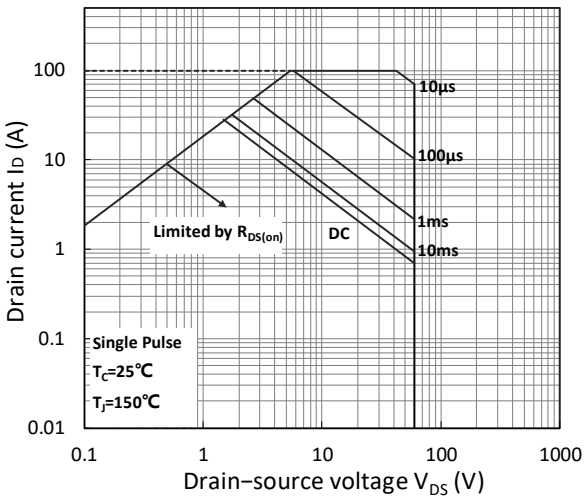


Figure10. Safe Operating Area

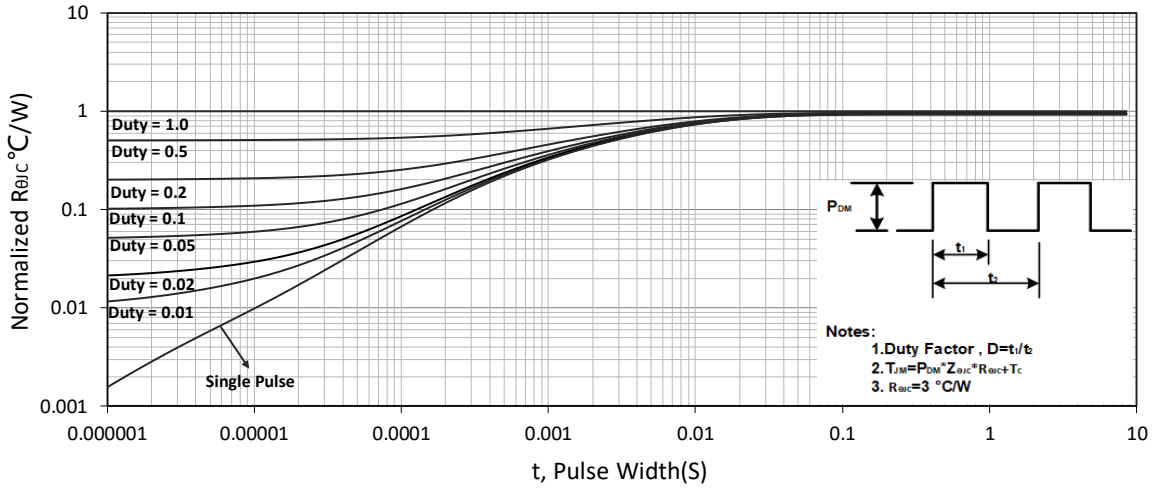
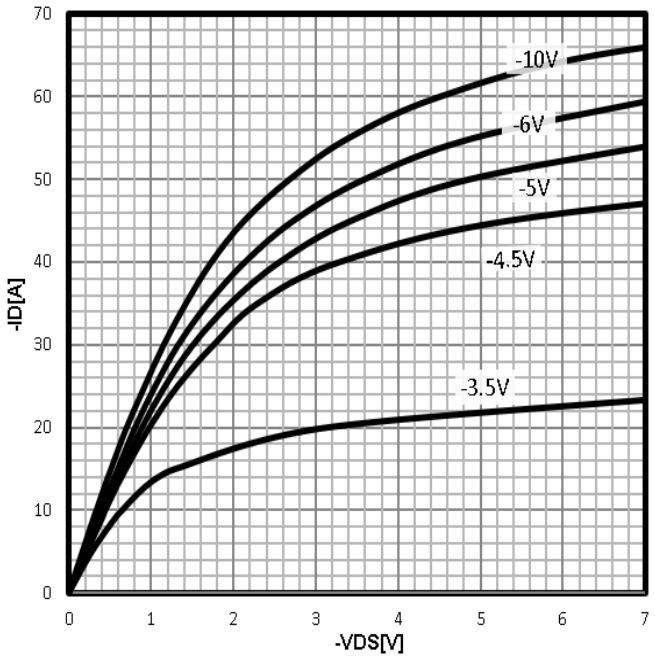


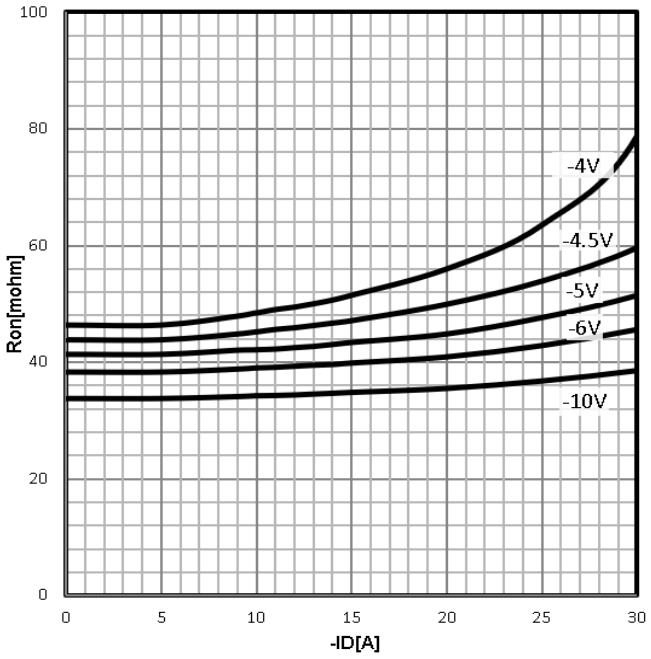
Figure 11. Normalized Maximum Transient Thermal Impedance

P-Channel Typical Characteristics

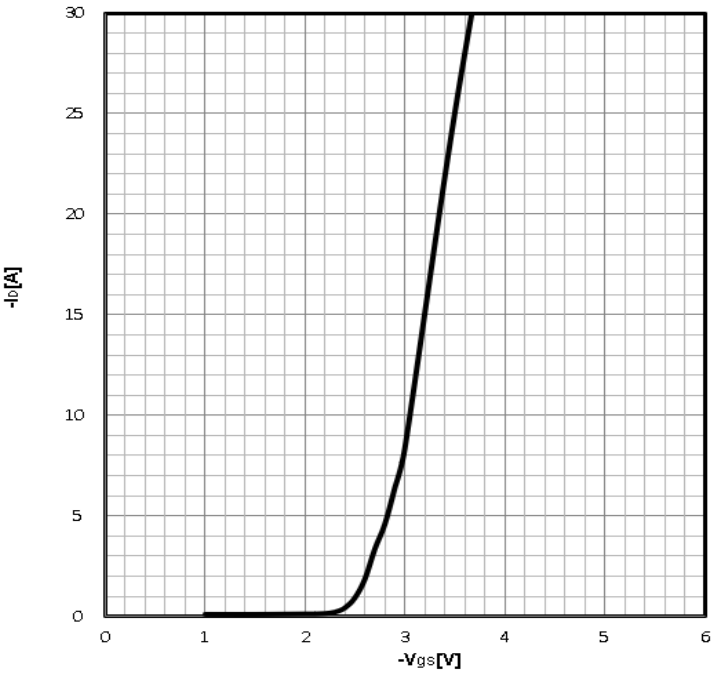
Typ. output characteristics
$-I_D=f(-V_{DS})$



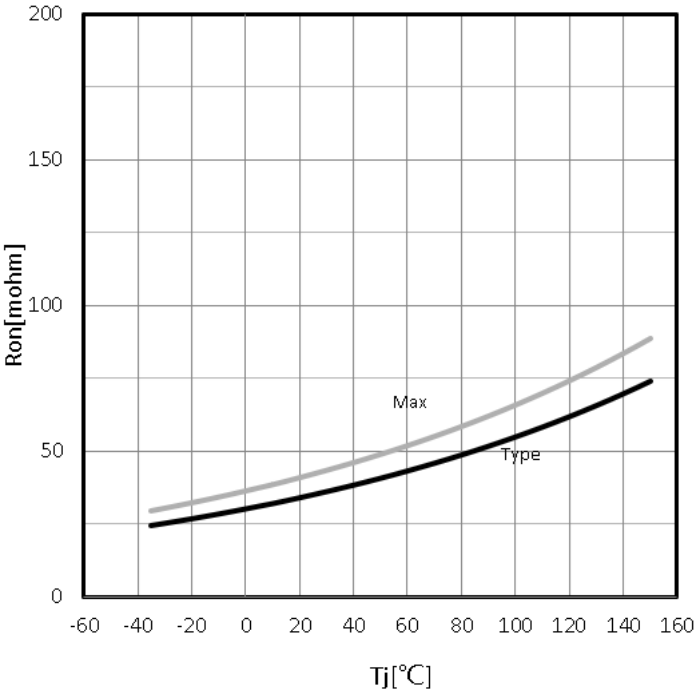
Typ. drain-source on resistance
$R_{DS(on)}=f(-I_D)$



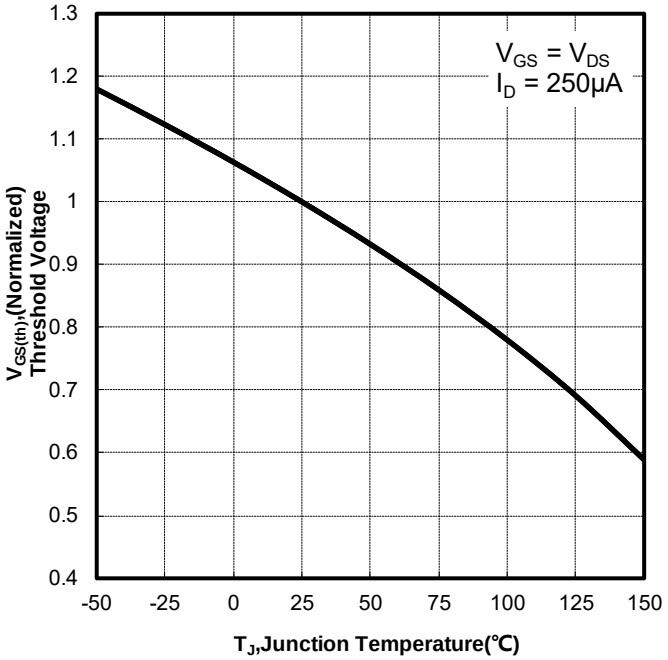
Typ. transfer characteristics
$-I_D=f(-V_{GS})$



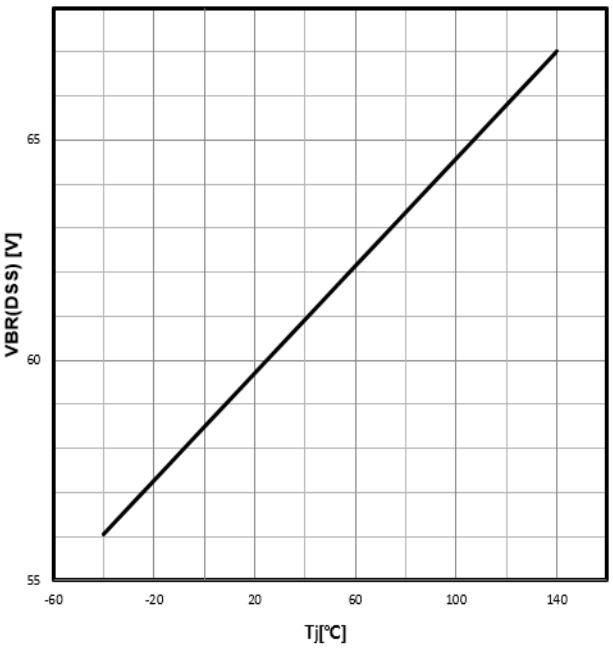
Drain-source on-state resistance
$R_{DS(on)}= f(T_j)$; I_D=-20A; V_{GS}=-10V



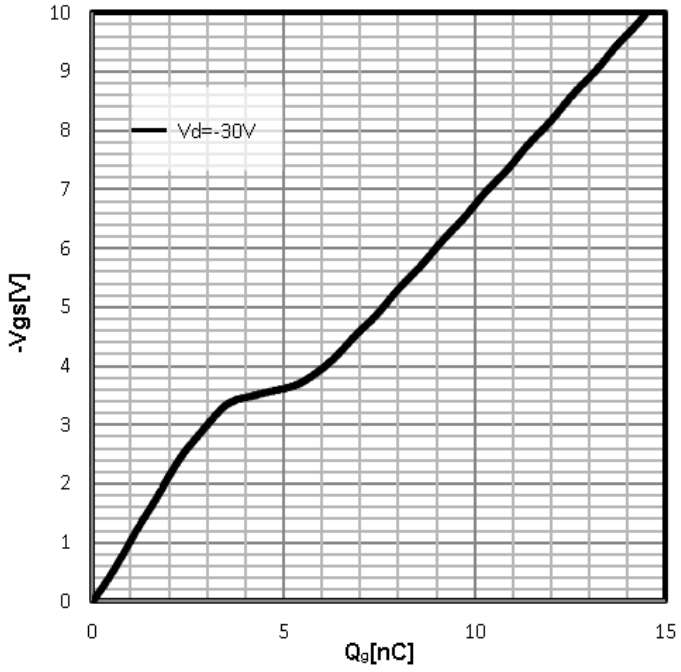
Gate Threshold Voltage
$-V_{TH}=f(T_j)$; I_D=-250uA



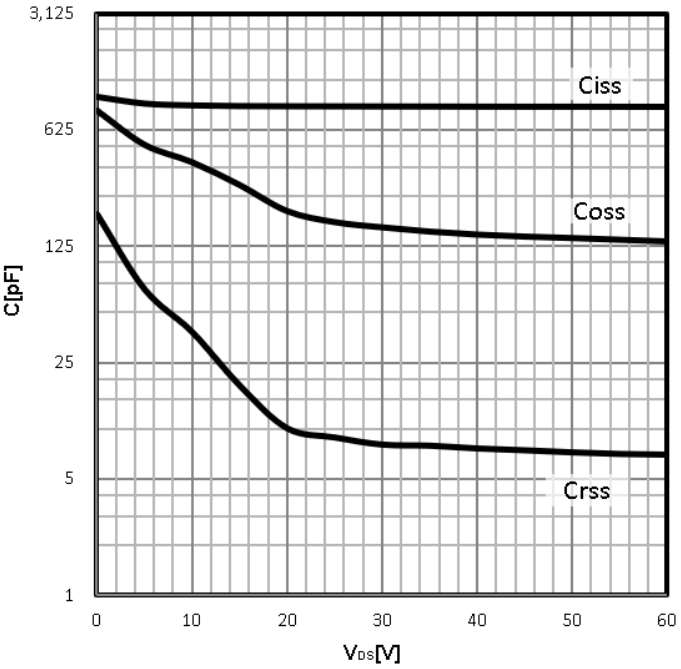
Drain-source breakdown voltage
$-V_{BR(DSS)}=f(T_j)$; I_D=-250uA



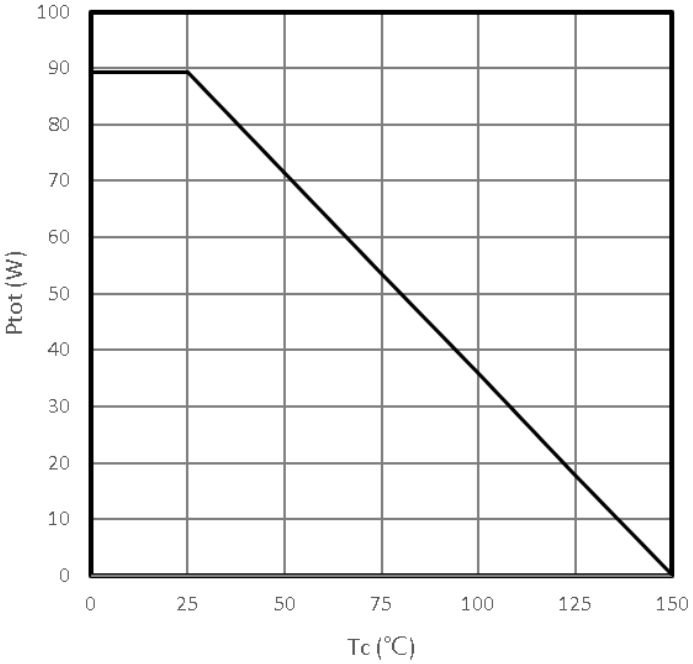
Typ. gate charge
$-V_{GS}=f(Q_g)$; I_D=-20A



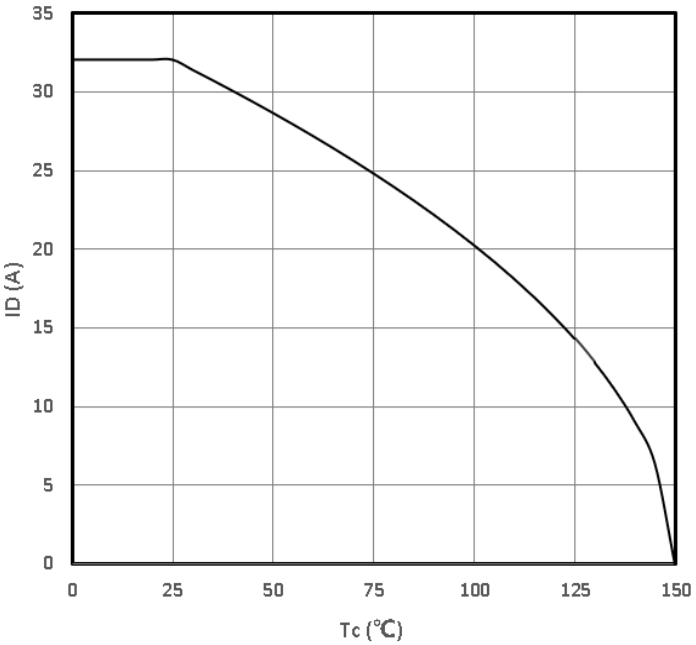
Typ. capacitances
C =f(-V_{DS}); V_{GS}=0V; f =1MHz



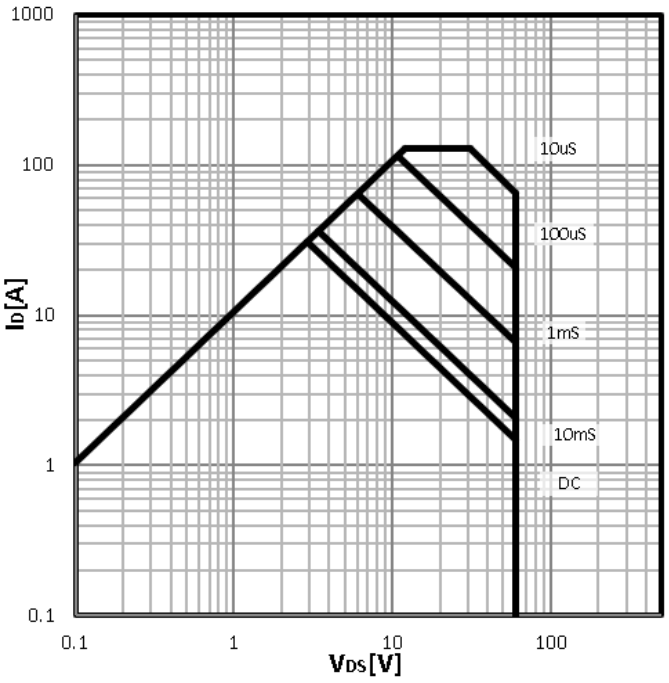
Power Dissipation
$P_{tot}=f(T_C)$



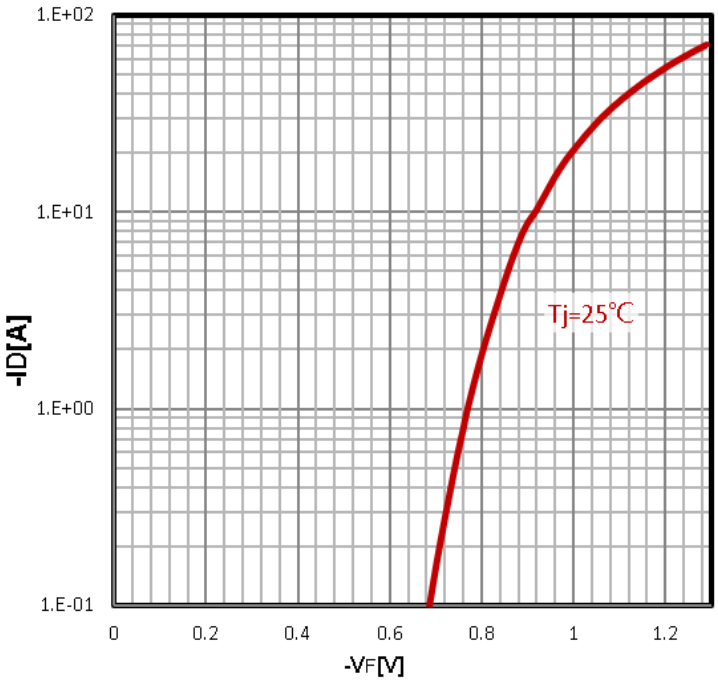
Maximum Drain Current
$-I_D=f(T_C)$



Safe operating area
$-I_D=f(-V_{DS})$

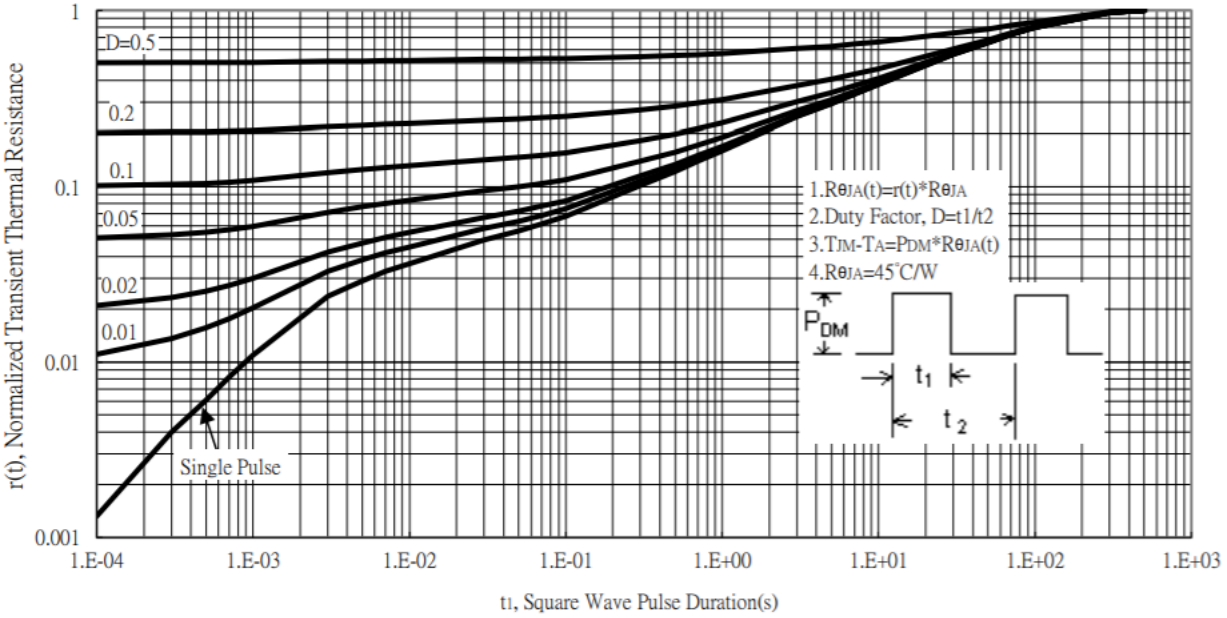


Body Diode Forward Voltage Variation
$-I_F=f(-V_{DS})$

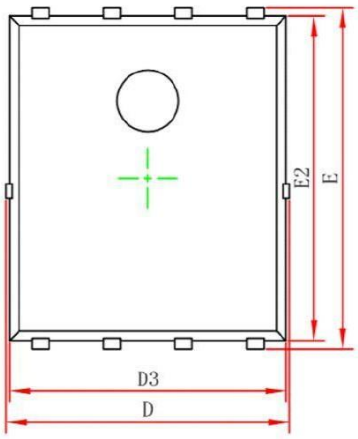


Max. transient thermal impedance

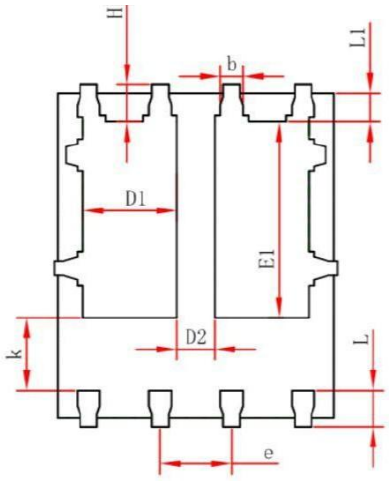
$Z_{thJC}=f(t_p)$



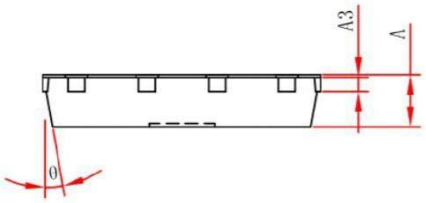
Package Mechanical Data- PDFN5X6-8L



Top View



Bottom View



Side View

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039
A3	0.154REF.		0.006REF.	
D	4.944	5.096	0.195	0.201
E	5.974	6.126	0.235	0.241
D1	1.470	1.870	0.058	0.074
D2	0.470	0.870	0.019	0.034
E1	3.375	3.575	0.133	0.141
D3	4.824	4.976	0.190	0.196
E2	5.674	5.826	0.223	0.229
k	1.190	1.390	0.047	0.055
b	0.350	0.450	0.014	0.018
e	1.270TYP.		0.050TYP.	
L	0.559	0.711	0.022	0.028
L1	0.424	0.576	0.017	0.023
H	0.574	0.726	0.023	0.029
θ	10°	12°	10°	12°