N-Channel and P-Channel 30V(D-S) MOSFET

Product summary			
V_{DS}	30	-30	V
$R_{DS(ON)}$(at V_{GS}=10V) Typ.	6.5	9	mΩ
$R_{DS(ON)}$(at V_{GS}=4.5V) Typ.	10	15	mΩ
I_D(T_A=25℃)	40	-40	A

Features

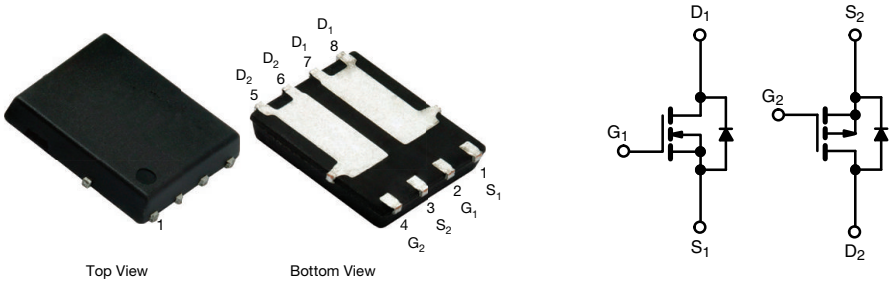
- Excellent package for heat dissipation
- Trench Power LV MOSFET technology

Applications

- Power management functions
- Load switch

Pin Configuration

PDFN5X6 8L



Packing Information

Device	Package	Reel Size	Quantity(Min. Package)
ECAP40C03B	PDFN5X6-8L	13″	5000pcs

Absolute Maximum Ratings (at T_A=25℃ Unless Otherwise Noted)

Symbol	Parameter		N-Rating	P-Rating	Units
V_{DS}	Drain-Source Voltage		30	-30	V
V_{GS}	Gate-Source Voltage		±20	±20	V
I_D	Continuous Drain Current [A]	T_A=25℃ [A]	11	-11	A
		T_A=70℃ [A]	8.8	-8.8	
		T_C=25℃	40	-40	
		T_C=70℃	32	-32	
I_{DM}	Pulse Drain Current Tested [B]		140	-160	A
E_{AS}	Single Pulse Avalanche Energy [C]		56	90	mJ
P_D	Power Dissipation [A]	T_A=25℃	2.5	2.5	W
	Power Dissipation [D]	T_C=25℃	50	54	
T_J,T_{STG}	Junciton and Storage Temperature Range		-55 to +150	-55 to +150	℃

Thermal Characteristics

Symbol	Parameter	NMOS	PMOS	Units
$R_{\theta JA}$	Thermal Resistance-Junction to ambient [A]	50	50	℃/W
$R_{\theta JC}$	Thermal Resistance-Junction to Case	2.5	2.3	℃/W

N-Channel Electrical Characteristics (at T_J =25℃ Unless Otherwise Noted)

Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
Static Parameters						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V,I_D=250uA	30	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=30V,V_{GS}=0V	--	--	1	uA
I_{GSS}	Gate-Body Leakage Current	V_{DS}=0V,V_{GS}=±20V	--	--	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250uA	1.0	1.5	2.5	V
$R_{DS(ON)}$	Drain-Source On-State Resistance [E]	V_{GS}=10V,I_D=20A	--	6.5	8.5	mΩ
		V_{GS}=4.5V,I_D=10A	--	10	14	mΩ
V_{SD}	Diode Forward Voltage	I_S=20A,V_{GS}=0V	--	--	1.2	V
I_S	Maximum Body-Diode Continuous Current		--	--	40	A
Dynamic Parameters [F]						
C_{iss}	Input Capacitance	V_{GS}=0V,V_{DS}=15V f=1MHZ	--	1050	--	pF
C_{oss}	Output Capacitance		--	180	--	pF
C_{rss}	Reverse Transfer Capacitance		--	160	--	pF
Q_g	Total Gate Charge	V_{DS}=15V,I_D=20A V_{GS}=10V	--	23.6	--	nC
Q_{gs}	Gate-Source Charge		--	3.9	--	nC
Q_{gd}	Gate-Drain Charge		--	7	--	nC
$t_{D(on)}$	Turn-on Delay Time	V_{DD}=15V I_D=20A,R_{Gen}=2.2Ω, V_{GS}=10V	--	7	--	ns
t_r	Turn-on Rise Time		--	19	--	ns
$t_{D(off)}$	Turn-off Delay Time		--	24	--	ns
t_f	Turn-off Fall Time		--	24	--	ns
t_{rr}	Reverse recovery time	I_F=20A, di/dt=100 A/uS	--	5	--	ns
Q_{rr}	Reverse recovery charge		--	0.2	--	nC

A. The data tested by surface mounted on a 1 inch x 1 inch FR-4 board with 2OZ copper.in the still air environment with TA =25℃.The maximum allowed junction temperature of 150℃. The value in any given application depends on the user's specific board design.

B. Repetitive rating: pulse width limited by max. junction temperature.

C. NMOS: TJ=25℃, V_{DD}=25V, V_G=10V, R_G=25Ω, L=0.5mH, I_{AS}=15A.

PMOS: TJ=25℃, V_{DD}=-25V, V_G=-10V, R_G=25Ω, L=0.5mH, I_{AS}=-19A.

D. P_D is based on max. junction temperature, using junction-case thermal resistance.

E. Pulse Test: Pulse Width≤300us,Duty cycle ≤2%.

F. Guaranteed by design, not subject to production testing.

P-Channel Electrical Characteristics (at T_J =25℃ Unless Otherwise Noted)

Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
Static Parameters						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V,I_D=-250uA	-30	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-30V,V_{GS}=0V	--	--	-1	uA
I_{GSS}	Gate-Body Leakage Current	V_{DS}=0V,V_{GS}=±20V	--	--	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=-250uA	-1.2	-1.8	-2.6	V
$R_{DS(ON)}$	Drain-Source On-State Resistance [E]	V_{GS}=-10V,I_D=-20A	--	9	12	mΩ
		V_{GS}=-4.5V,I_D=-10A	--	15	20	mΩ
V_{SD}	Diode Forward Voltage	I_S=-20A,V_{GS}=0V	--	--	-1.2	V
I_{SM}	Maximum Body-Diode Continuous Current		--	--	-40	A
Dynamic Parameters [F]						
C_{iss}	Input Capacitance	V_{GS}=0V,V_{DS}=-15V f=1MHZ	--	1860	--	pF
C_{oss}	Output Capacitance		--	310	--	pF
C_{rss}	Reverse Transfer Capacitance		--	280	--	pF
Q_g	Total Gate Charge	V_{DS}=-15V,I_D=-20A V_{GS}=-10V	--	38	--	nC
Q_{gs}	Gate-Source Charge		--	6	--	nC
Q_{gd}	Gate-Drain Charge		--	10	--	nC
$t_{D(on)}$	Turn-on Delay Time	V_{DD}=-15V I_D=-20A, R_{GEN}=2.2Ω, V_{GS}=-10V	--	8	--	ns
t_r	Turn-on Rise Time		--	6	--	ns
$t_{D(off)}$	Turn-off Delay Time		--	108	--	ns
t_f	Turn-off Fall Time		--	69	--	ns

E. Pulse Test: Pulse Width≤300us,Duty cycle ≤2%.

F. Guaranteed by design, not subject to production testing.

N-Channel Typical Characteristics

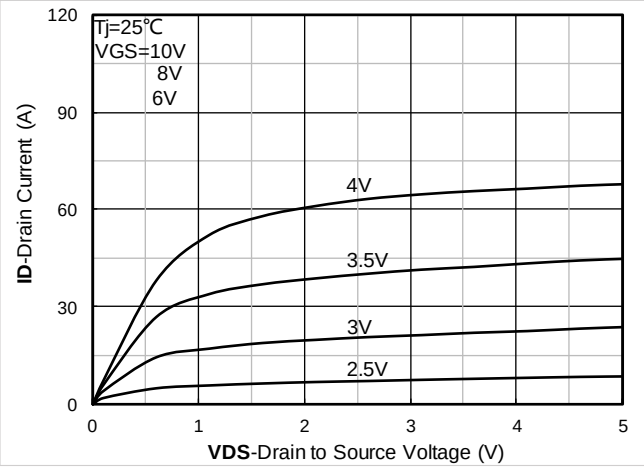


Figure 1. Output Characteristics

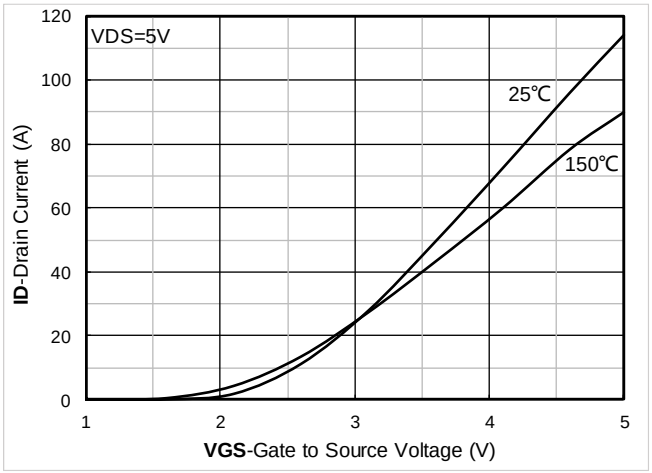


Figure 2. Transfer Characteristics

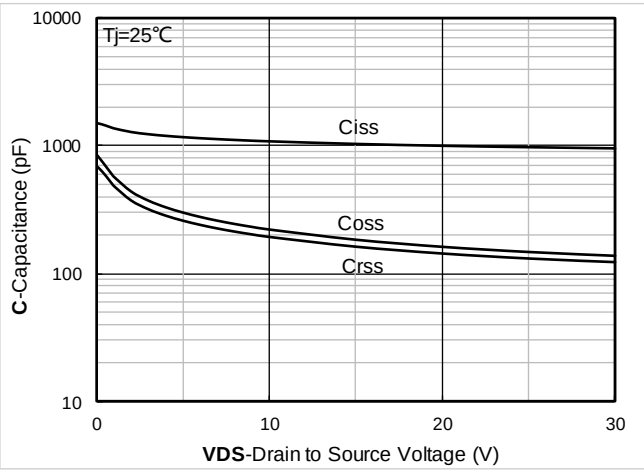


Figure 3. Capacitance Characteristics

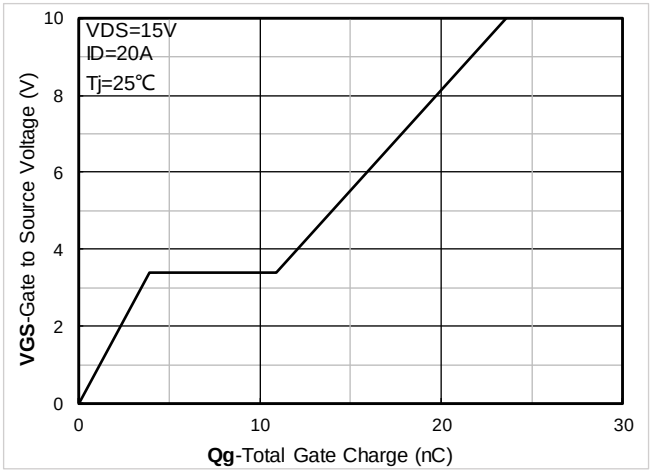


Figure 4. Gate Charge

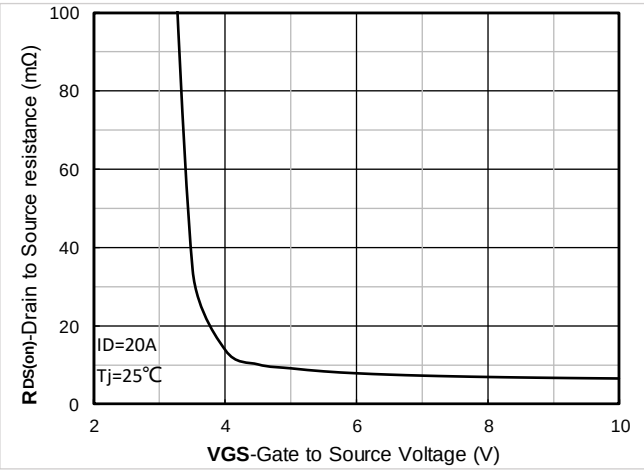


Figure 5. On-Resistance vs Gate to Source Voltage

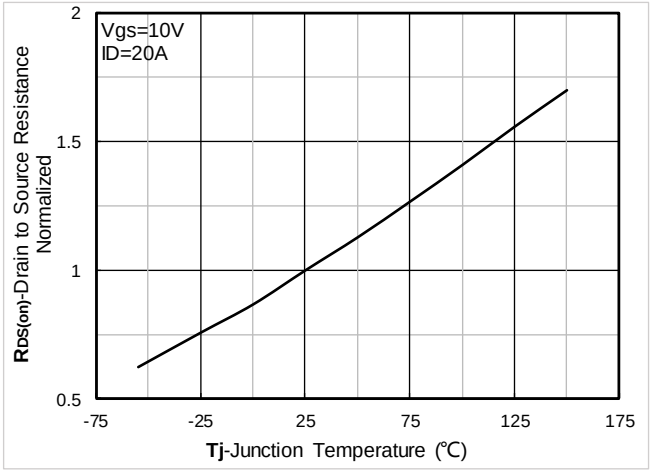


Figure 6. Normalized On-Resistance

N-Channel Typical Characteristics

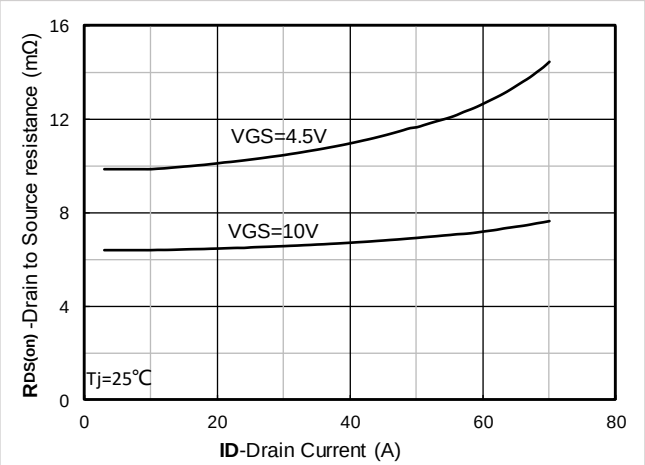


Figure 7. $R_{DS(on)}$ VS Drain Current

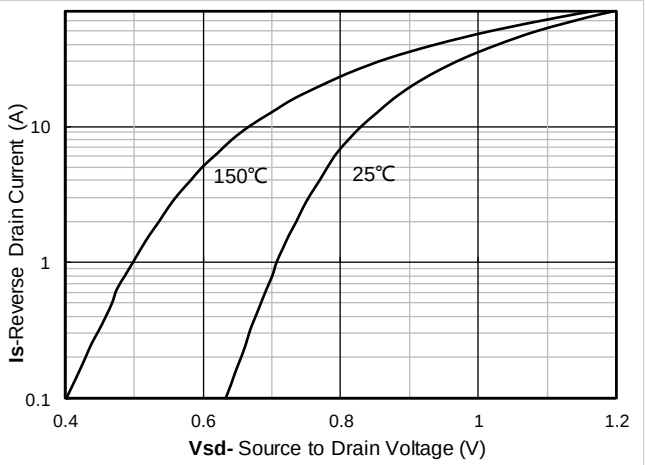


Figure 8. Forward characteristics of reverse diode

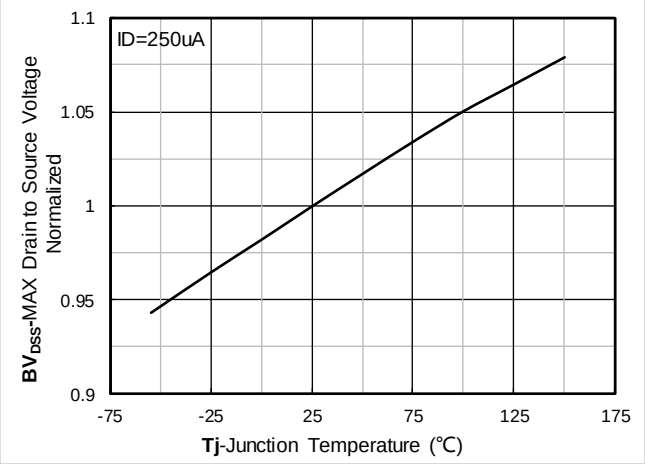


Figure 9. Normalized breakdown voltage

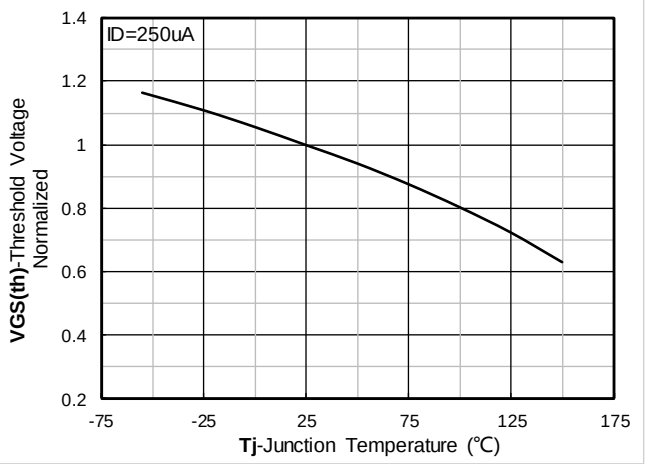


Figure 10. Normalized Threshold voltage

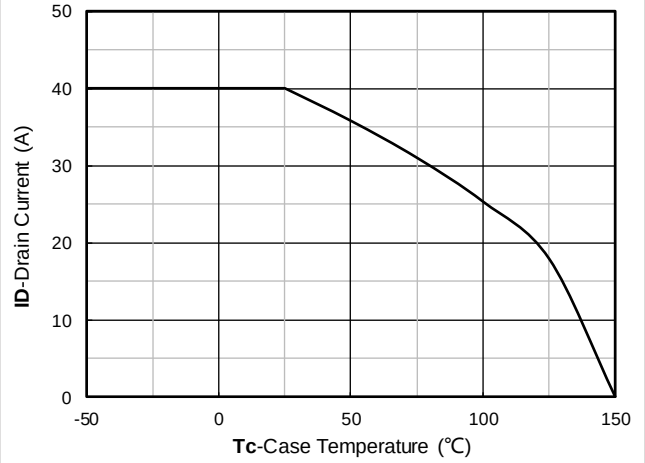


Figure 11. Current dissipation

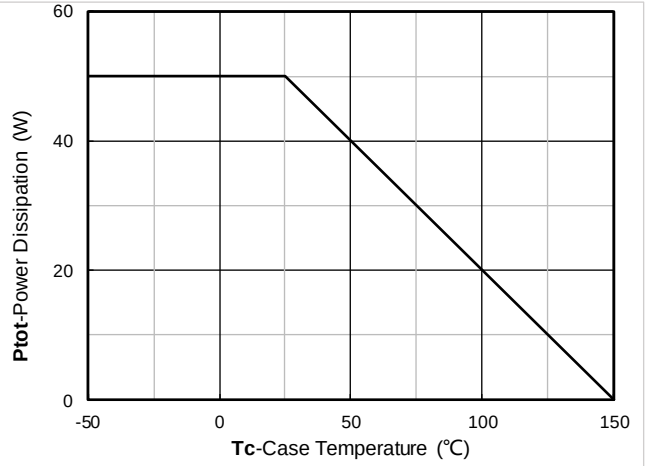


Figure 12. Power dissipation

N-Channel Typical Characteristics

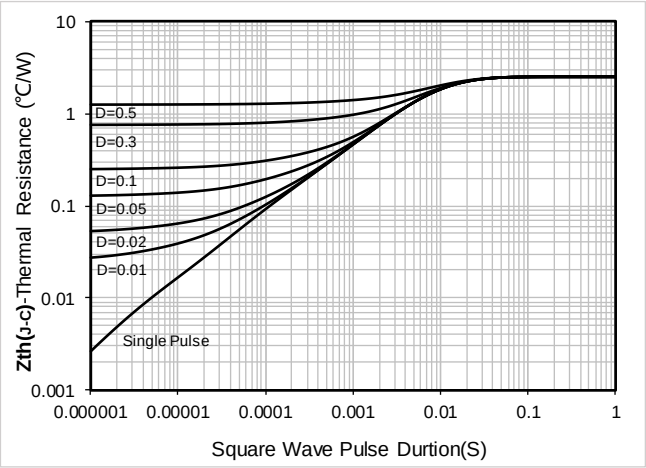


Figure 13. Maximum Transient Thermal Impedance

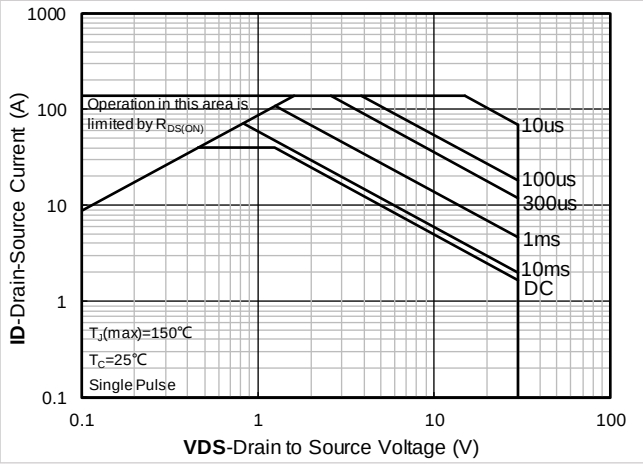


Figure 14. Safe Operation Area

P-Channel Typical Characteristics

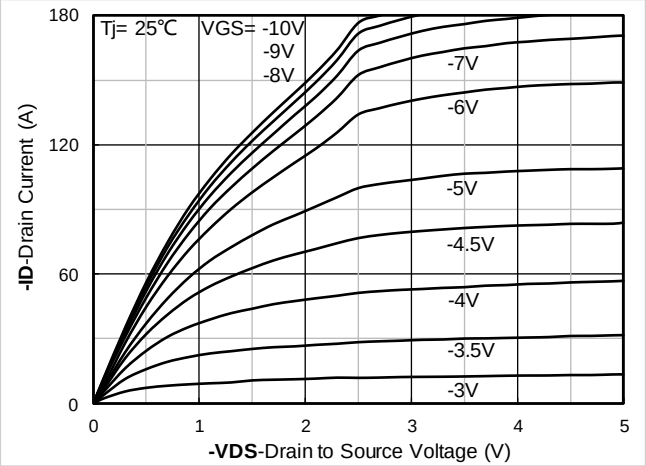


Figure 1. Output Characteristics

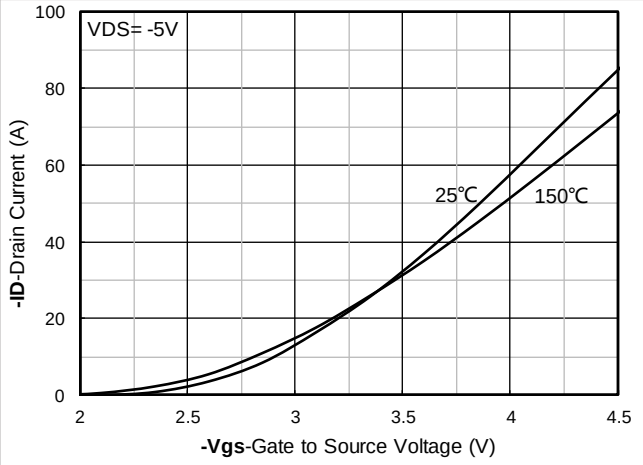


Figure 2. Transfer Characteristics

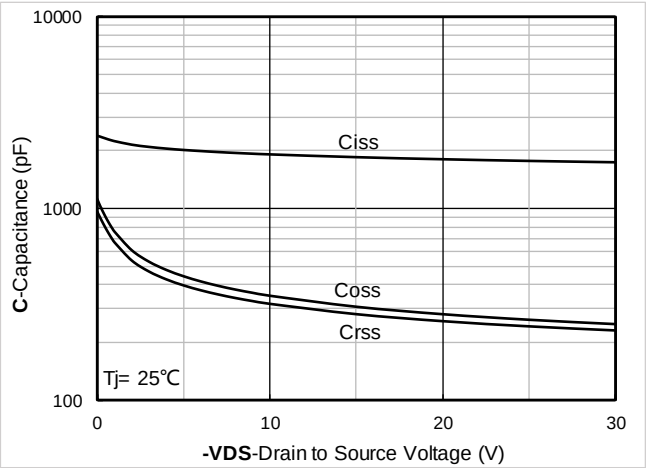


Figure 3. Capacitance Characteristics

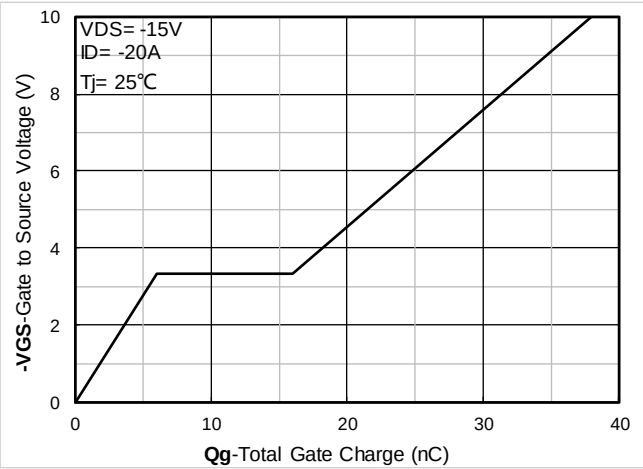


Figure 4. Gate Charge

P-Channel Typical Characteristics

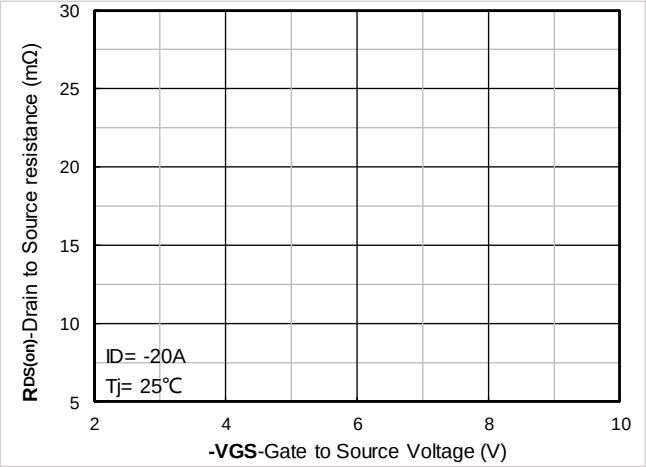


Figure 5. On-Resistance vs Gate to Source Voltage

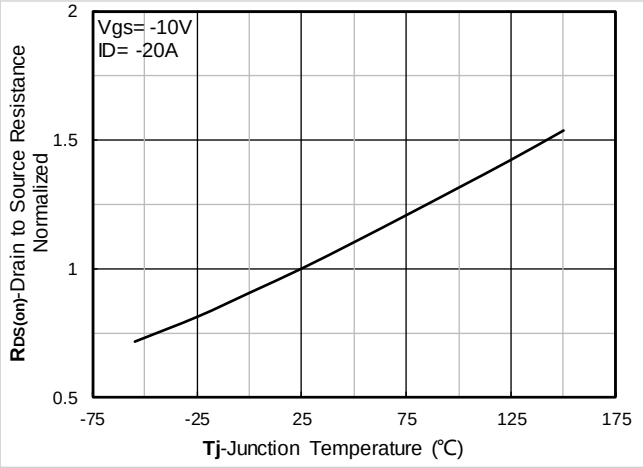


Figure 6. Normalized On-Resistance

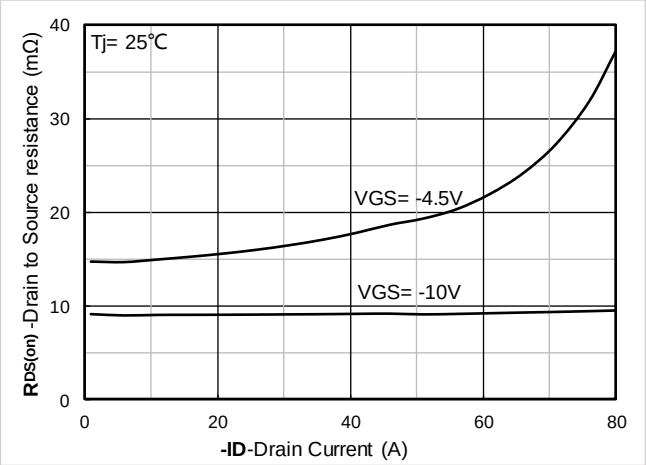


Figure 7. $R_{DS(on)}$ VS Drain Current

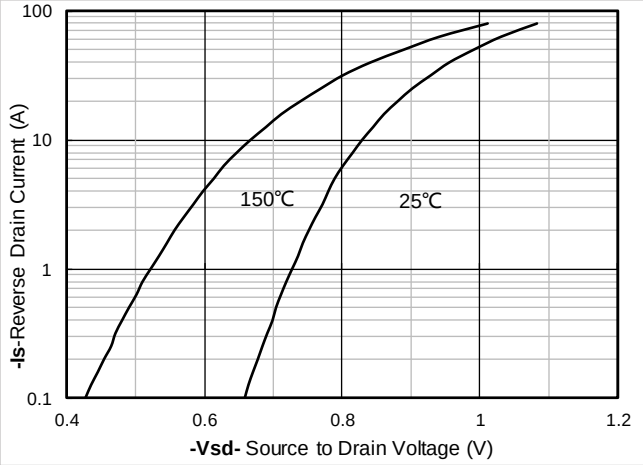


Figure 8. Forward characteristics of reverse diode

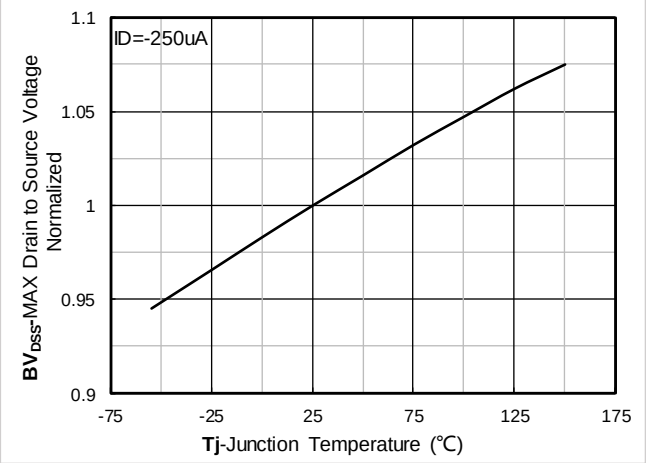


Figure 9. Normalized breakdown voltage

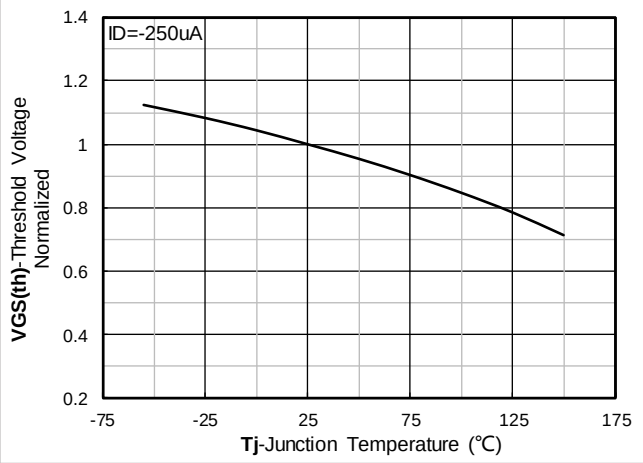


Figure 10. Normalized Threshold voltage

P-Channel Typical Characteristics

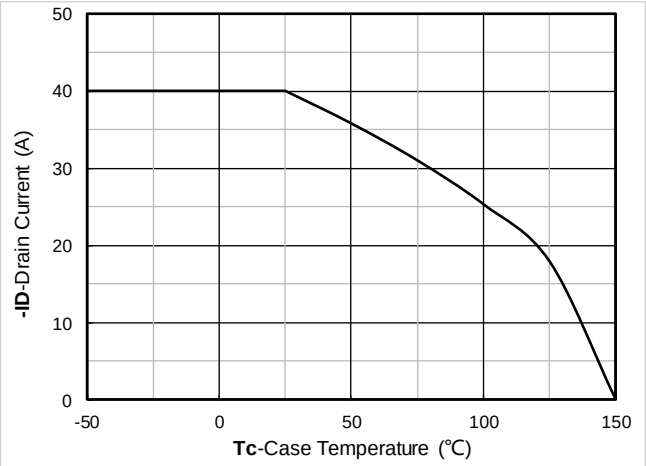


Figure 11. Current dissipation

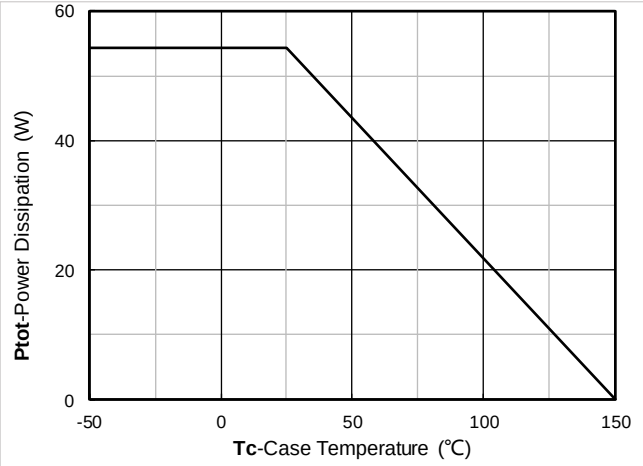


Figure 12. Power dissipation

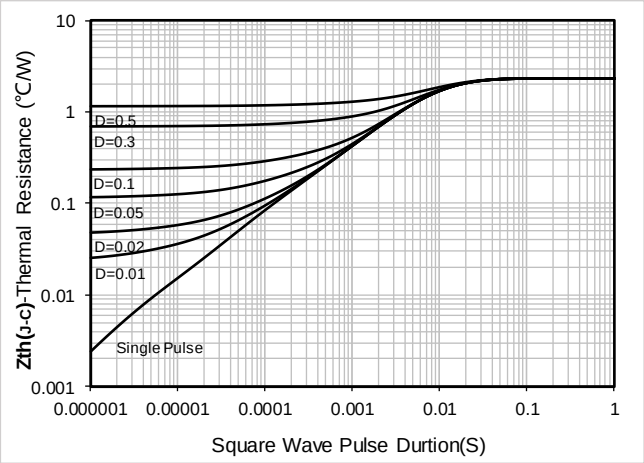


Figure 13. Maximum Transient Thermal Impedance

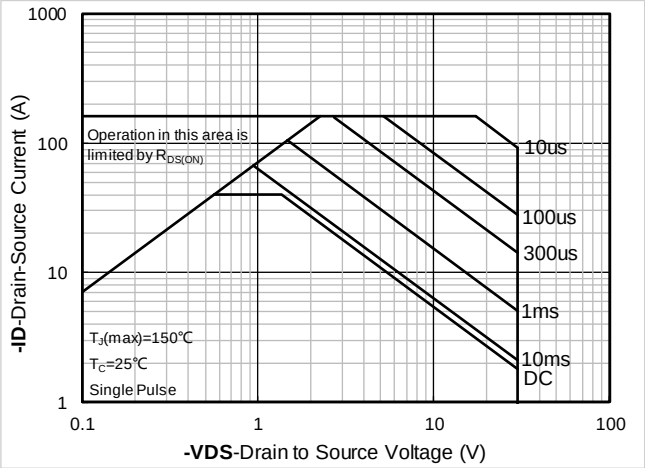
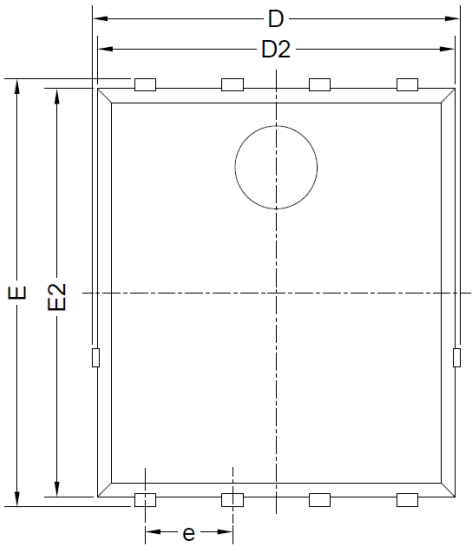
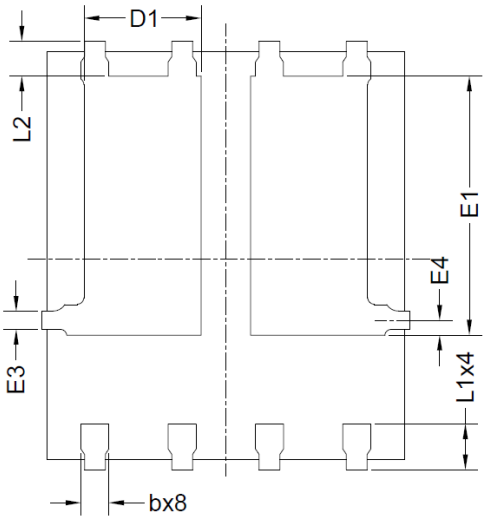


Figure 14. Safe Operation Area

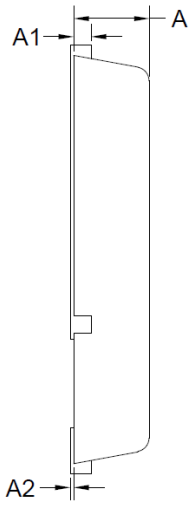
PDFN5X6-8L Package Information



Top View



Bottom View



Side View

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
D	5.15	5.35	5.55
E	5.95	6.15	6.35
A	1.00	1.10	1.20
A1		0.254 BSC	
A2			0.10
D1	1.50	1.70	1.90
E1	3.52	3.72	3.92
D2	5.00	5.20	5.40
E2	5.66	5.86	6.06
E3		0.254REF	
E4		0.21REF	
L1	0.56	0.66	0.76
L2		0.50 BSC	
b	0.31	0.41	0.51
e		1.27 BSC	