30V N-Channel MOSFETs

PDC3805R

General Description

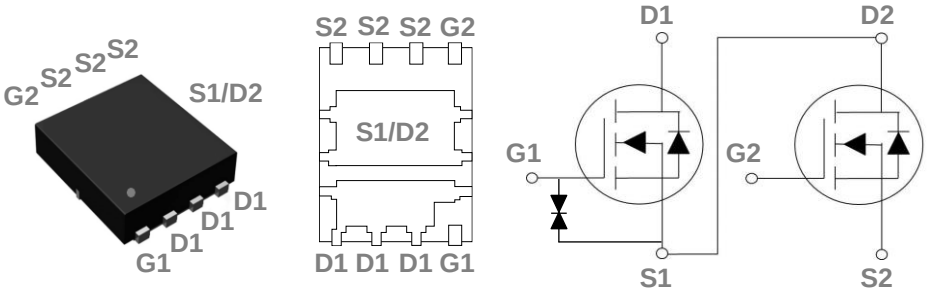
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

	BVDSS	RDSON	ID
Q1	30V	5mΩ	45A
Q2	30V	2.8mΩ	80A

Features

- *Improved dv/dt capability*
- *Fast switching*
- *100% EAS Guaranteed*
- *Green Device Available*

PPAK5x6 Asymmetric Dual Pin Configuration



Applications

- *MB / VGA / Vcore*
- *POL Buck Applications*
- *SMPS 2nd SR*

Absolute Maximum Ratings Tc=25℃ unless otherwise noted

Symbol	Parameter	Q1	Q2	Units
V_{DS}	Drain-Source Voltage	30	30	V
V_{GS}	Gate-Source Voltage	±20	±20	V
I_D	Drain Current – Continuous (T_C=25℃)	45	80	A
	Drain Current – Continuous (T_C=100℃)	28.5	51	A
I_{DM}	Drain Current – Pulsed[1]	180	320	A
EAS	Single Pulse Avalanche Energy[2]	60	151	mJ
IAS	Single Pulse Avalanche Current[2]	34.5	55	A
P_D	Power Dissipation (T_C=25℃)	17.5	33	W
	Power Dissipation – Derate above 25℃	0.14	0.26	W/℃
T_{STG}	Storage Temperature Range	-55 to 150		℃
T_J	Operating Junction Temperature Range	-55 to 150		℃

Thermal Characteristics

Symbol		Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Q1	Thermal Resistance Junction to ambient (t ≦10s)	---	40	℃/W
$R_{\theta JA}$	Q2		---	40	℃/W
$R_{\theta JC}$	Q1	Thermal Resistance Junction to Case	---	7.1	℃/W
$R_{\theta JC}$	Q2		---	3.8	℃/W

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

Static State Characteristics

Symbol	Parameter	Conditions		Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	Q1	30	---	---	V
			Q2	30	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=27V , V_{GS}=0V , T_J=25℃	Q1	---	---	1	uA
			Q2	---	---	1	uA
		V_{DS}=24V , V_{GS}=0V , T_J=85℃	Q1	---	---	10	uA
			Q2	---	---	10	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	Q1	---	---	±20	uA
		V_{GS}=20V , V_{DS}=0V	Q2	---	---	100	nA
$R_{DS(ON)}$	Static Drain-Source On-Resistance[3]	V_{GS}=10V , I_D=20A	Q1	---	4.2	5	mΩ
		V_{GS}=10V , I_D=20A	Q2	---	2.3	2.8	mΩ
		V_{GS}=4.5V , I_D=15A	Q1	---	6.4	8.3	mΩ
		V_{GS}=4.5V , I_D=15A	Q2	---	3.3	4.3	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	Q1	1.2	1.7	2.5	V
			Q2	1.2	1.7	2.5	V

Dynamic Characteristics

Q_g	Total Gate Charge[3,4]	V_{DS}=15V , V_{GS}=4.5V , I_D=35A	Q1	---	6.5	---	nC
			Q2	---	12	---	
Q_g	Total Gate Charge[3,4]	V_{DS}=15V , V_{GS}=10V , I_D=35A	Q1	---	11	---	
			Q2	---	24	---	
Q_{gs}	Gate-Source Charge[3,4]		Q1	---	1.9	---	
			Q2	---	5.8	---	
Q_{gd}	Gate-Drain Charge[3,4]		Q1	---	2.6	---	
			Q2	---	4.5	---	
$T_{d(on)}$	Turn-On Delay Time[3,4]	V_{DD}=15V , V_{GS}=10V , R_G=6Ω I_D=35A	Q1	---	2	---	ns
			Q2	---	4	---	
T_r	Rise Time[3,4]		Q1	---	3	---	
			Q2	---	6	---	
$T_{d(off)}$	Turn-Off Delay Time[3,4]		Q1	---	5	---	
			Q2	---	12	---	
T_f	Fall Time[3,4]		Q1	---	5	---	
			Q2	---	8	---	

C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , F=1MHz	Q1	---	840	---	pF
			Q2	---	1870	---	
C_{oss}	Output Capacitance		Q1	---	620	---	
			Q2	---	1380	---	
C_{rss}	Reverse Transfer Capacitance		Q1	---	10	---	
			Q2	---	18	---	
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, F=1MHz	Q1	---	1.3	---	Ω
			Q2	---	1	---	Ω

Drain-Source Diode Characteristics

Symbol	Parameter	Conditions		Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	Q1	---	---	45	A
			Q2	---	---	80	A
I_{SM}	Pulsed Source Current[3]		Q1	---	---	90	A
			Q2	---	---	160	A
V_{SD}	Diode Forward Voltage[3]	V_{GS}=0V , I_S=1A , T_J=25℃	Q1	---	---	1	V
			Q2	---	---	1	V

Note :
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V,V_{GS}=10V,L=0.1mH,Q1:I_{AS}=34.5A,Q2:I_{AS}=55A,R_G=25Ω,Starting T_J=25℃.
3. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
4. Essentially independent of operating temperature.

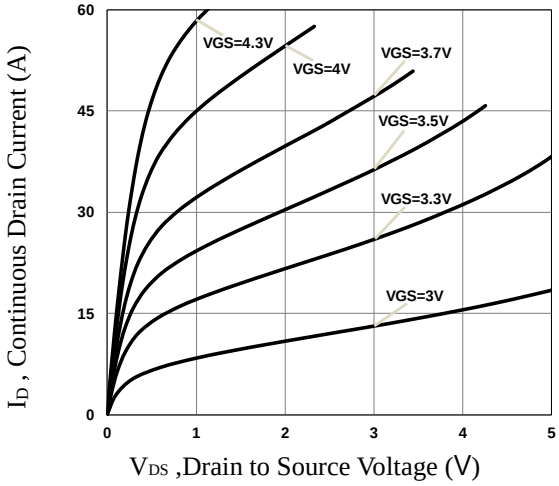


Fig.1 Q1 Typical Output Characteristics

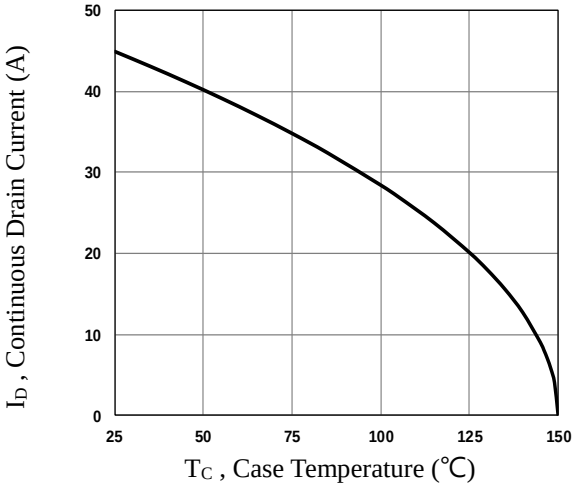


Fig.2 Q1 Continuous Drain Current vs. T_C

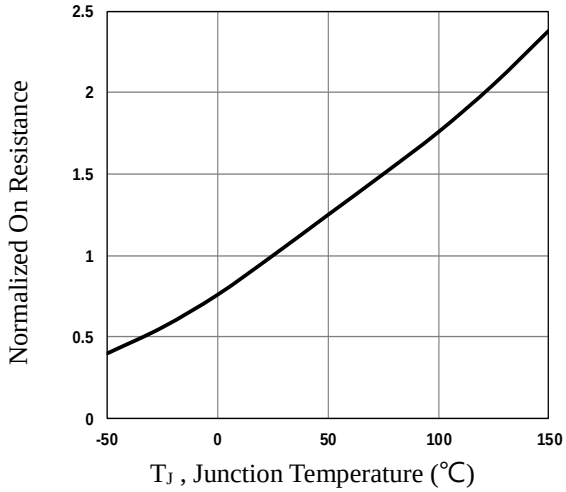


Fig.3 Q1 Normalized RDSON vs. T_J

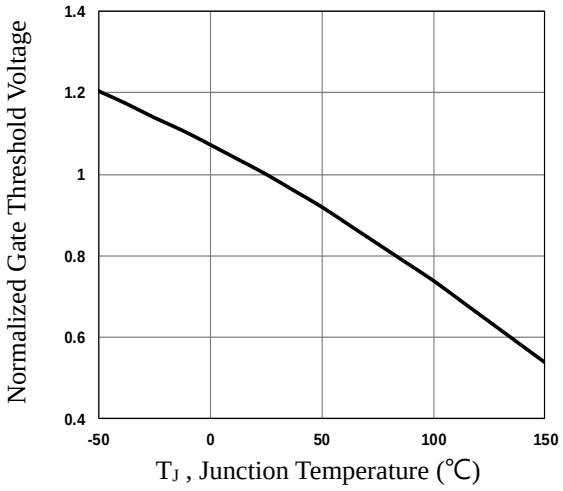


Fig.4 Q1 Normalized V_{th} vs. T_J

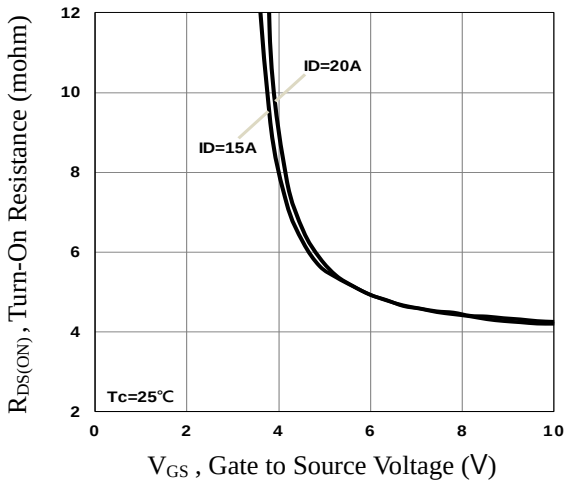


Fig.5 Q1 Turn-On Resistance vs. V_{GS}

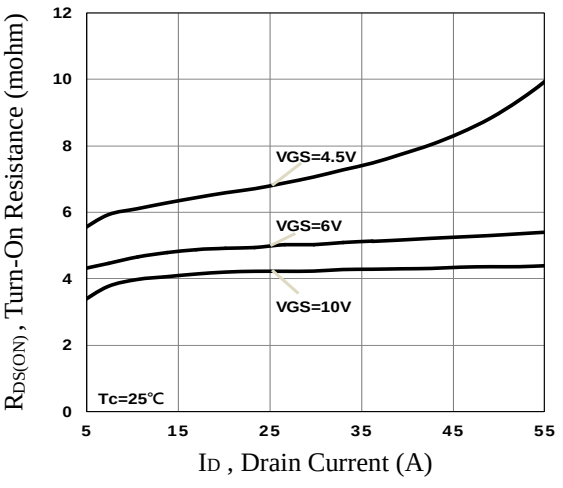


Fig.6 Q1 Turn-On Resistance vs. I_D

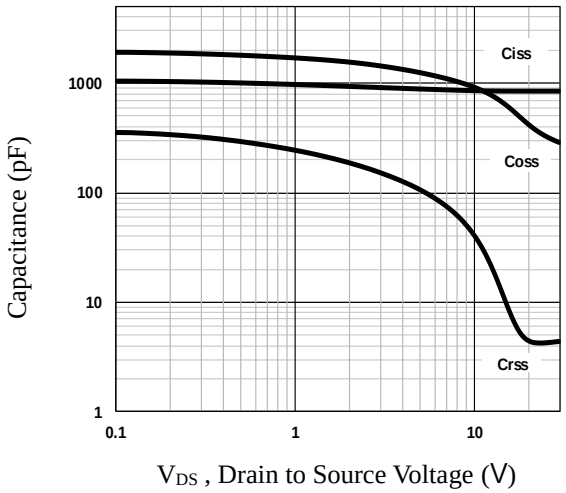


Fig.7 Q1 Capacitance Characteristics

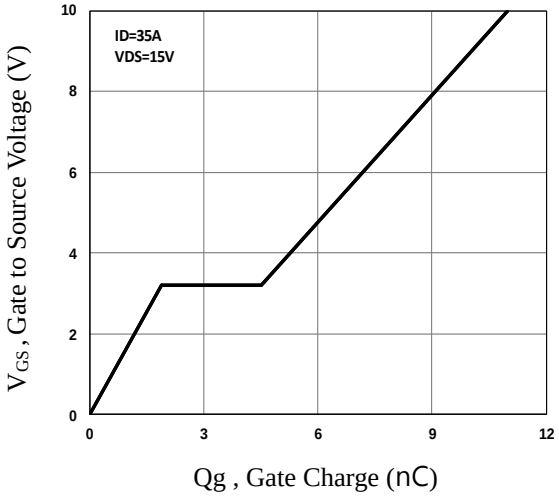


Fig.8 Q1 Gate Charge Characteristics

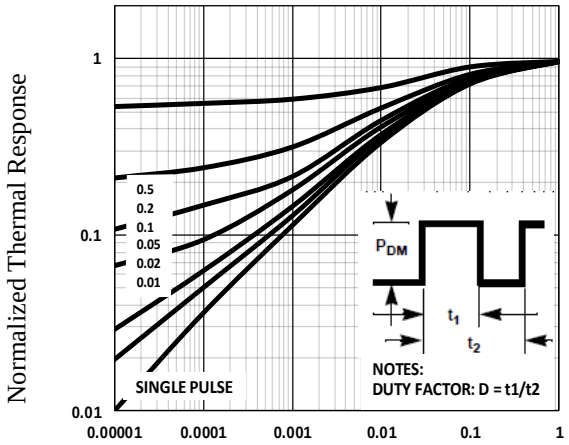


Fig.9 Q1 Normalized Transient Impedance

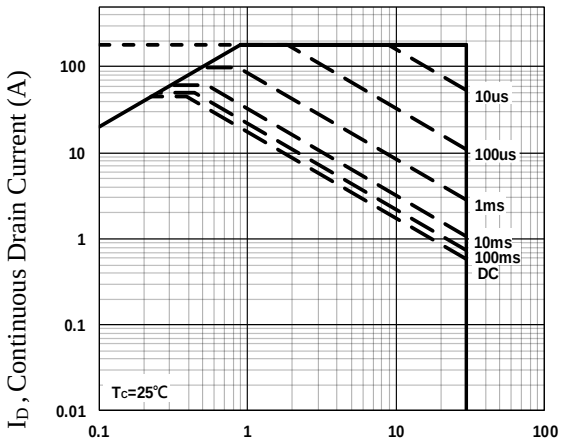


Fig.10 Q1 Maximum Safe Operation Area

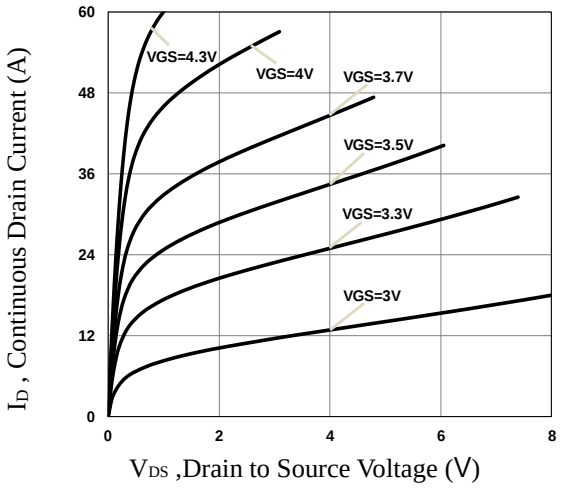


Fig.11 Q2 Typical Output Characteristics

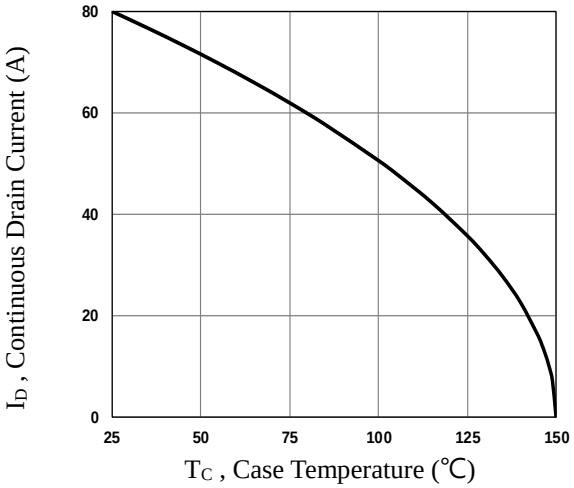


Fig.12 Q2 Continuous Drain Current vs. T_C

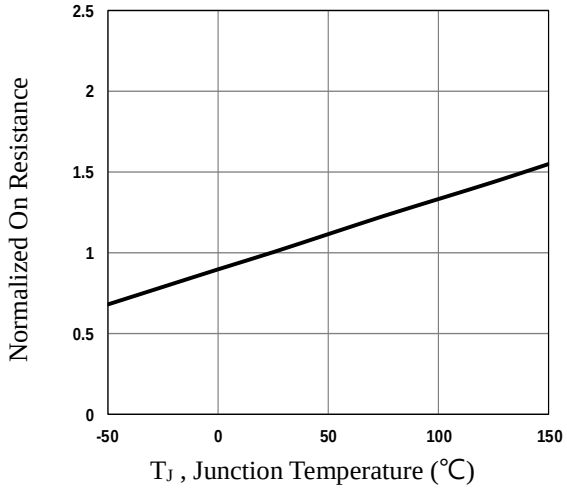


Fig.13 Q2 Normalized RDSON vs. T_J

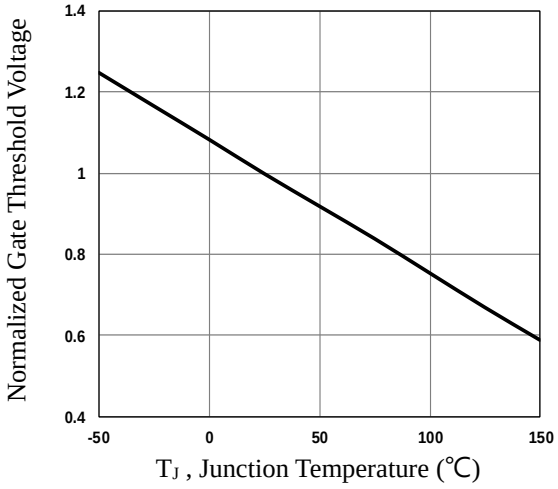


Fig.14 Q2 Normalized V_{th} vs. T_J

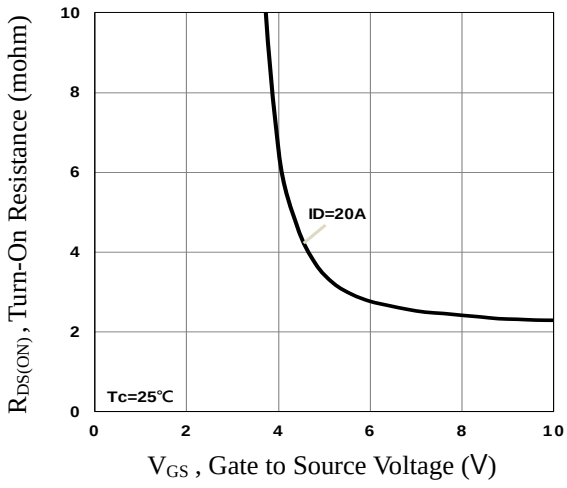


Fig.15 Q2 Turn-On Resistance vs. V_{GS}

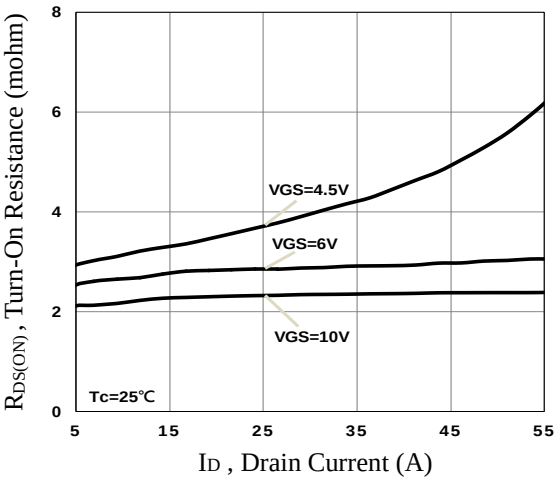


Fig.16 Q2 Turn-On Resistance vs. I_D

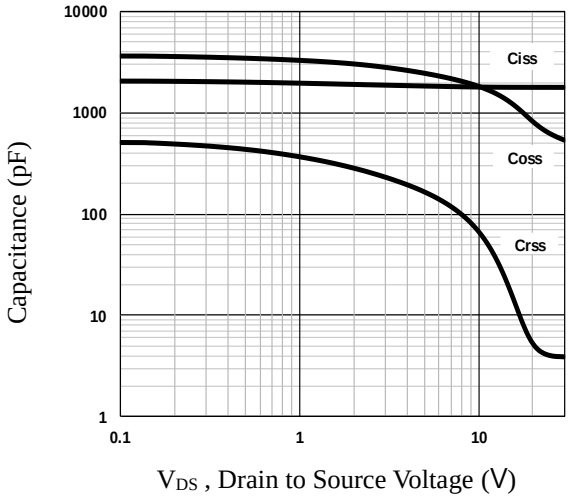


Fig.17 Q2 Capacitance Characteristics

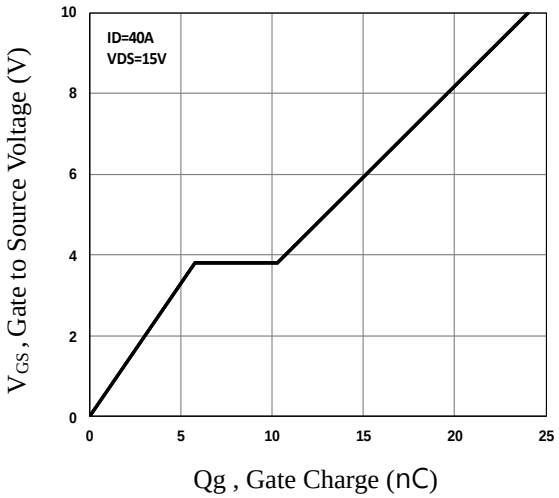


Fig.18 Q2 Gate Charge Characteristics

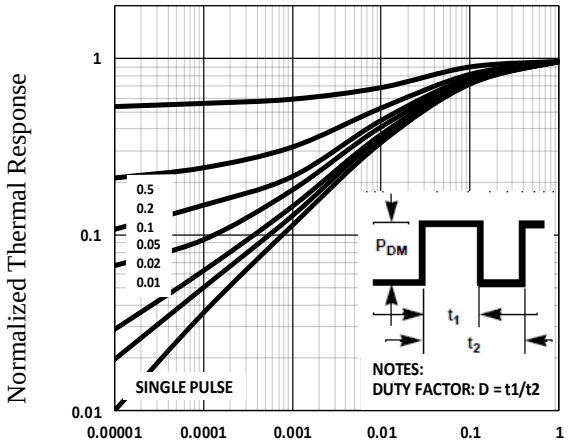


Fig.19 Q2 Normalized Transient Impedance

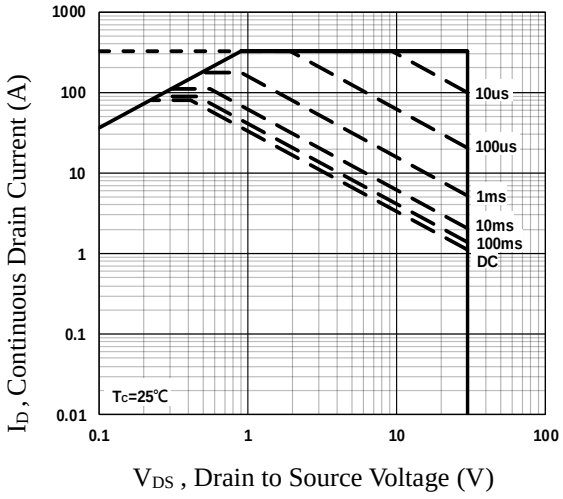


Fig.20 Q2 Maximum Safe Operation Area

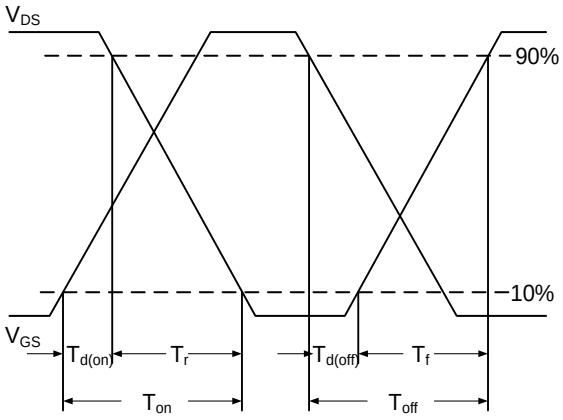


Fig.21 Switching Time Waveform

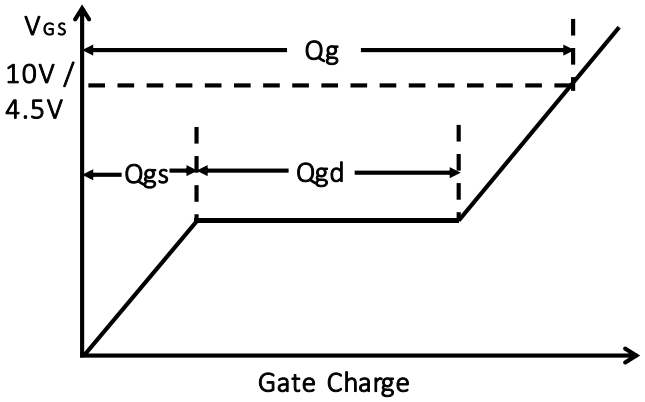
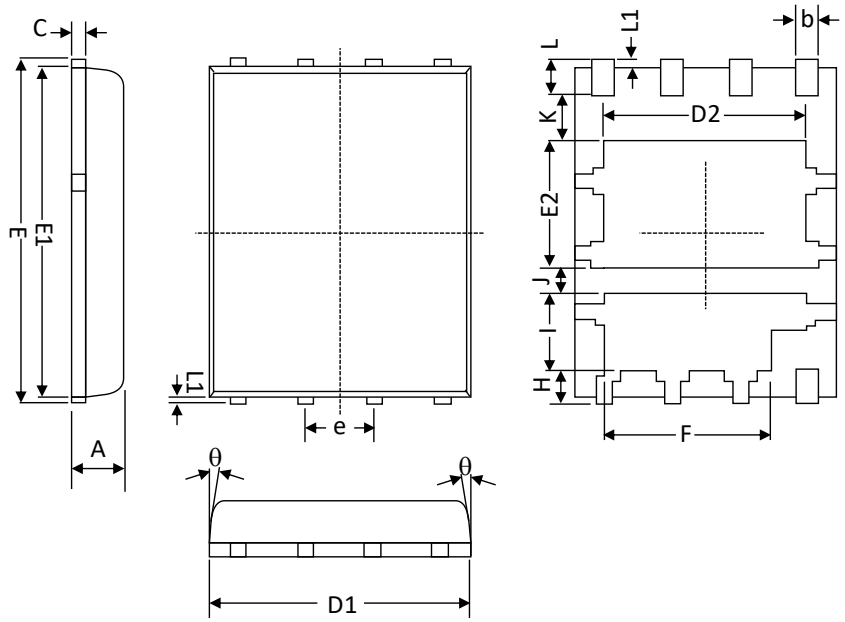


Fig.22 Gate Charge Waveform

PPAK5x6 Asymmetric Dual Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.850	1.100	0.033	0.043
b	0.250	0.510	0.010	0.020
C	0.150	0.300	0.006	0.012
D1	4.800	5.300	0.189	0.209
D2	3.600	3.960	0.142	0.156
E	5.900	6.200	0.232	0.244
E1	5.400	5.850	0.213	0.230
E2	2.000	2.450	0.079	0.096
e	1.270 BSC		0.050 BSC	
F	2.550	3.250	0.100	0.128
H	0.430	0.810	0.017	0.032
I	1.100	1.420	0.043	0.056
J	0.300	0.600	0.012	0.024
K	0.500	-	0.020	-
L	0.350	0.800	0.014	0.031
L1	0.060	0.350	0.002	0.014
θ	0°	14°	0°	14°