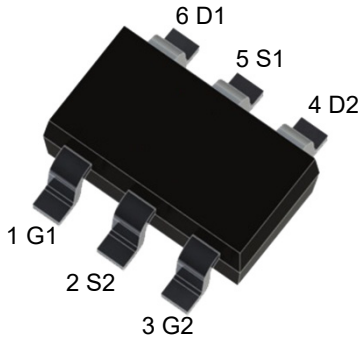
N-Channel and P-Channel MOSFET

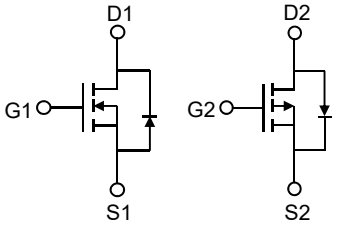
Description

The PDM6T30V6 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. This device is suitable for use as a load switch or in PWM applications.

MOSFET Product Summary		
V_{DS}(V)	$R_{DS(on)}$(mΩ)	I_D(A)
N-Channel 30	26@ V_{GS} = 10V	5.8
	28@ V_{GS} = 4.5V	
P-Channel -30	36@ V_{GS} = -10V	-4.2
	42@ V_{GS} = -4.5V	



SOT-23-6L(Top View)



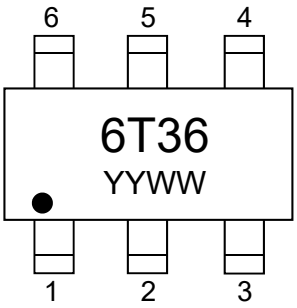
Circuit Diagram

Feature

- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

Applications

- PWM applications
- Load switch
- Power management
- DC-DC Converters
- Wireless Chargers



Marking (Top View)

Absolute maximum rating@25℃

Rating		Symbol	N-Channel	P-Channel	Units
Drain-Source Voltage		V_{DS}	30	-30	V
Gate-Source Voltage		V_{GS}	±12	±12	V
Drain Current-Continuous[1]	T_C=25℃	I_D	5.8	-4.2	A
	T_C=100℃		3.75	-2.4	
Pulsed Drain Current[2]		I_{DM}	30	-30	A
Total Power Dissipation[3]		P_D	1.2	1.2	W
Avalanche Current[4]		I_{AS}	15.6	21	A
Avalanche Energy[4]		E_{AS}	12.3	22.7	mJ
Thermal Resistance , Junction-case[5]		$R_{\theta JC}$	30.2	30.2	℃/W
Thermal Resistance Junction-to-Ambient[5]		$R_{\theta JA}$	93	93	℃/W
Junction and Storage Temperature Range		T_J,T_{STG}	-55~+150	-55~+150	℃

Electrical characteristics per line@25℃ (unless otherwise specified)(N-Channel)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0V,I_D = 250μA	30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 30V,V_{GS} = 0V	-	-	1.0	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS} = ±12V,V_{DS} = 0V	-	-	±100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS},I_D = 250μA	0.5	-	1.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS} = 10V,I_D = 3.4A	-	26	32	mΩ
		V_{GS} = 4.5V,I_D = 3.0A	-	28	38	
		V_{GS} = 2.5V,I_D = 2.8A	-	34	50	
Dynamic Characteristics[6)]						
Input Capacitance	C_{lss}	V_{DS} = 15V,V_{GS} = 0V, f = 1.0MHz	-	582	-	pF
Output Capacitance	C_{oss}		-	46	-	
Reverse Transfer Capacitance	C_{rss}		-	41	-	
Switching Characteristics[6)]						
Turn-on Delay Time	$t_{d(on)}$	V_{DS} = 15V, V_{GS} = 4.5V, R_G = 10Ω, I_D = 4A	-	7.9	-	ns
Turn-on Rise Time	t_r		-	11.2	-	
Turn-Off Delay Time	$t_{d(off)}$		-	26	-	
Turn-Off Fall Time	t_f		-	13.7	-	
Total Gate Charge	Q_g	V_{DS} = 15V, V_{GS} = 4.5V, I_D = 4A	-	6.4	-	nC
Gate-Source Charge	Q_{gs}		-	0.9	-	
Gate-Drain Charge	Q_{gd}		-	1.4	-	
Gate Resistance	R_g	V_{GS}=0V,V_{DS}=0V,f=1MHz	-	1.87	-	Ω
Drain-Source Diode Characteristics						
Diode Forward Voltage	V_{SD}	V_{GS} = 0V,I_S = 1A	-	0.8	1.3	V

Electrical characteristics per line@25℃ (unless otherwise specified)(P-Channel)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0V,I_D = -250μA	-30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -24V,V_{GS} = 0V	-	-	-1.0	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS} = ±12V,V_{DS} = 0V	-	-	±100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS},I_D = -250μA	-0.5	-	-1.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS} = -10V,I_D = -2.5A	-	36	45	mΩ
		V_{GS} = -4.5V,I_D = -2.0A	-	39	50	
		V_{GS} = -2.5V,I_D = -1.0A	-	55	70	
Dynamic Characteristics[6)]						
Input Capacitance	C_{lss}	V_{DS} = -15V,V_{GS} = 0V, f = 1.0MHz	-	547	-	pF
Output Capacitance	C_{oss}		-	73	-	
Reverse Transfer Capacitance	C_{rss}		-	65	-	
Switching Characteristics[6)]						
Turn-on Delay Time	$t_{d(on)}$	V_{DS} = -15V, V_{GS} = -4.5V, R_G = 6Ω, I_D = -4A	-	12	-	ns
Turn-on Rise Time	t_r		-	22	-	
Turn-Off Delay Time	$t_{d(off)}$		-	30	-	
Turn-Off Fall Time	t_f		-	26.5	-	
Total Gate Charge	Q_g	V_{DS} = -15V, V_{GS} = -4.5V, I_D = -4A	-	5.2	-	nC
Gate-Source Charge	Q_{gs}		-	0.9	-	
Gate-Drain Charge	Q_{gd}		-	1.8	-	
Gate Resistance	R_g	V_{GS}=0V,V_{DS}=0V,f=1MHz	-	7.47	-	Ω
Drain-Source Diode Characteristics						
Diode Forward Voltage	V_{SD}	V_{GS} = 0V,I_S = 1A	-	-	-1.2	V

Notes:
1. Computed continuous current assumes the condition of T_{J_Max} while the actual continuous current depends on the thermal & electro-mechanical application board design.
2. Repetitive Rating: Pulse width limited by maximum junction temperature(T_{J_Max}=150℃).
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. This single-pulse measurement was taken under the following condition [L=100uH,V_{GS}=10V,V_{DS}=40V]while it's value is limited by T_{J_Max}=150℃.
5. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper pad layout.
6. Guaranteed by design, not subject to production.

Typical Characteristics (N-Channel)

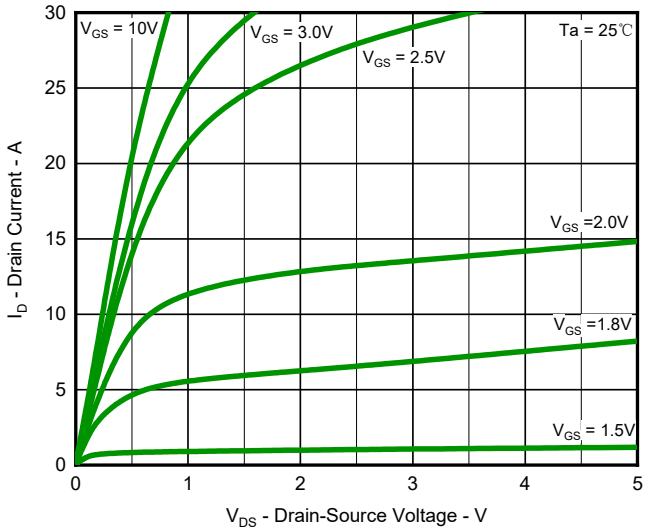


Fig.1 Output Characteristics

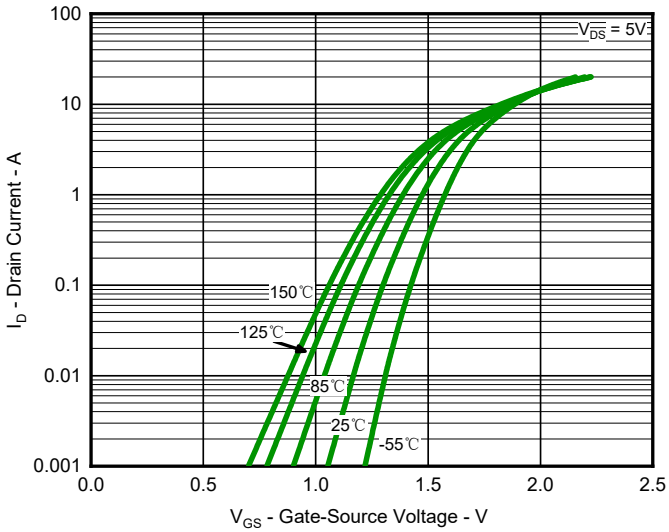


Fig.2 Typical Transfer Characteristic

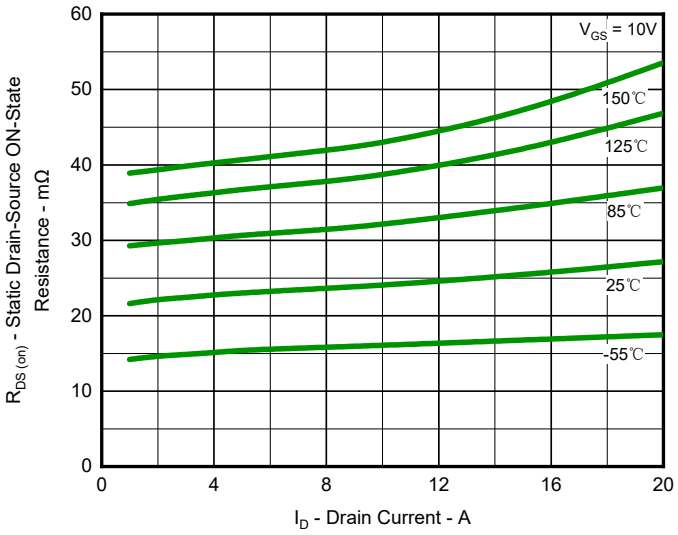


Fig.3 Typical On-Resistance vs Drain Current and Temperature

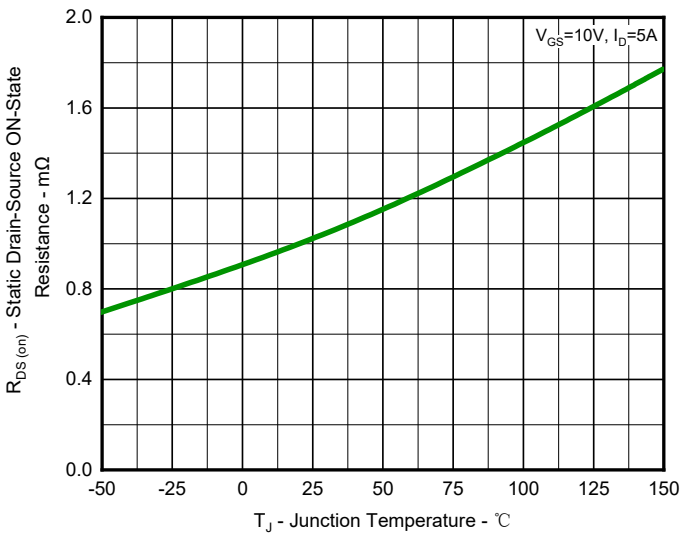


Fig.4 On-Resistance Variation with Temperature

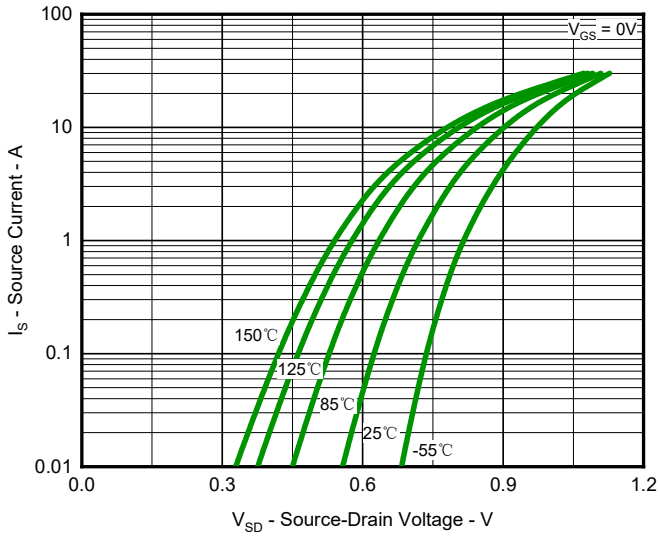


Fig.5 Diode Forward Voltage vs. Current

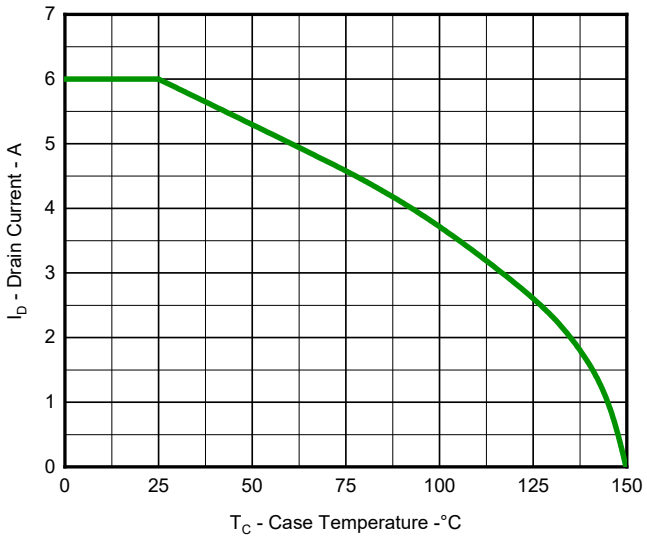


Fig.6 Maximun Drain Current vs. Case Temperature

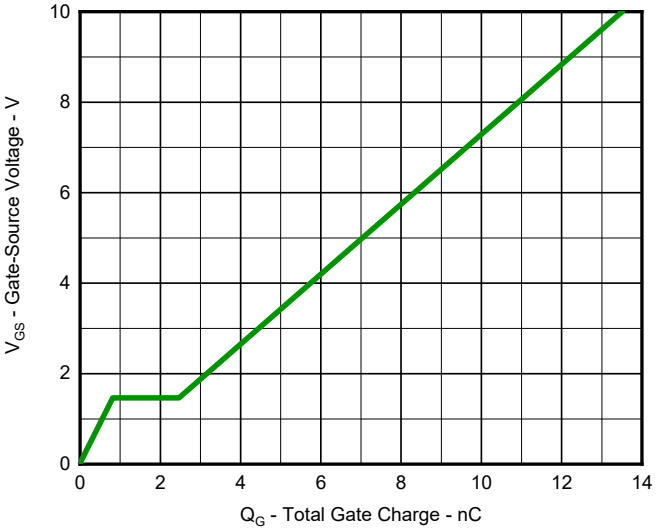


Fig.7 Gate Charge Characteristics

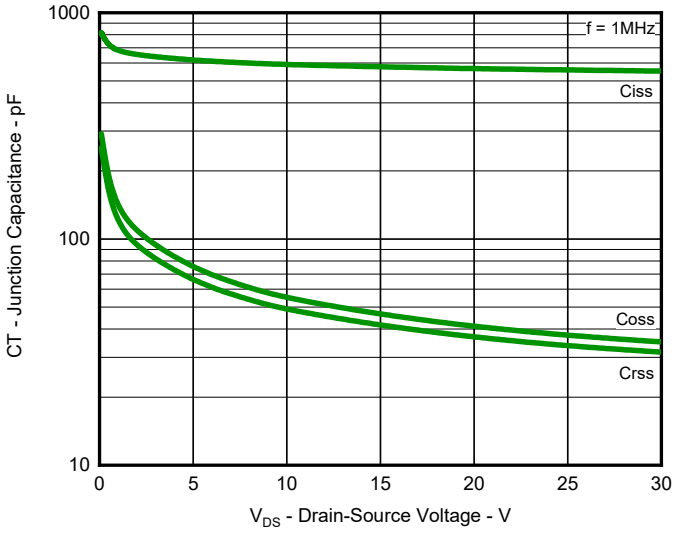


Fig.8 Typical Junction Capacitance

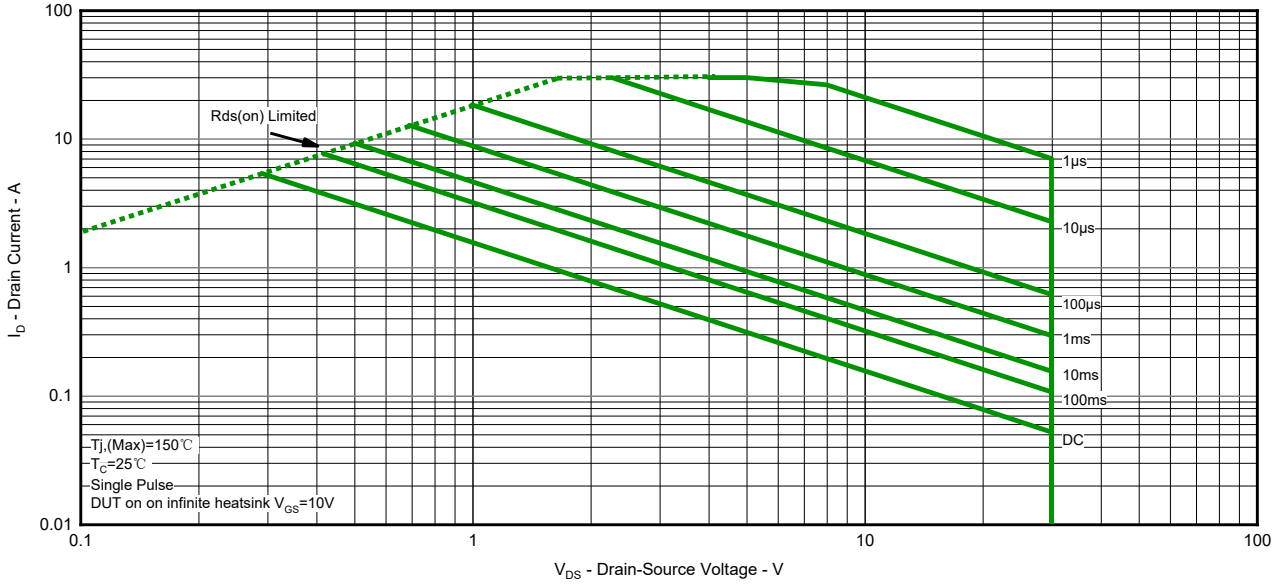


Fig.9 Safe Operation Area

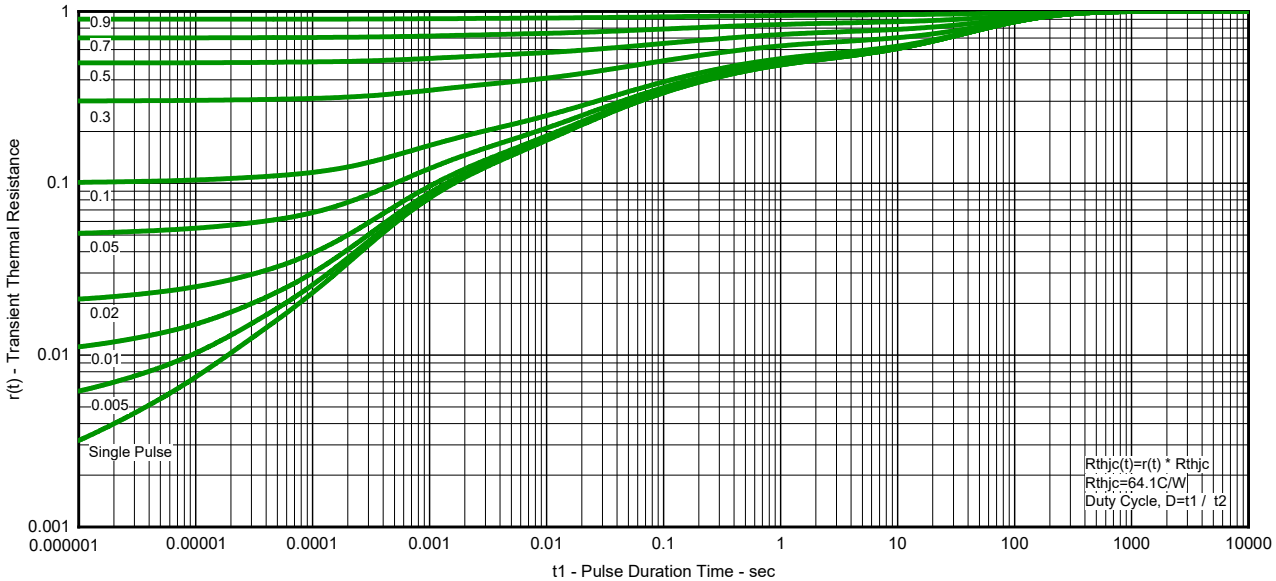


Fig.10 Transient Thermal Resistance

Typical Characteristics (P-Channel)

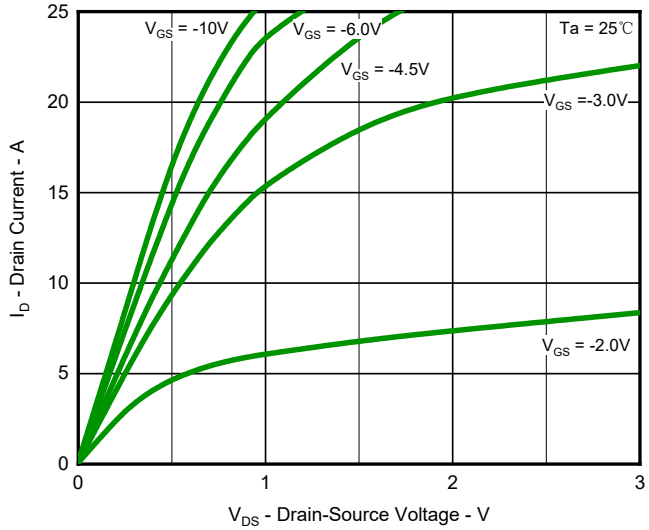


Fig.1 Output Characteristics

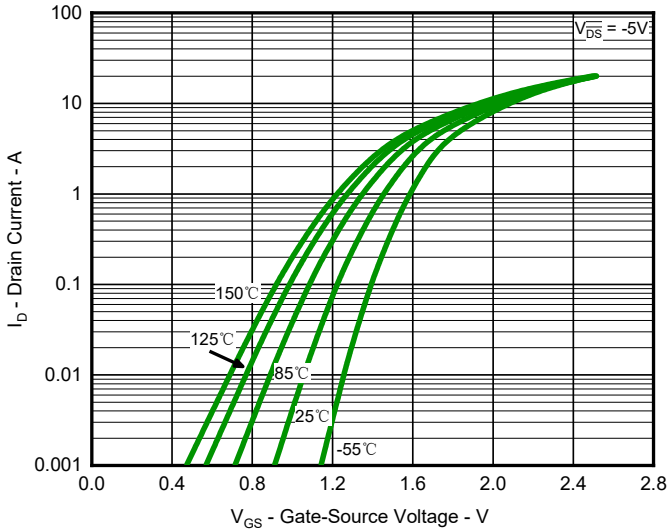


Fig.2 Typical Transfer Characteristic

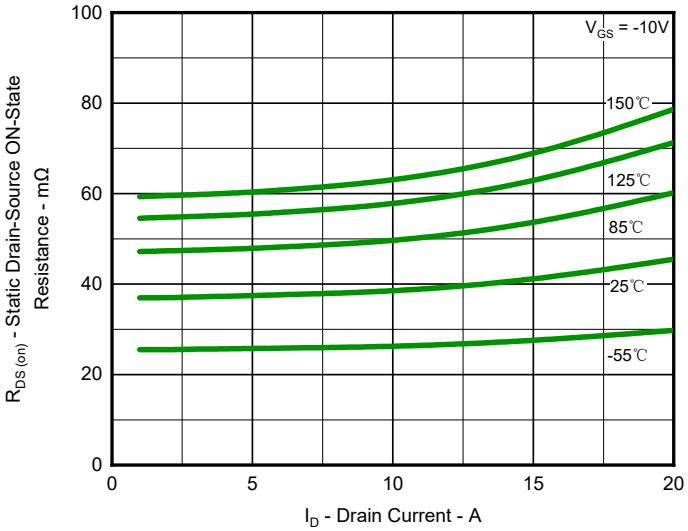


Fig.3 Typical On-Resistance vs Drain Current and Temperature

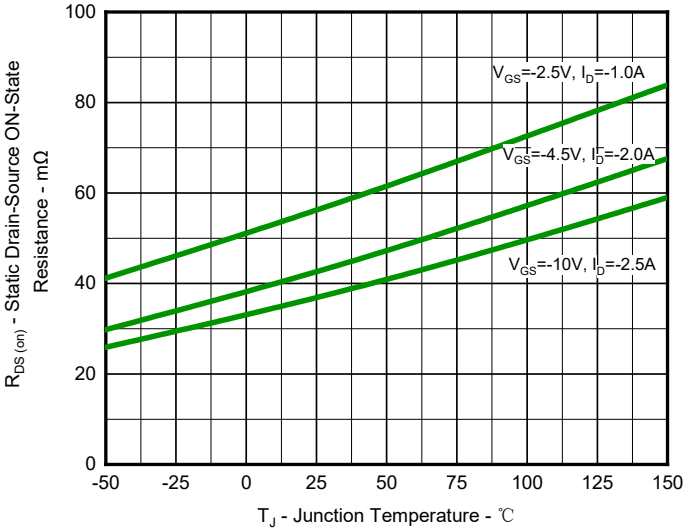


Fig.4 On-Resistance Variation with Temperature

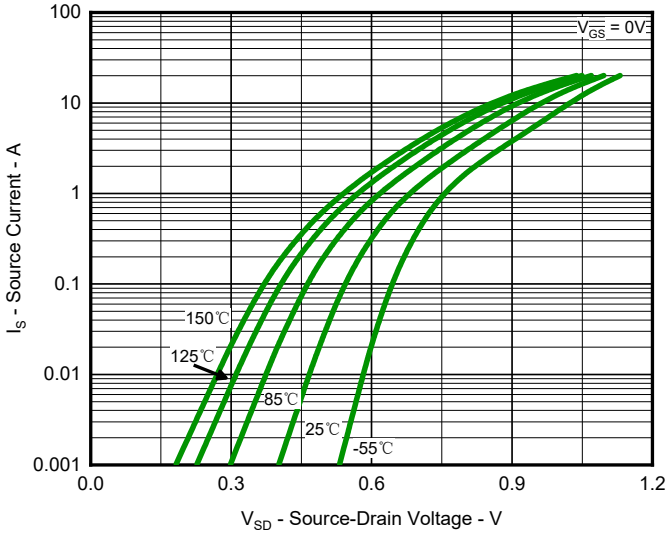


Fig.5 Diode Forward Voltage vs. Current

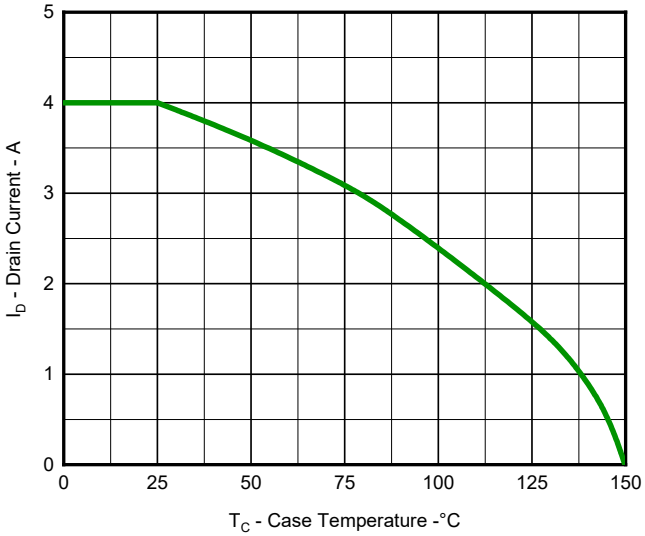


Fig.6 Maximun Drain Current vs. Case Temperature

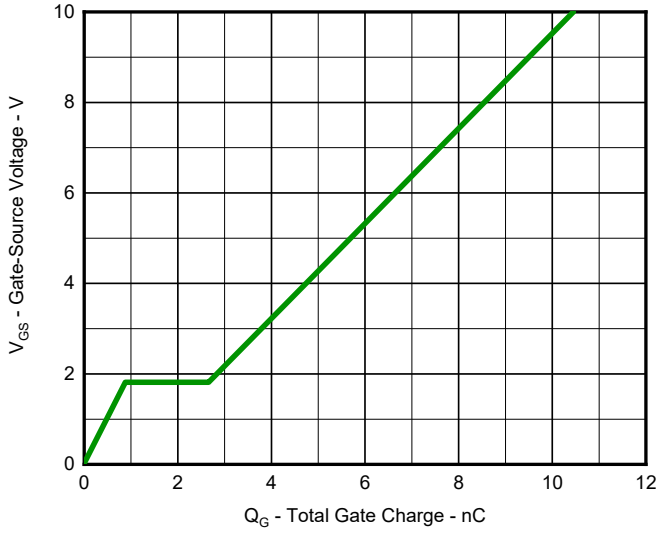


Fig.7 Gate Charge Characteristics

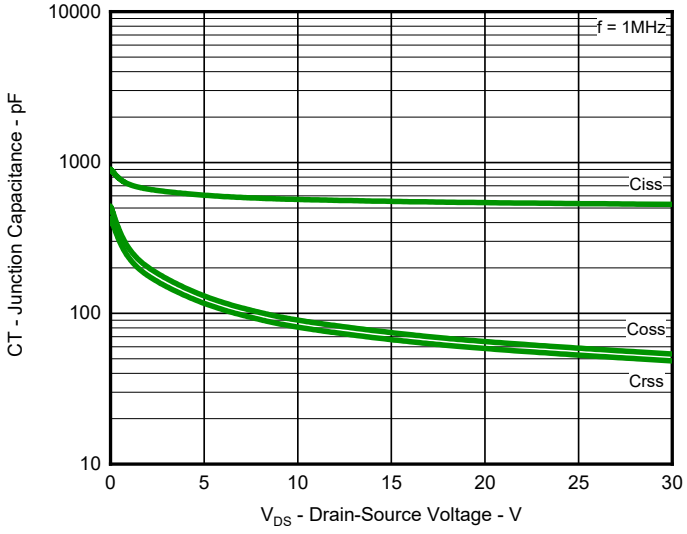


Fig.8 Typical Junction Capacitance

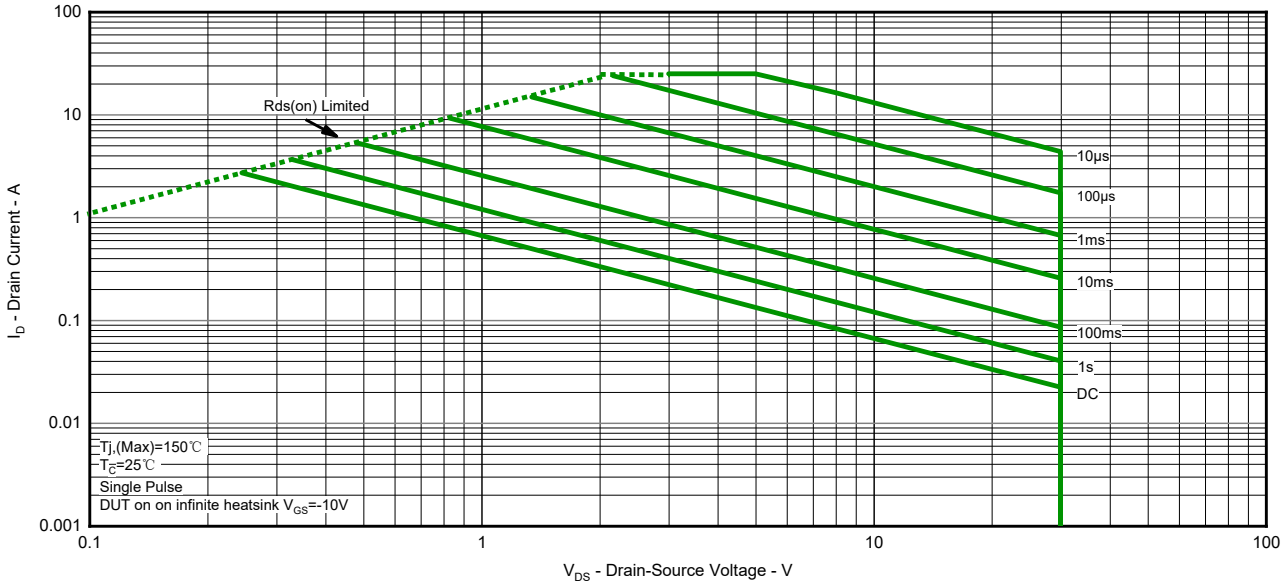


Fig.9 Safe Operation Area

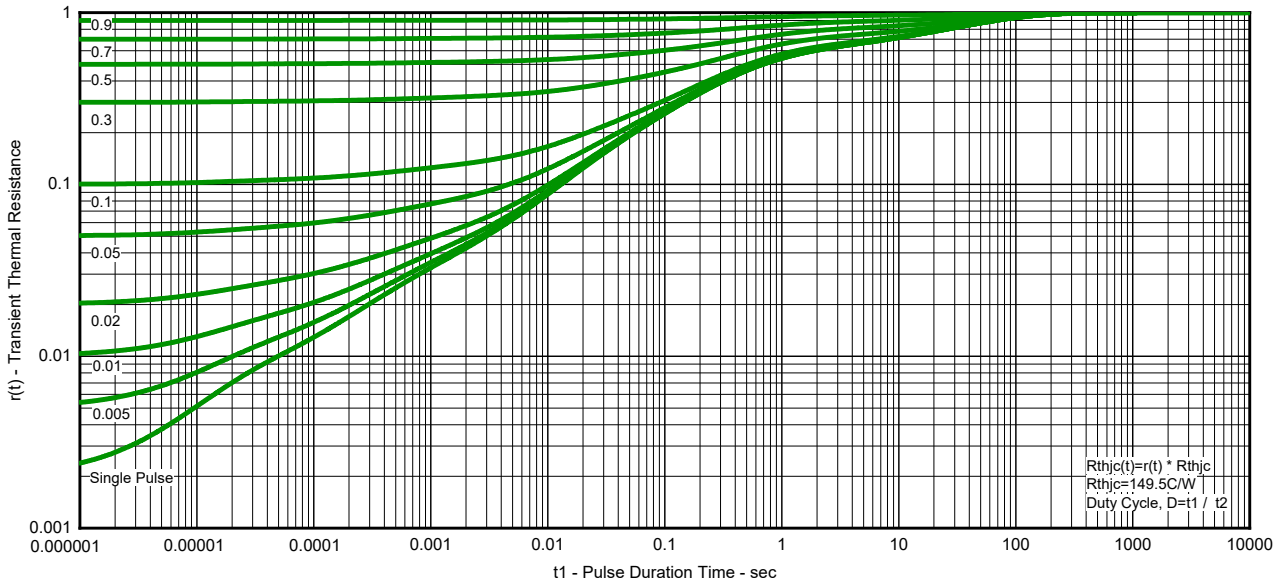
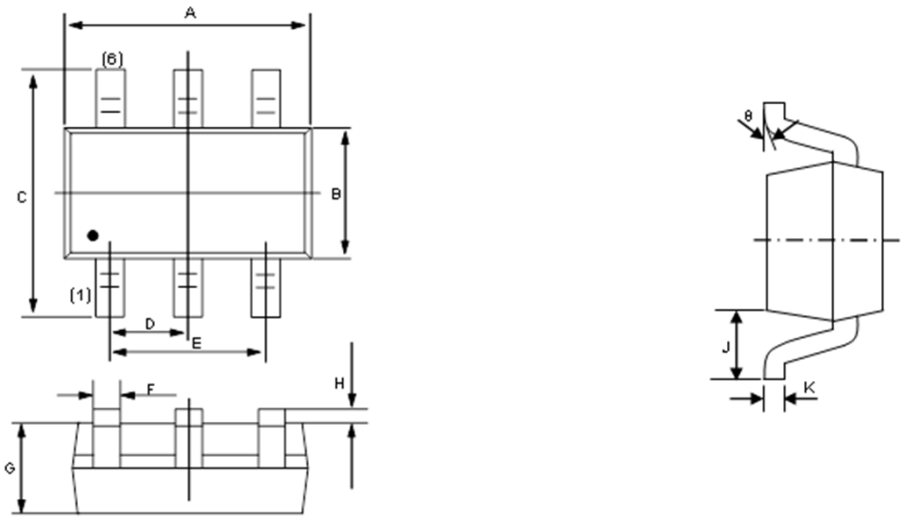
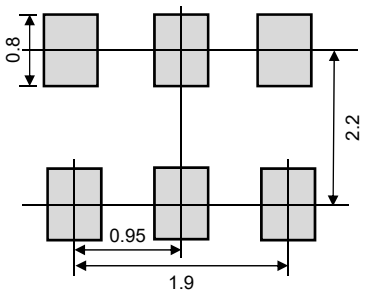


Fig.10 Transient Thermal Resistance

Product dimension (SOT-23-6L)



Dim	Millimeters		Inches	
	Min	Max	Min	Max
A	2.720	3.120	0.107	0.123
B	1.400	1.800	0.055	0.071
C	2.600	3.000	0.102	0.118
D	0.950 (BSC)		0.037 (BSC)	
E	1.800	2.000	0.071	0.079
F	0.300	0.500	0.012	0.020
G	1.000	1.250	0.040	0.049
H	0.000	0.150	0.000	0.006
J	0.450	0.750	0.0180	0.029
K	0.100	0.200	0.004	0.008
θ	0°	8°	0°	8°



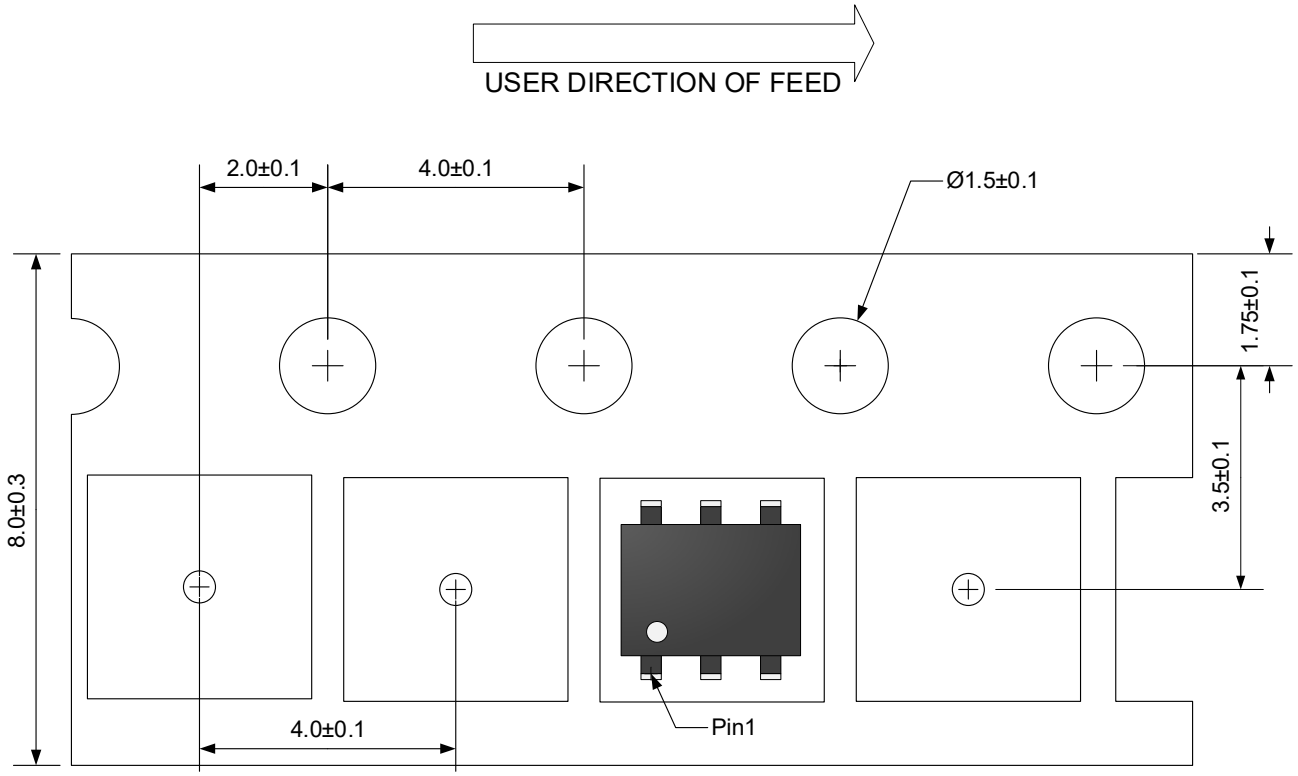
Unit:mm

Suggested PCB Layout

Ordering Information

Device	Package	Reel	Shipping
PDM6T30V6	SOT-23-6L	7"	3000 / Tape & Reel

Load With Information



Unit:mm

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