CMD101312RSF5

Dual N and P Channel 100V (D-S) Power MOSFET

Description

CMD101312RSF5 is the Dual N and P-Channel enhancement mode power field effect transistors with high cell density, trench technology. This high density process and design have been optimized switching performance and especially tailored to minimize on-state resistance.

Applications

- Cellular Handsets and Accessories
- Personal Digital Assistants
- Portable Instrumentation
- Load switch

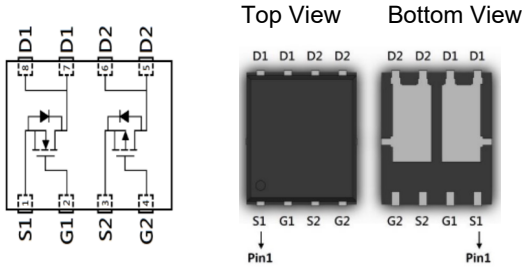
Features

- N-Channel V_{DS}: 100V
- N-Channel I_D: 8A
- N-Channel $R_{DS_{ON}}$ (@V_{GS}=10V) : < 120mΩ
- N-Channel $R_{DS_{ON}}$ (@V_{GS}=4.5V) : < 180mΩ
- P-Channel V_{DS}: -100V
- P-Channel I_D: -11A
- P-Channel $R_{DS_{ON}}$ (@V_{GS}=-10V) : < 115mΩ
- P-Channel $R_{DS_{ON}}$ (@V_{GS}=-4.5V) : < 130mΩ
- High density cell design for extremely low $R_{DS_{ON}}$
- Excellent on-resistance and DC current capability

Marking Information

Marking Code = D101312RSF5
Date Code = XXXX

Equivalent Circuit and Pin Configuration



Ordering Information

Part Number	Packaging	Reel Size
CMD101312RSF5	5000/Tape & Reel	13 inch

Absolute Maximum Ratings (T_A=25 ℃ unless otherwise noted)

Parameter		Symbol	Maximum		Unit
			N-Channel	P-Channel	
Drain-source Voltage		V_{DS}	100	-100	V
Gate-source Voltage		V_{GS}	±20	±20	V
Drain Current[1][6]	T_C=25°C	I_D	8	-11	A
	T_C=100°C		3	-3	A
Pulsed Drain Current[3]		I_{DM}	30	-44	A
Total Power Dissipation[4]		PD	17	28	W
Thermal Resistance Junction-to-Ambient[2][5]		$R_{\theta JA}$	63	58	°C/W
Thermal Resistance Junction-to-Case		$R_{\theta Jc}$	7.4	4.5	°C/W
Junction and Storage Temperature Range		T_J,T_{STG}	-55 to +150	-55 to +150	°C

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

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V,I_D=250μA	100			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=100V,V_{GS}=0V,T_C=25°C			1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	1.0		2.5	V
Static Drain-Source on-Resistance	$R_{DS(on)}$	V_{GS}=10V,I_D=5A		100	120	mΩ
		V_{GS}=4.5V,I_D=4A		140	180	
Diode Forward Voltage	V_{SD}	I_S=8A,V_{GS}=0V		0.85	1.2	V
Maximum Body-Diode Continuous Current	I_S				8	A
Dynamic Parameters						
Input Capacitance	C_{iss}	V_{DS}=50V,V_{GS}=0V,f=1MHz		196		pF
Output Capacitance	C_{oss}			27		
Reverse Transfer Capacitance	C_{rss}			1. 85		
Switching Parameters						
Total Gate Charge	Q_g	V_{GS}=10V,V_{DS}=50V,I_D=2A		3.78		nC
Gate Source Charge	Q_{gs}			0.45		
Gate Drain Charge	Q_{gd}			0.83		
Turn-on Delay Time	$t_{D(on)}$	V_{GS}=10V,V_{DD}=50V, I_D=1A,R_{GEN}=6Ω		10.6		ns
Turn-on Rise Time	t_r			5.2		
Turn-off Delay Time	$t_{D(off)}$			24.8		
Turn-off Fall Time	t_f			12.7		

Noted: (1) Pulse Test: Pulse Width≤300us,Duty cycle ≤2%.

(2) The value of $R_{\theta JA}$ is measured with the device mounted on lin2 FR-4 board with 2oz.Copper,in a still air environment with T_A =25°C.The Power dissipation PDSM is based on $R_{\theta JA}$ t≤10s and the maximum allowed junction temperature of 150°C.The value in any given application depends on the user's specific board design.

(3) Single pulse width limited by junction temperature $T_{J(MAX)}$ = 150°C.

(4) The power dissipation PD is based on $T_{J(MAX)}$ = 150°C,using junction-to-case thermal resistance, and is more useful in setting the upper Dissipation limit for cases where additional heatsinking is used.

(5) The $R_{\theta JA}$ is the sum of the thermal impedance from junction to case $R_{\theta JA}$ and case to ambient.

(6) The maximum current rating is package limited.

N-Channel Typical Performance Characteristics

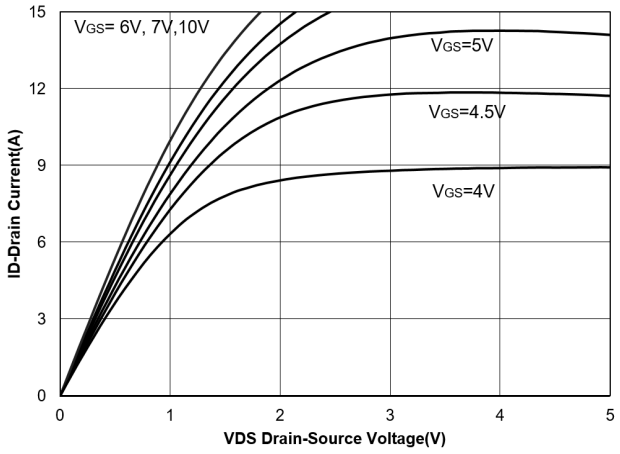


Figure 1. Output Characteristics

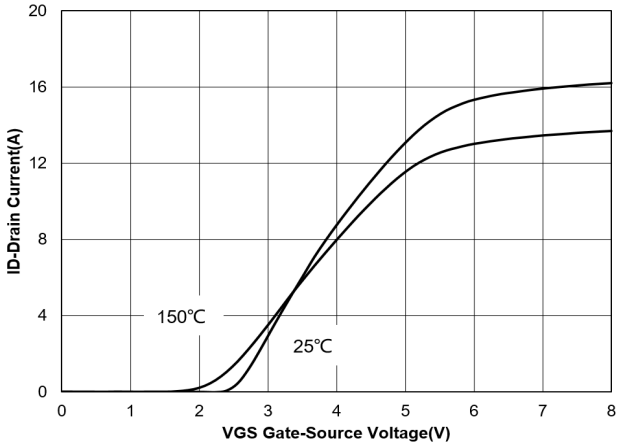


Figure 2. Transfer Characteristics

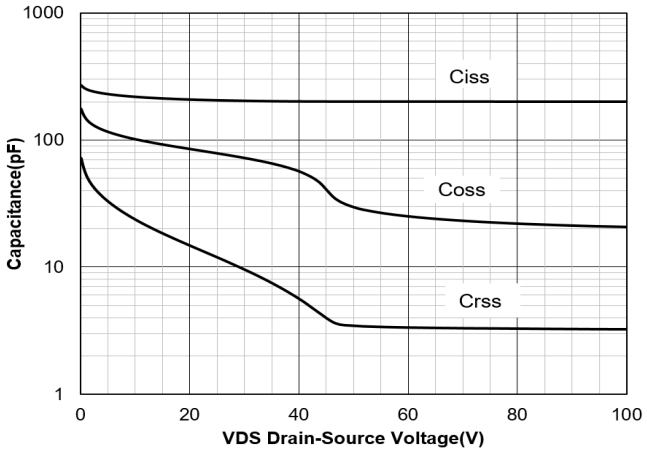


Figure 3. Capacitance Characteristics

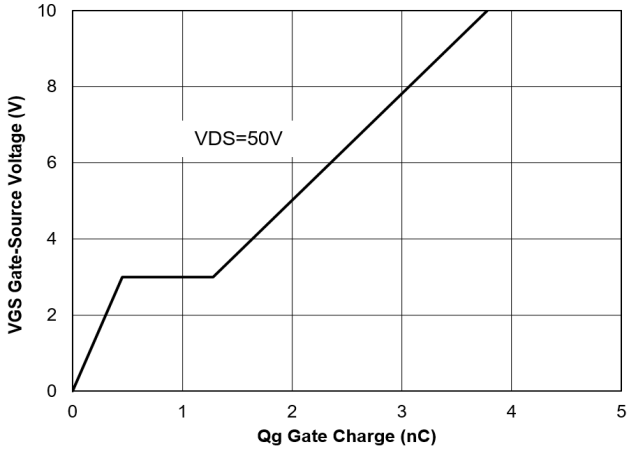


Figure 4. Gate Charge

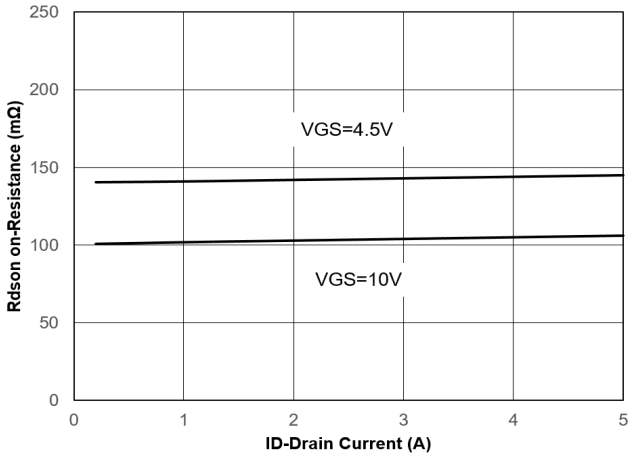


Figure 5. Drain-Source on Resistance

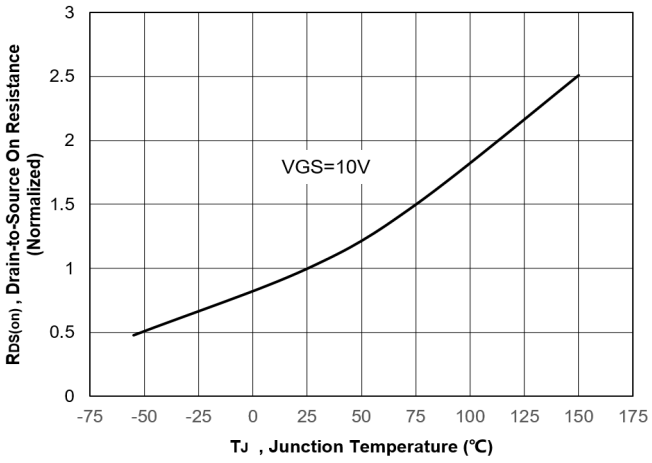


Figure 6. Normalized On-Resistance Vs. Temperature

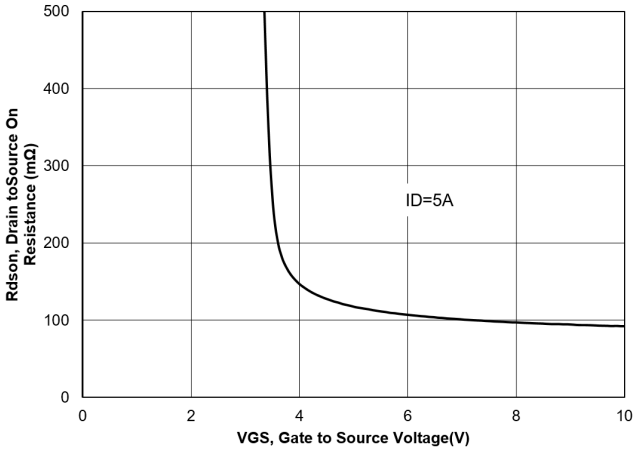


Figure 7. Typical Drain to Source ON Resistance

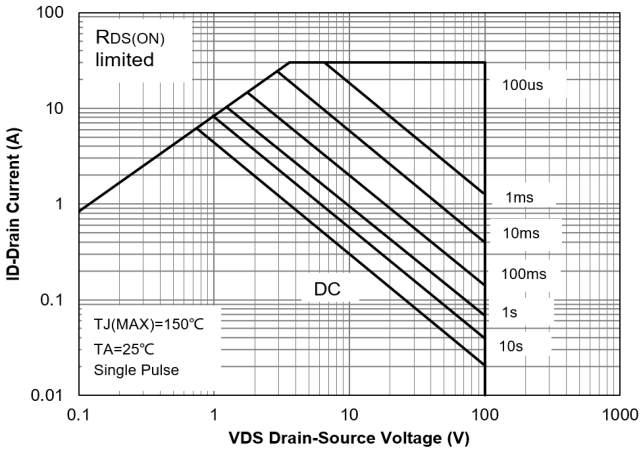


Figure 8. Safe Operation Area

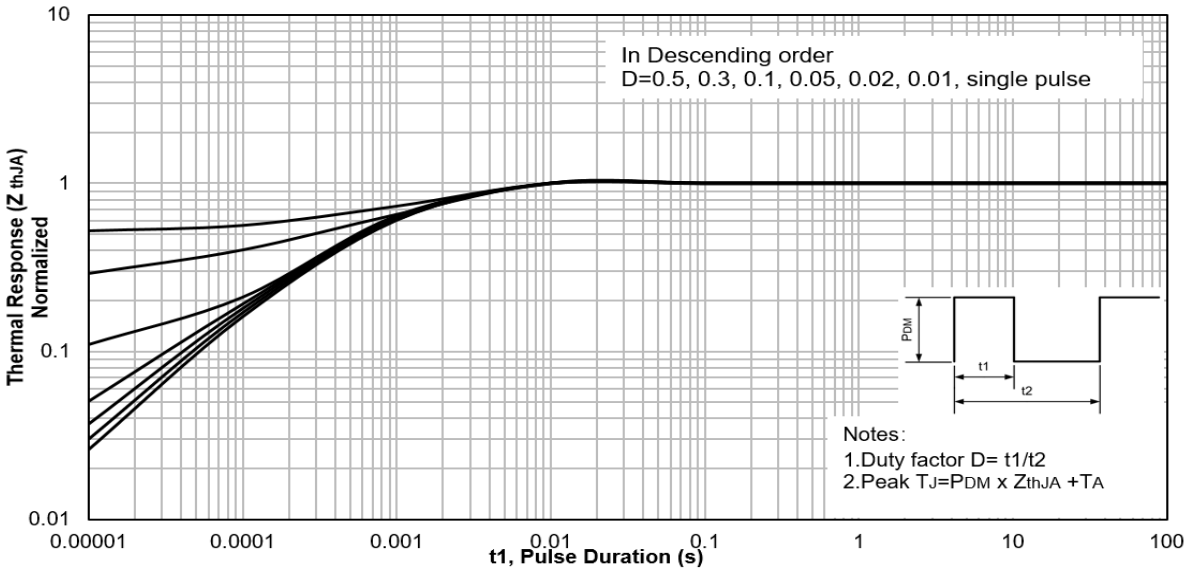


Figure 9. Maximum Effective Transient Thermal Impedance ,Junction-to-Ambient

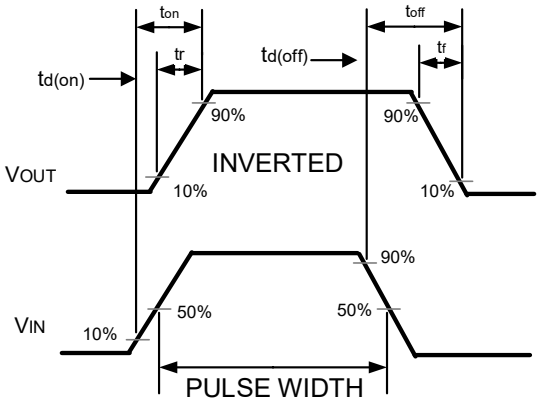


Figure 10. Switching wave

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

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V,I_D=-250μA	-100			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-100V,V_{GS}=0V,T_C=25°C			-1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=-250μA	-1.0		-2.5	V
Static Drain-Source on-Resistance	$R_{DS(on)}$	V_{GS}=-10V,I_D=-5A		95	115	mΩ
		V_{GS}=-4.5V,I_D=-4A		100	130	
Diode Forward Voltage	V_{SD}	I_S=-11A,V_{GS}=0V		-0.85	-1.2	V
Maximum Body-Diode Continuous Current	I_S				-11	A
Dynamic Parameters						
Input Capacitance	C_{iss}	VDS=-50V,VGS=0V,f=1MHz		3770		pF
Output Capacitance	C_{oss}			71.2		
Reverse Transfer Capacitance	C_{rss}			68.5		
Switching Parameters						
Total Gate Charge	Q_g	V_{GS}=-10V,V_{DS}=-50V,I_D=-2A		60		nC
Gate Source Charge	Q_{gs}			3.3		
Gate Drain Charge	Q_{gd}			5.2		
Turn-on Delay Time	$t_{D(on)}$	V_{GS}=-10V,V_{DD}=-50V, I_D=-1A，R_{GEN}=6Ω		21		ns
Turn-on Rise Time	t_r			6.3		
Turn-off Delay Time	$t_{D(off)}$			246		
Turn-off Fall Time	t_f			28		

P-Channel Typical Performance Characteristics

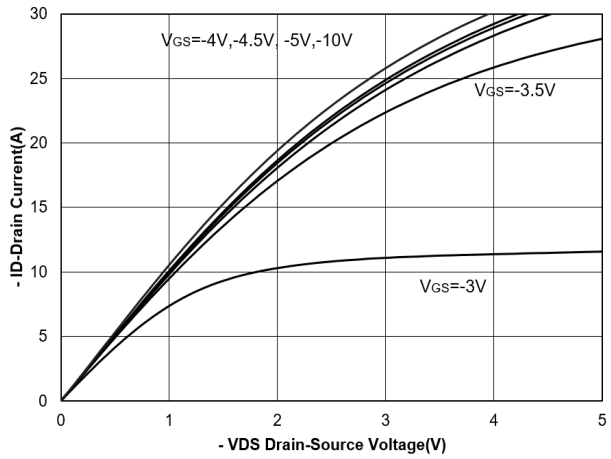


Figure 11. Output Characteristics

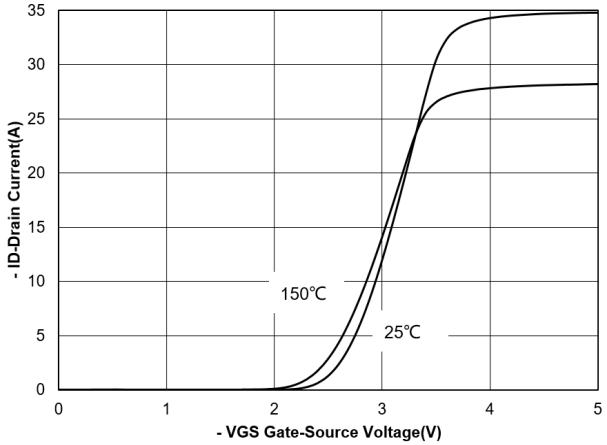


Figure 12. Transfer Characteristics

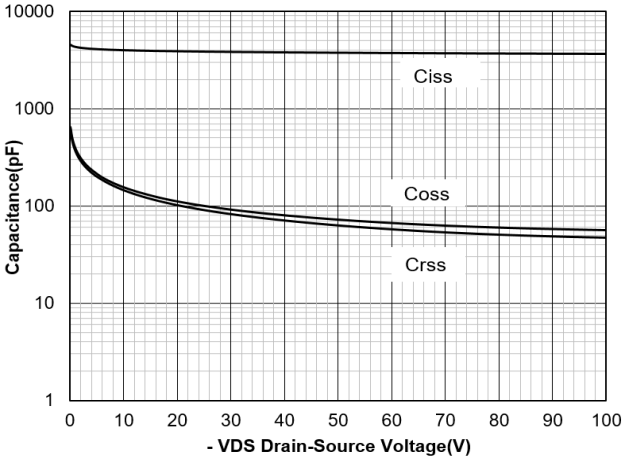


Figure 13. Capacitance Characteristics

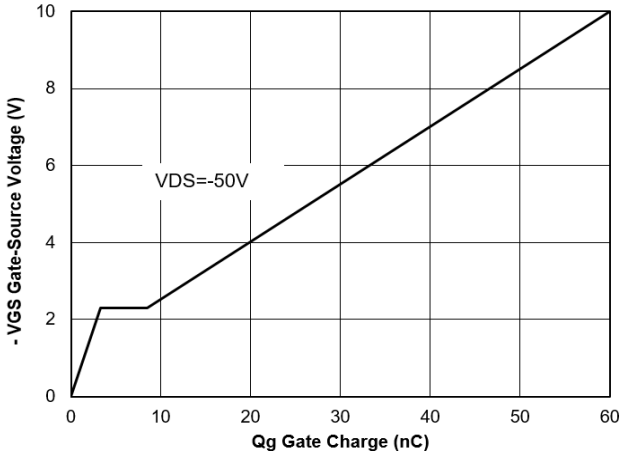


Figure 14. Gate Charge

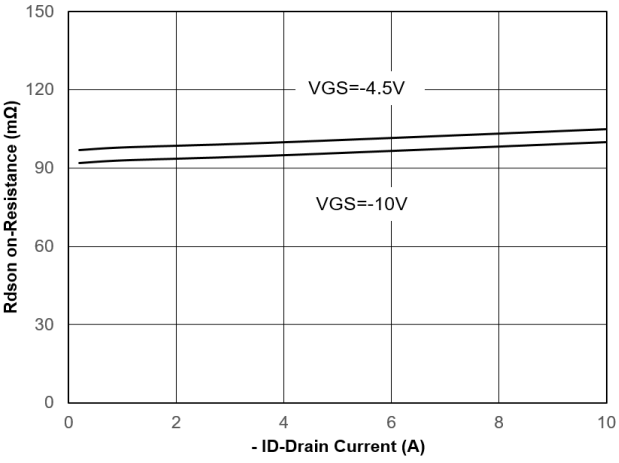


Figure 15. Drain-Source on Resistance

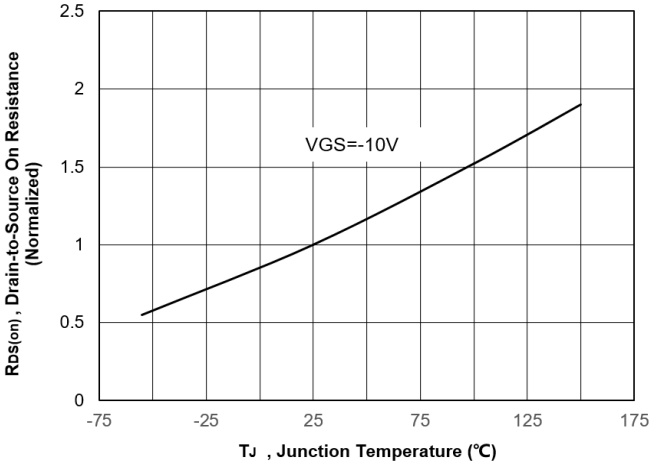


Figure 16. Normalized On-Resistance Vs. Temperature

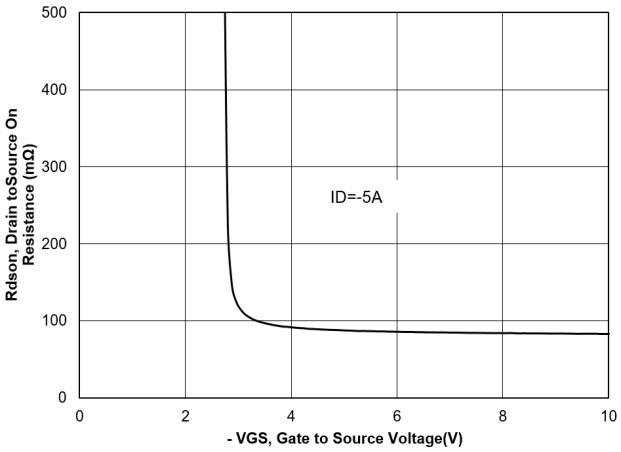


Figure 17. Typical Drain to Source ON Resistance VS Gate Voltage and Drain Current

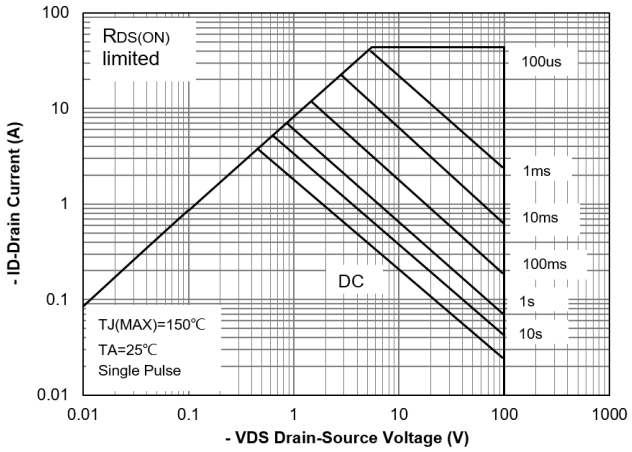


Figure 18. Safe Operation Area

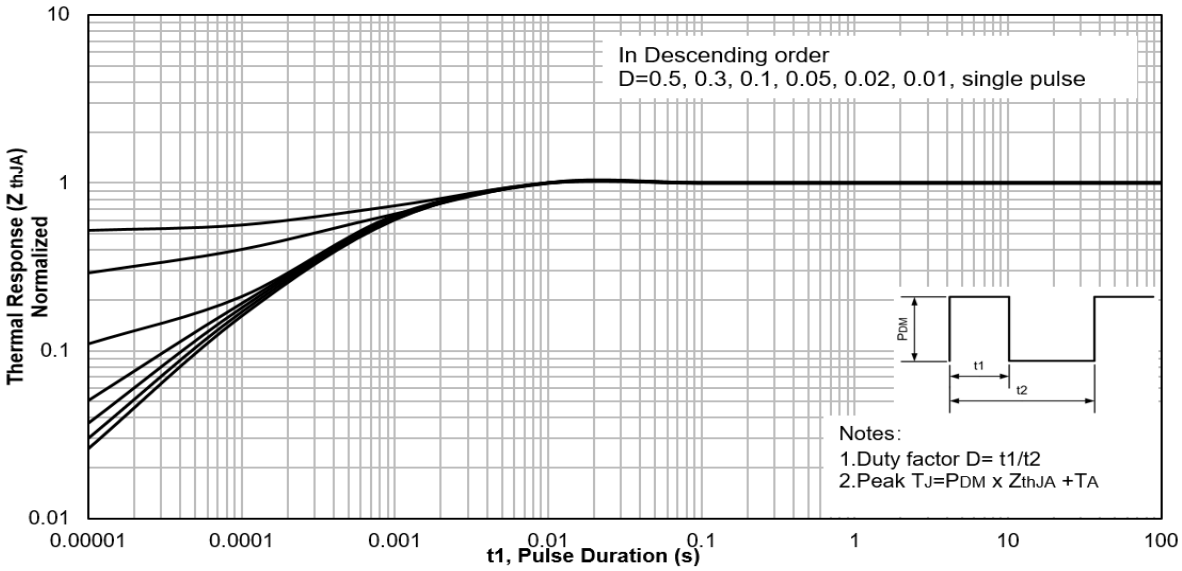


Figure 19. Maximum Effective Transient Thermal Impedance ,Junction-to-Ambient

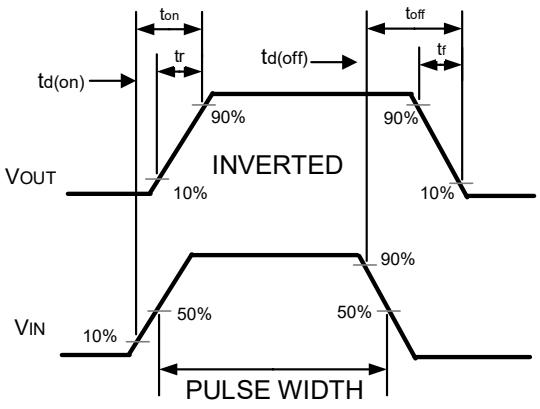
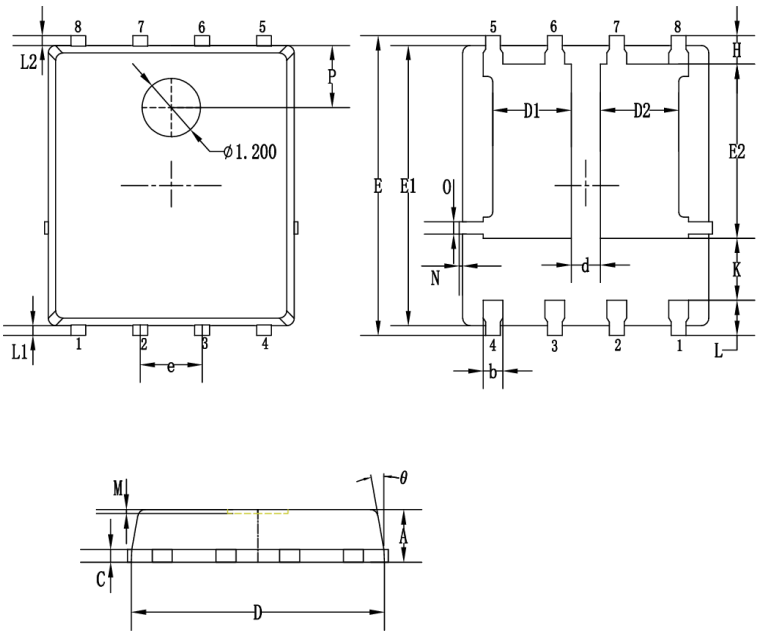


Figure 20. Switching wave

DFN 5x6 Package Outline Drawing



Symbol	Millimeters		
	Min.	Nom.	Max.
A	0.90	1.05	1.20
b	0.35	0.40	0.50
C	0.20	0.25	0.35
D	4.90	5.05	5.20
D1/D2	1.51	1.61	1.71
d	0.50	0.60	0.70
E	6.00	6.15	6.30
E1	5.60	5.75	5.90
E2	3.47	3.57	3.67
e	1.27 BSC		
H	0.48	0.58	0.68
K	1.17	1.27	1.37
L	0.64	0.74	0.84
L1/L2	0.20 REF		
θ	8°	10°	12°
M	0.08 REF		
N	0	--	0.15
O	0.25 REF		
P	1.28 REF		

Contact Information

Applied Power Microelectronics Inc.

Website: http://www.appliedpowermicro.com

Email: sales@appliedpowermicro.com

Phone: +86 (0519) 8399 3606