AP2714QD

N and P-Channel Enhancement Mosfet

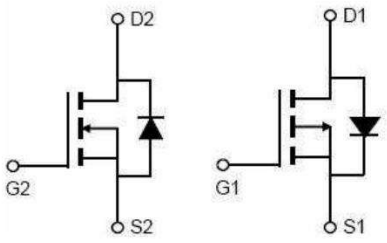
DATA SHEET

Feature

- **N-Channel**
  V_{DD}=40V,I_D=16A
  $R_{DS(ON)}$ <22mΩ @V_{GS}=10V
  $R_{DS(ON)}$ <30mΩ @V_{GS}=4.5V

- **P-Channel**
  V_{DD}=-40V,I_D=-18A
  $R_{DS(ON)}$ <35mΩ @V_{GS}=-10V
  $R_{DS(ON)}$ <50mΩ @V_{GS}=-4.5V

- Lead free product is acquired
- High power and current handing capability
- Surface mount package



N-channel P-channel

Schematic diagram

Marking and pin assignment

Application

- PWM applications
- Load Switch
- Power management

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
2714QD	AP2714QD	PDFN3X3	13 inch	-	5000

ABSOLUTE MAXIMUM RATINGS (T_a=25℃ unless otherwise noted)

Parameter	Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage	V_{DS}	40	-40	V
Gate-Source Voltage	V_{GS}	±20	±20	V
Continuous Drain Current (T_a =25℃)	I_D	16	-18	A
Continuous Drain Current (T_a =100℃)	I_D	10.2	-11.2	A
Pulsed Drain Currenr (1)	I_{DM}	40	-45	A
Power Dissipation	P_D	21		W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	6.25		℃/W
Junction Temperature	T_J	150		℃
Storage Temperature	T_{STG}	-55~ +150		℃

N-CH ELECTRICAL CHARACTERISTICS(T_a=25℃ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D =-250μA	40			V
Zero gate voltage drain current	I_{DSS}	V_{DS} =100V, V_{GS} = 0V			1	μA
Gate-body leakage current	I_{GSS}	V_{GS} =±20V, V_{DS} = 0V			±100	nA
Gate threshold voltage(2)	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA	1	1.6	2.5	V
Drain-source on-resistance(2)	$R_{DS(on)}$	V_{GS} =10V, I_D =10A		17	22	mΩ
		V_{GS} =4.5V, I_D =6A		22	30	
Dynamic characteristics						
Input Capacitance	C_{iss}	V_{DS} =20V, V_{GS} =0V, f =1MHz		1050		pF
Output Capacitance	C_{oss}			84		
Reverse Transfer Capacitance	C_{rss}			72		
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	V_{DD}=20V, I_D=5A, R_L=6Ω V_{GS}=10V, R_G=1Ω		11		ns
Turn-on rise time	t_r			13		
Turn-off delay time	$t_{d(off)}$			36		
Turn-off fall time	t_f			9		
Total Gate Charge	Qg	VDS=20V, ID=5A, VGS=10V		11		nC
Gate-Source Charge	Qgs			1.9		
Gate-Drain Charge	Qgd			2.2		
Source-Drain Diode characteristics						
Diode Forward voltage(2)	V_{DS}	V_{GS} =0V, I_S=10A			1.2	V
Diode Forward current(3)	I_S		-	-	10	A

P-CH ELECTRICAL CHARACTERISTICS(T_a=25℃ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D =-250μA	-40			V
Zero gate voltage drain current	I_{DSS}	V_{DS} =-40V, V_{GS} = 0V			1	μA
Gate-body leakage current	I_{GSS}	V_{GS} =±20V, V_{DS} = 0V			±100	nA
Gate threshold voltage(2)	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =-250μA	-1	-1.6	-2.5	V
Drain-source on-resistance(2)	$R_{DS(on)}$	V_{GS} =-10V, I_D =-8A		27	35	mΩ
		V_{GS} =-4.5V, I_D =-5A		35	50	
Dynamic characteristics						
Input Capacitance	C_{iss}	V_{DS} =-20V, V_{GS} =0V, f =1MHz		1415		pF
Output Capacitance	C_{oss}			134		
Reverse Transfer Capacitance	C_{rss}			102		
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	V_{DD}=-20V, I_D=-5A, R_L=6Ω V_{GS}=-10V, R_G=1Ω		22		ns
Turn-on rise time	t_r			16		
Turn-off delay time	$t_{d(off)}$			59		
Turn-off fall time	t_f			6		
Total Gate Charge	Qg	VDS=-20V, ID=-5A, VGS=-10V		11.5		nC
Gate-Source Charge	Qgs			3.5		
Gate-Drain Charge	Qgd			3.2		
Source-Drain Diode characteristics						
Diode Forward voltage(2)	V_{DS}	V_{GS} =0V, I_S=-12A			1.2	V
Diode Forward current(3)	I_S		-	-	-12	A

Notes:

1. Repetitive Rating: pulse width limited by maximum junction temperature
2. Pulse Test: pulse width≤300μs, duty cycle≤2%
3. Surface Mounted on FR4 Board,t≤10 sec

N-Channel

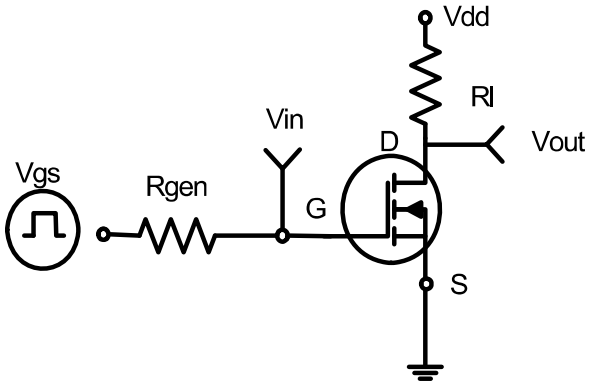


Figure 1:Switching Test Circuit

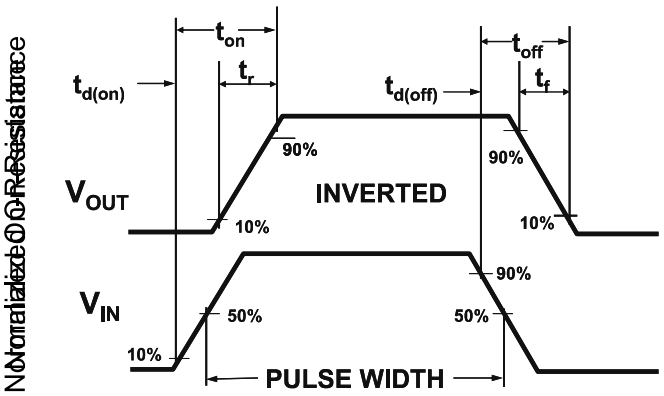
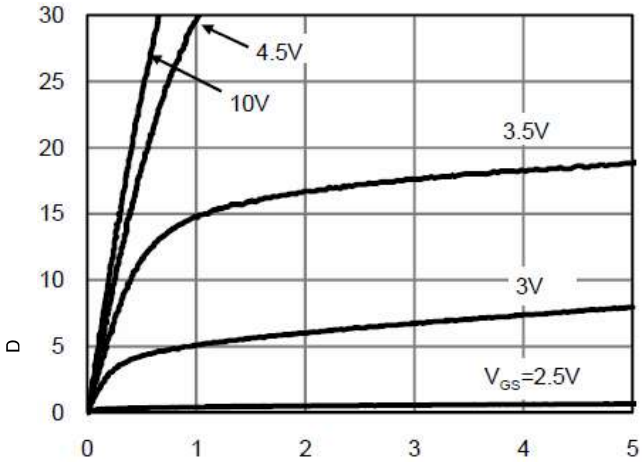
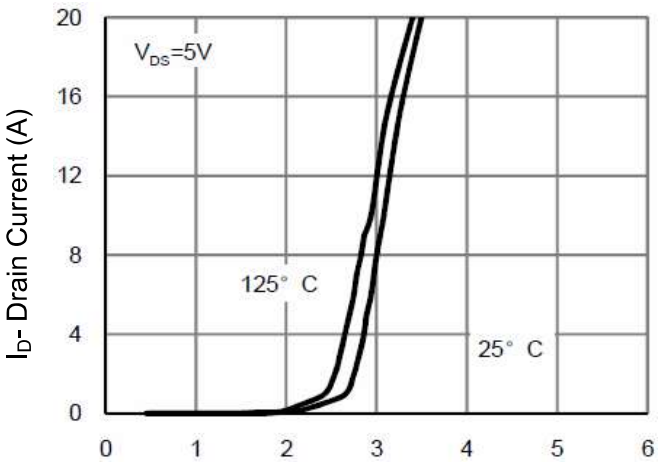


Figure 2:Switching Waveforms



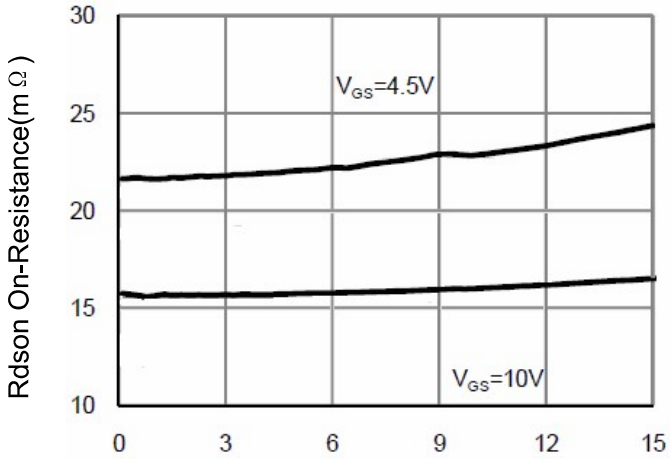
Vds Drain-Source Voltage (V)

Figure 3 Output Characteristics



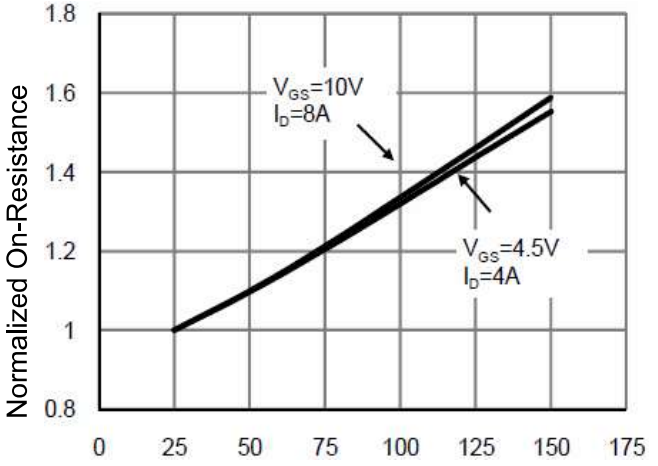
Vgs Gate-Source Voltage (V)

Figure 4 Transfer Characteristics



I_D- Drain Current (A)

Figure 5 Drain-Source On-Resistance



T_J-Junction Temperature(℃)

Figure 6 Drain-Source On-Resistance

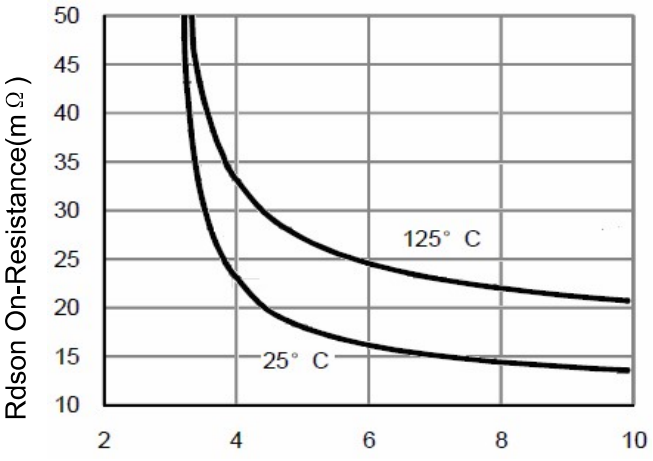


Figure7 Rdson vs Vgs

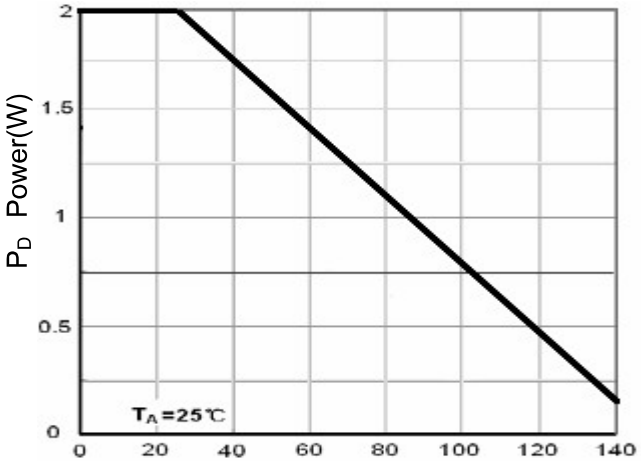


Figure 8 Power Dissipation

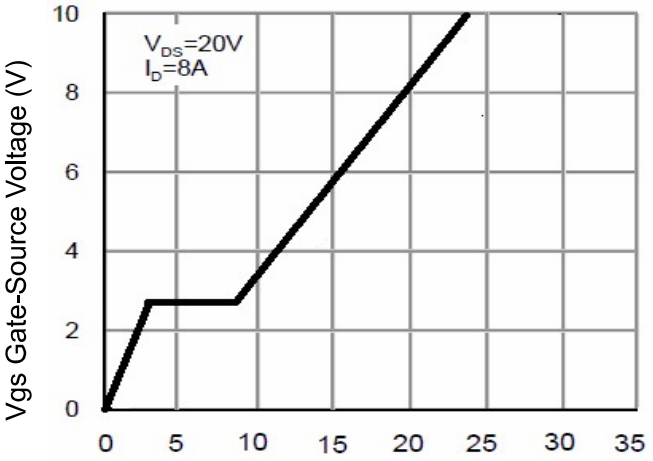


Figure 9 Gate Charge

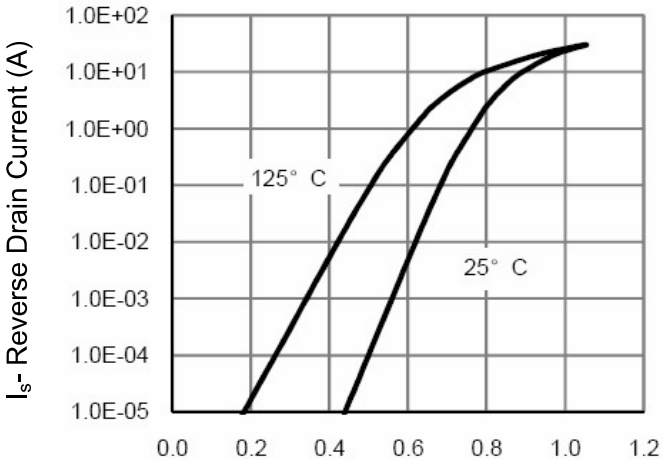


Figure 10 Source- Drain Diode Forward

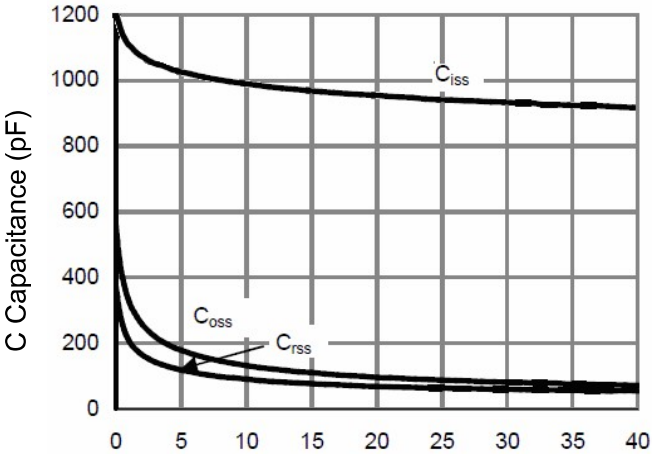


Figure 11 Capacitance vs Vds

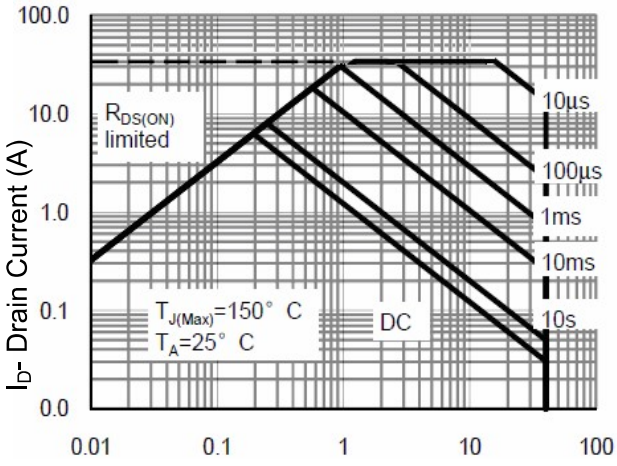


Figure 12 Safe Operation Area

P-Channel

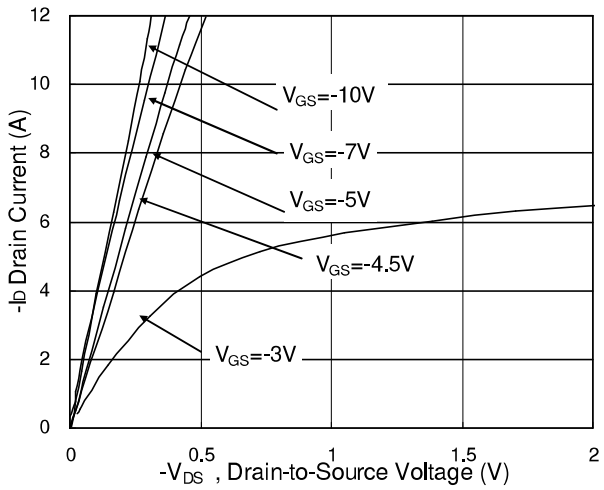


Fig.1 Typical Output Characteristics

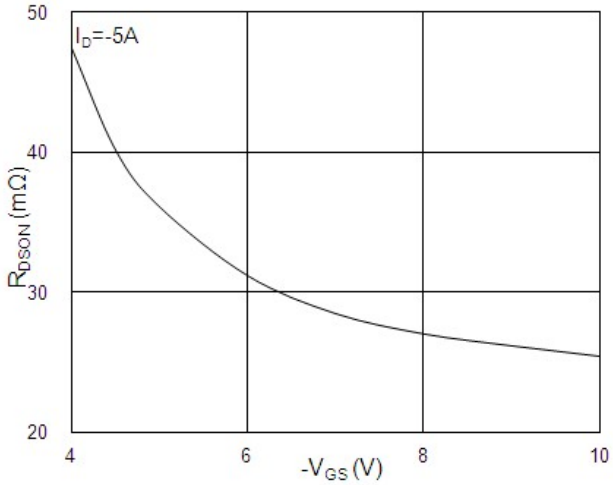


Fig.2 On-Resistance v.s Gate-Source

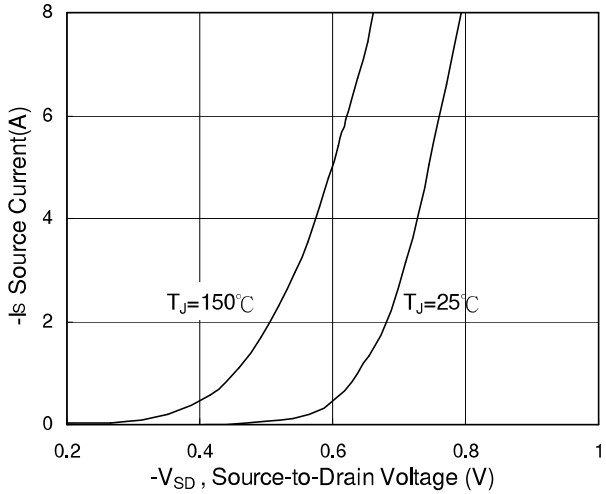


Fig.3 Forward Characteristics Of Reverse

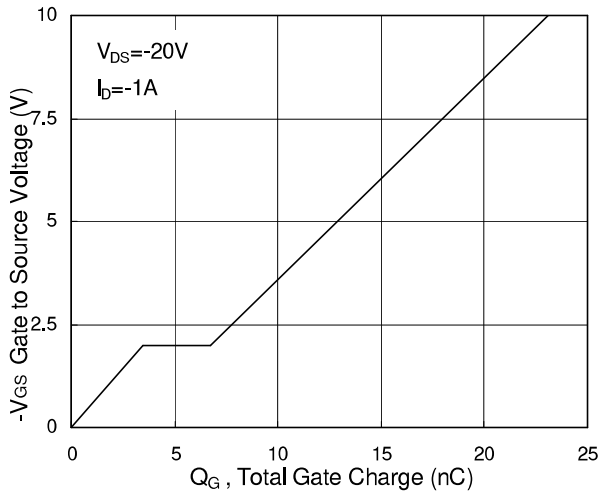


Fig.4 Gate Charge Characteristics

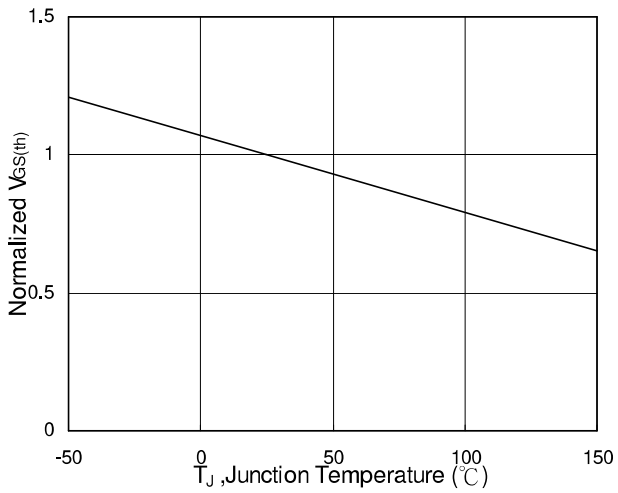


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

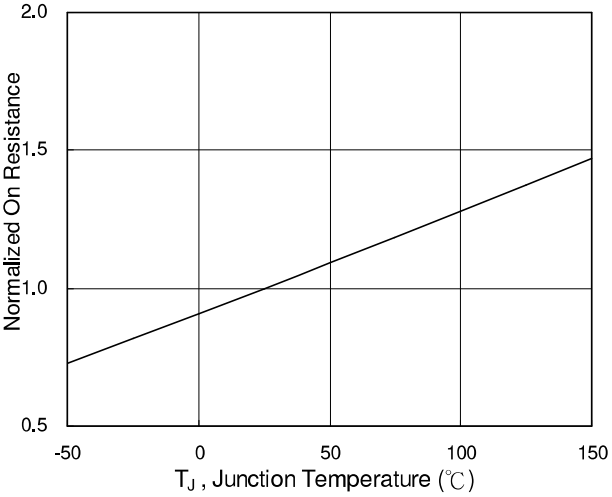


Fig.6 Normalized R_{DSON} vs. T_J

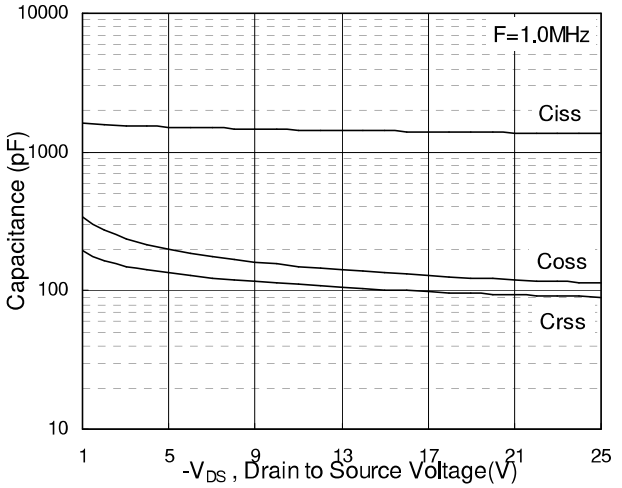


Fig.7 Capacitance

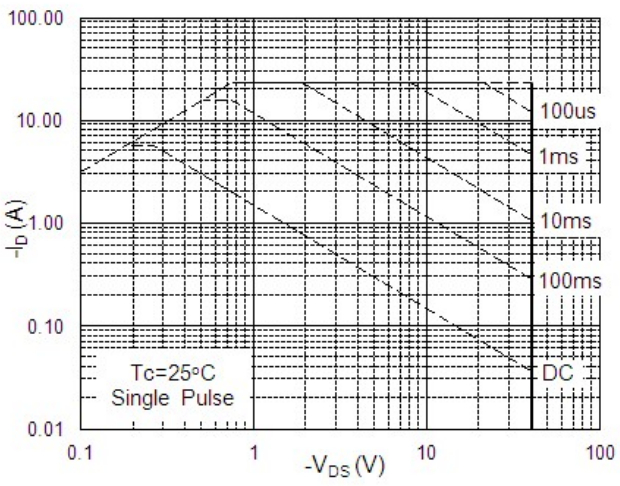


Fig.8 Safe Operating Area

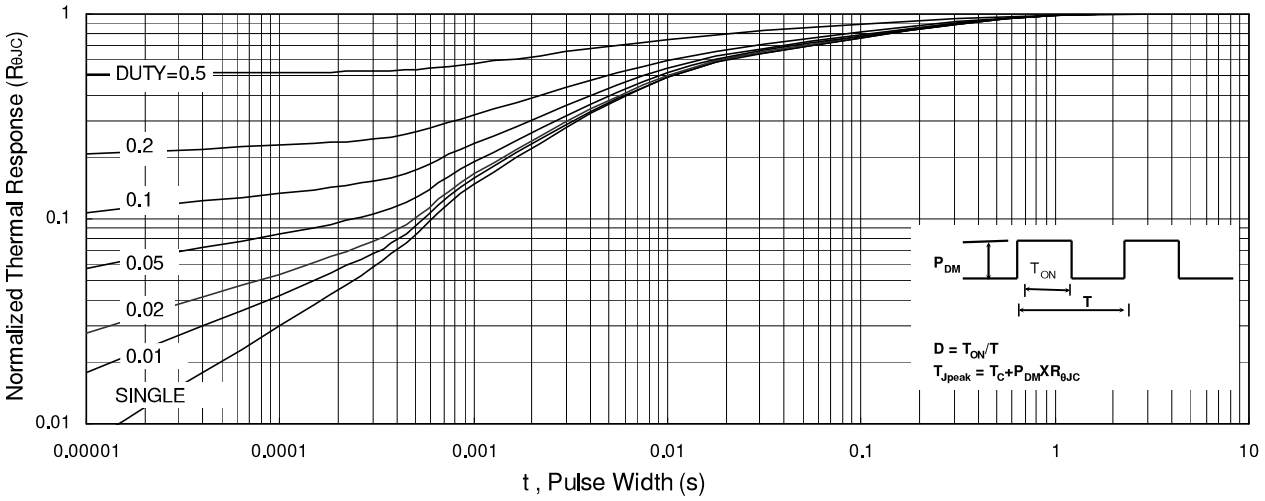


Fig.9 Normalized Maximum Transient Thermal Impedance

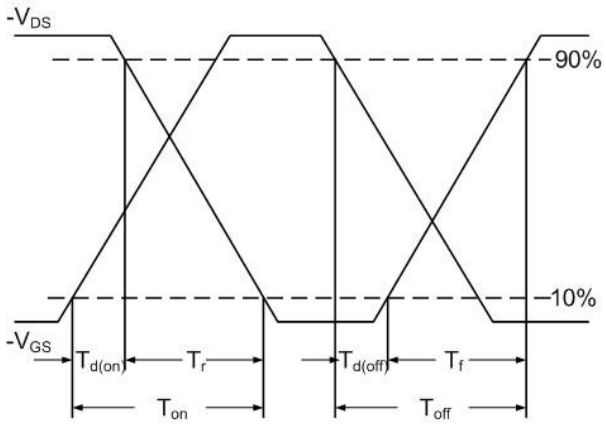


Fig.10 Switching Time Waveform

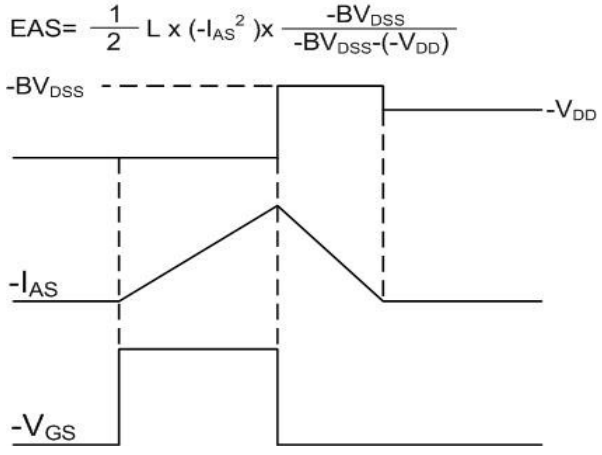


Fig.11 Unclamped Inductive Switching

PACKAGE OUTLINE DIMENSIONS