General Description

The WSF3017 is the highest performance trench N-Ch and P-Channel MOSFETs with extreme high cell density, which provide excellent $R_{DS(ON)}$ and gate charge for most of the synchronous buck converter applications.

The WSF3017 meet the RoHS and Green Product requirement 100% E_{AS} guaranteed with full function reliability approved.

Product Summery

BV_{DSS}	$R_{DS(ON)}$	I_D
30V	16mΩ	24A
-30V	38mΩ	-18A

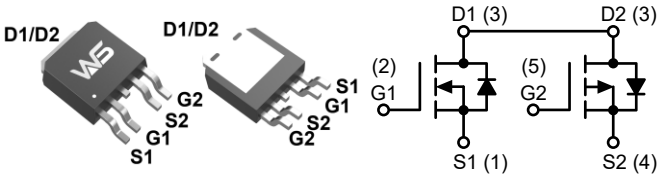
Applications

- BLDC
- DC-DC Power System

Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- 100% E_{AS} Guaranteed
- Green Device Available

TO-252-4L Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating		Units
		N-Channel	P-Channel	
V_{DS}	Drain-Source Voltage	30	-30	V
V_{GS}	Gate-Source Voltage	±20	±20	
I_D	Continuous Drain Current, $V_{GS(NP)}$ =10V , T_C=25°C	24	-18	A
	Continuous Drain Current, $V_{GS(NP)}$ =10V , T_C=100°C	10	-10	
I_{DP} [1]	Pulse Drain Current Tested, $V_{GS(NP)}$ =10V	60	-50	
E_{AS} [3]	Avalanche Energy, Single pulse, L=0.5mH	22	45	mJ
I_{AS} [3]	Avalanche Current, Single pulse, L=0.5mH	21	-30	A
P_D	Total Power Dissipation, T_C=25°C	25	25	W
T_{STG}	Storage Temperature Range	-55 to 150		°C
T_J	Operating Junction Temperature Range	150		
$R_{\theta JA}$ [2]	Thermal Resistance-Junction to Ambient, Steady State	60		°C/W
$R_{\theta JC}$	Thermal Resistance-Junction to Case, Steady State	5.1		

N-Channel Electrical Characteristics (T_J=25°C, Unless Otherwise Noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250μA	30	---	---	V
$R_{DS(ON)}$ [4]	Static Drain-Source On-Resistance	V_{GS}=10V , I_D=10A	---	16	28	mΩ
		V_{GS}=4.5V , I_D=5A	---	25	42	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D=250μA	1.0	1.6	2.5	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=20V , V_{GS}=0V , T_J=25°C	---	---	1.0	μA
		V_{DS}=20V , V_{GS}=0V , T_J=85°C	---	---	30	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1.0MHz	---	2.3	5.0	Ω
Q_g [5]	Total Gate Charge	V_{DS}=20V , V_{GS}=4.5V , I_{DS}=1A	---	7.2	---	nC
Q_{gs} [5]	Gate-Source Charge		---	1.4	---	
Q_{gd} [5]	Gate-Drain Charge		---	2.2	---	
$T_{d(on)}$ [5]	Turn-On Delay Time	V_{DD}=12V , I_{DS}=5A , V_{GS}=10V , R_G=3.3Ω	---	4.1	---	ns
T_r [5]	Rise Time		---	9.8	---	
$T_{d(off)}$ [5]	Turn-Off Delay Time		---	15.5	---	
T_f [5]	Fall Time		---	6.0	---	
C_{iss} [5]	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1.0MHz	---	611	---	pF
C_{oss} [5]	Output Capacitance		---	85	---	
C_{rss} [5]	Reverse Transfer Capacitance		---	67	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	25	A
V_{SD} [4]	Diode Forward Voltage	V_{GS}=0V , I_S=1A	---	---	1.2	V

Note:

*. Max. current is limited by bonding wire.

1. Pulse width limited by max. junction temperature.
2. $R_{\theta JA}$ steady state t=999s. $R_{\theta JA}$ is measured with the device mounted on 1in^2, FR-4 board with 2oz. Copper.
3. UIS tested and pulse width limited by maximum junction temperature 150°C (initial temperature T_J=25°C).
4. Pulse test ; pulse width ≤ 300μs, duty cycle ≤ 2%.
5. Guaranteed by design, not subject to production testing.

P-Channel Electrical Characteristics (T_J=25°C, Unless Otherwise Noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=-250μA	-30	---	---	V
$R_{DS(ON)}$ [4]	Static Drain-Source On-Resistance	V_{GS}=-10V , I_D=-4A	---	38	44	mΩ
		V_{GS}=-4.5V , I_D=-3A	---	54	62	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D=250μA	-1.2	-1.7	-2.5	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-24V , V_{GS}=0V , T_J=25°C	---	---	-1.0	μA
		V_{DS}=-24V , V_{GS}=0V , T_J=85°C	---	---	-30	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
Q_g [5]	Total Gate Charge	V_{DS}=-20V , V_{GS}=-4.5V , I_D=-4A	---	9.2	---	nC
Q_{gs} [5]	Gate-Source Charge		---	2.0	---	
Q_{gd} [5]	Gate-Drain Charge		---	3.1	---	
$T_{d(on)}$ [5]	Turn-On Delay Time	V_{DD}=-24V , I_D=-1A , R_L=15Ω , V_{GS}=-10V , R_G=3.3Ω	---	15	---	ns
T_r [5]	Rise Time		---	19	---	
$T_{d(off)}$ [5]	Turn-Off Delay Time		---	53	---	
T_f [5]	Fall Time		---	9	---	
C_{iss} [5]	Input Capacitance	V_{DS}=-15V , V_{GS}=0V , f=1.0MHz	---	910	---	pF
C_{oss} [5]	Output Capacitance		---	141	---	
C_{rss} [5]	Reverse Transfer Capacitance		---	98	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	-18	A
V_{SD} [5]	Diode Forward Voltage	V_{GS}=0V , I_S=-1A , T_J=25°C	---	---	-1.2	V

Note:

*. Max. current is limited by bonding wire.

1. Pulse width limited by max. junction temperature.
2. $R_{\theta JA}$ steady state t=999s. $R_{\theta JA}$ is measured with the device mounted on 1in^2, FR-4 board with 2oz. Copper.
3. UIS tested and pulse width limited by maximum junction temperature 150°C (initial temperature T_J=25°C).
4. Pulse test ; pulse width ≤ 300μs, duty cycle ≤ 2%.
5. Guaranteed by design, not subject to production testing.

N-Channel Typical Characteristics

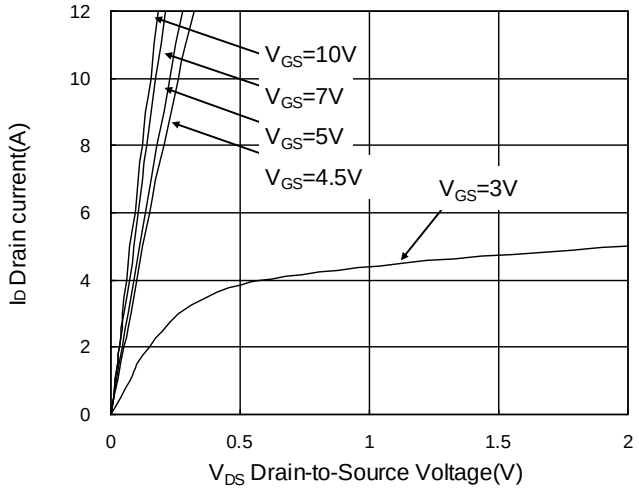


Fig.1 Typical Output Characteristics

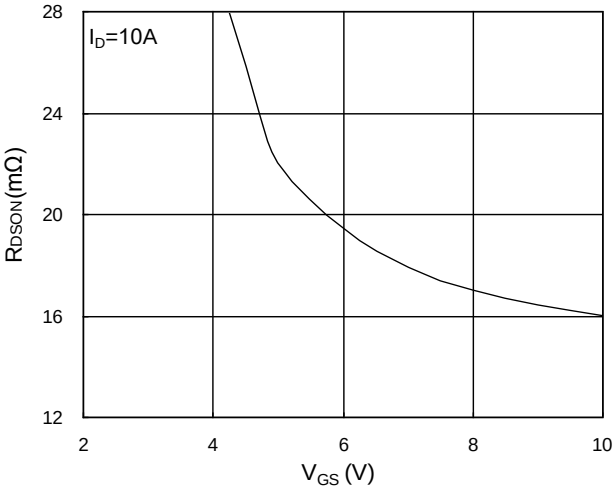


Fig.2 On-Resistance v.s Gate-Source

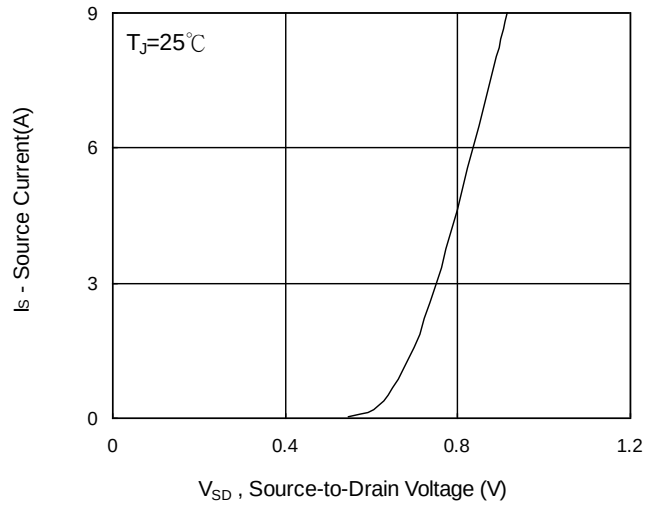


Fig.3 Forward Characteristics Of Reverse

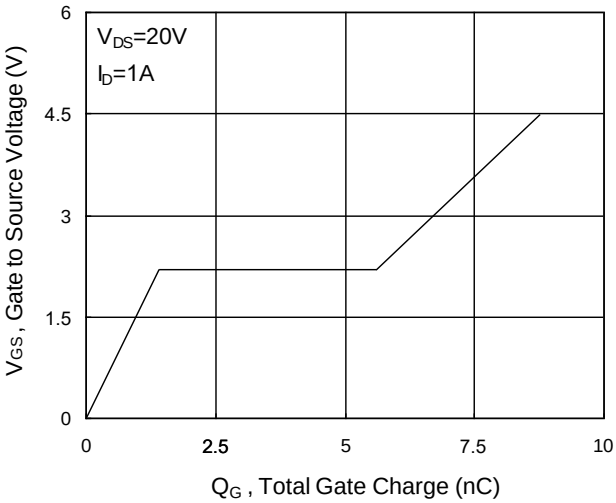


Fig.4 Gate-Charge characteristics

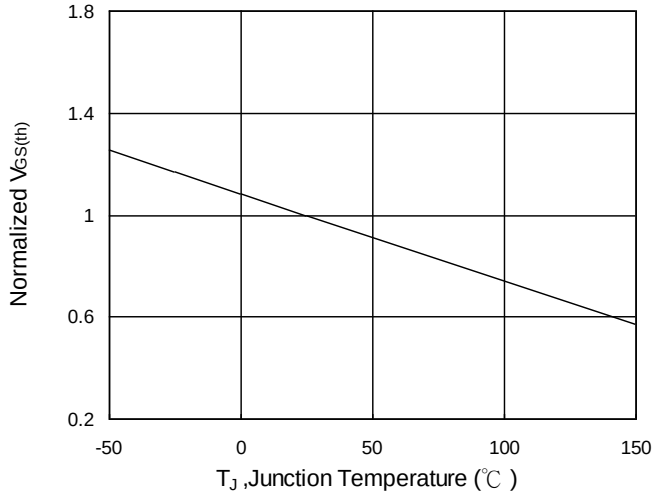


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

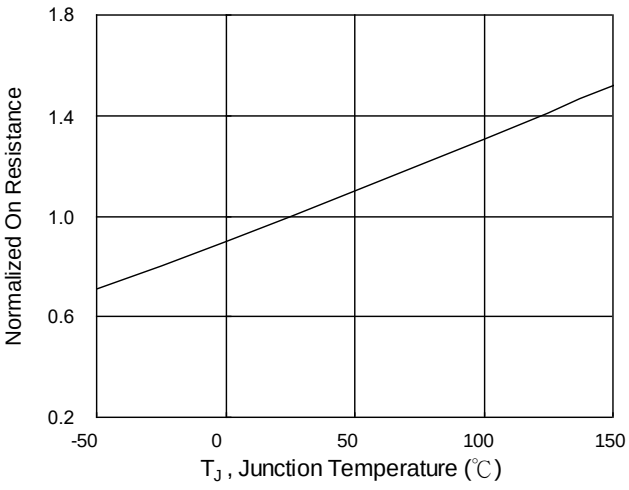


Fig.6 Normalized R_{DSON} v.s T_J

N-Channel Typical Characteristics (Cont.)

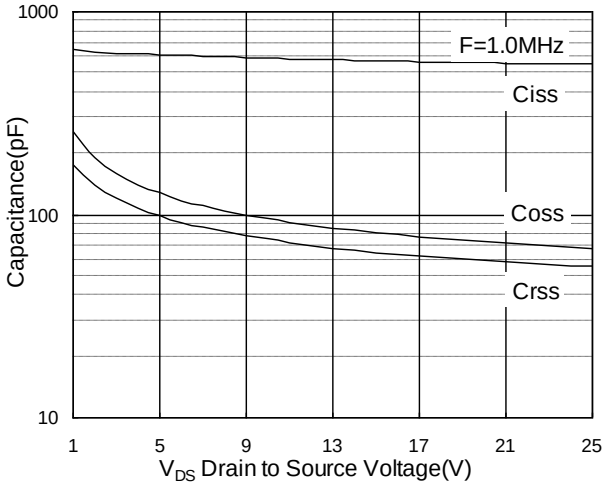


Fig.7 Capacitance

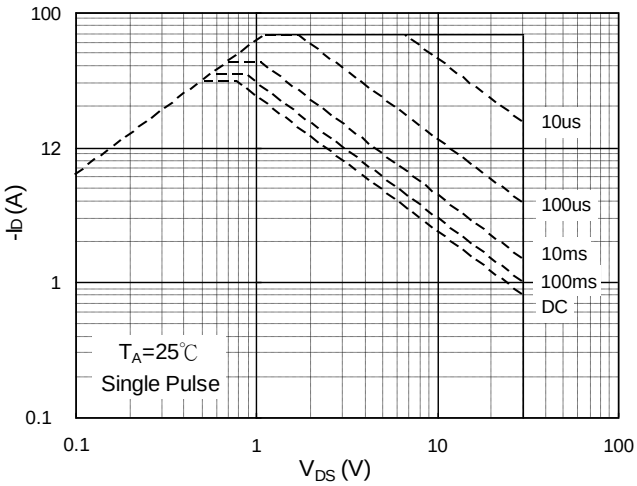


Fig.8 Safe Operating Area

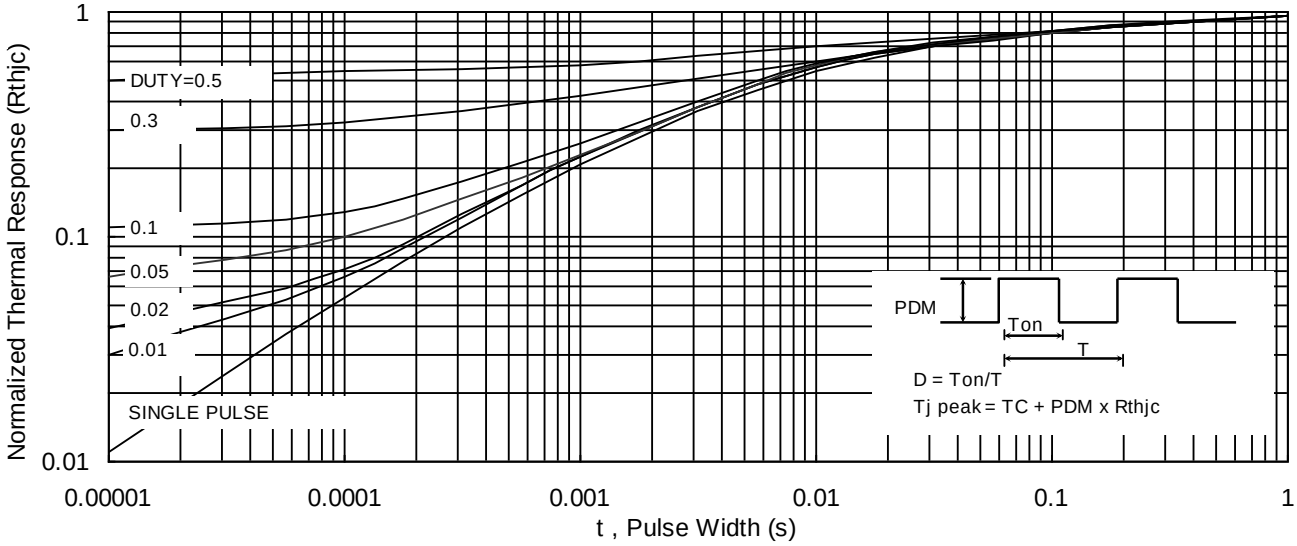


Fig.9 Normalized Maximum Transient Thermal Impedance

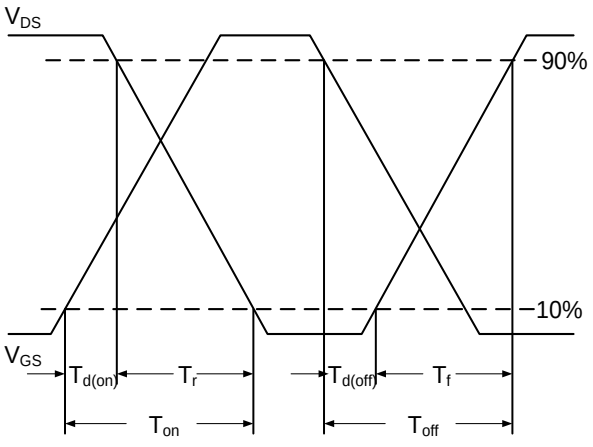


Fig.10 Switching Time Waveform

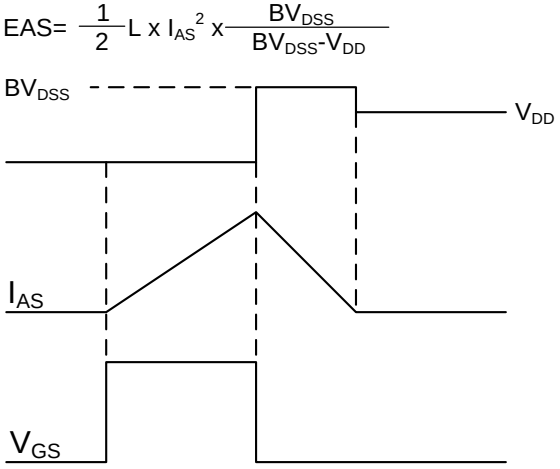


Fig.11 Unclamped Inductive Waveform

P-Channel Typical Characteristics

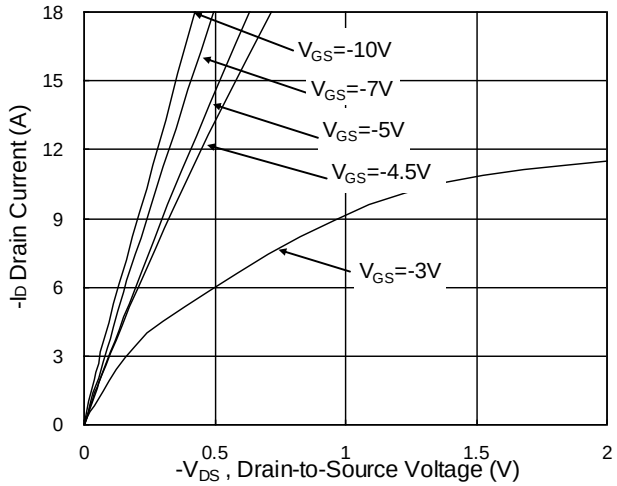


Fig.1 Typical Output Characteristics

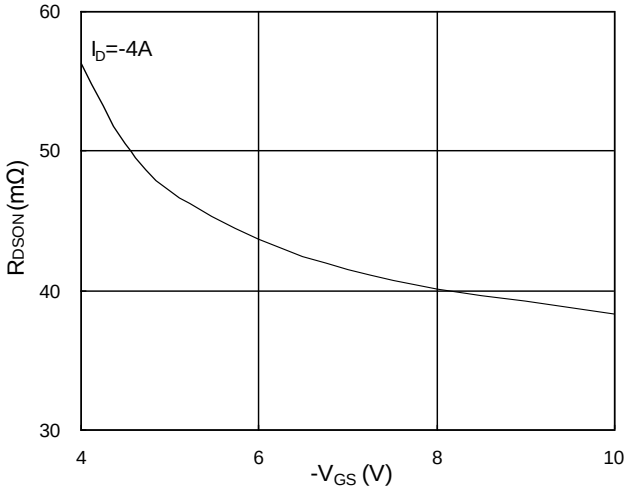


Fig.2 On-Resistance v.s Gate-Source

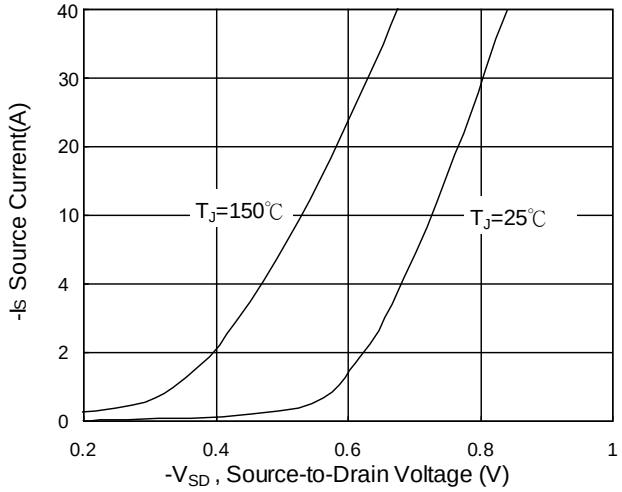


Fig.3 Forward Characteristics of Reverse

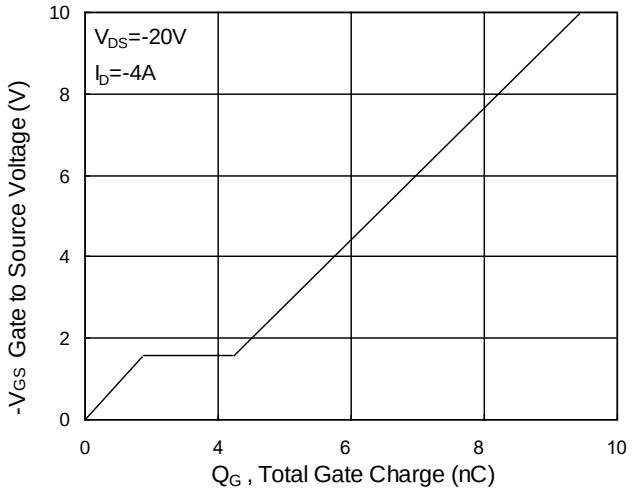


Fig.4 Gate-Charge Characteristics

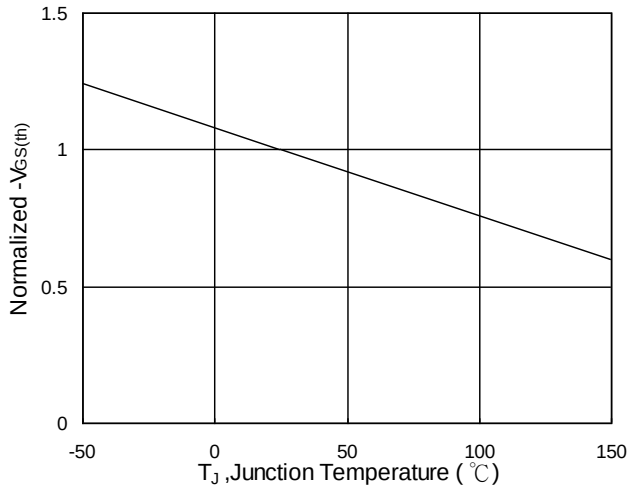


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

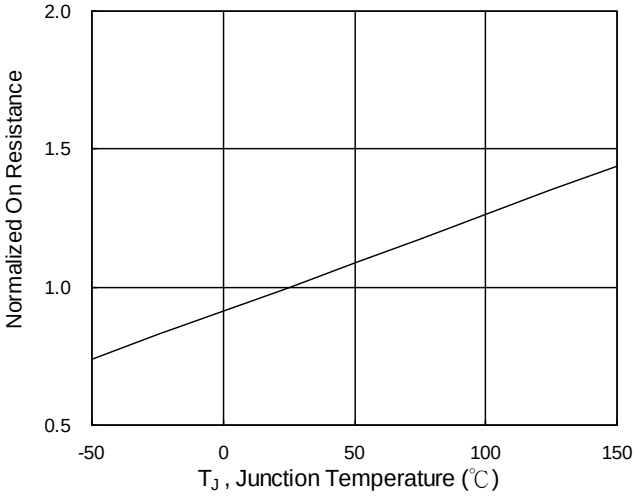


Fig.6 Normalized R_{DSON} v.s T_J

P-Channel Typical Characteristics (Cont.)

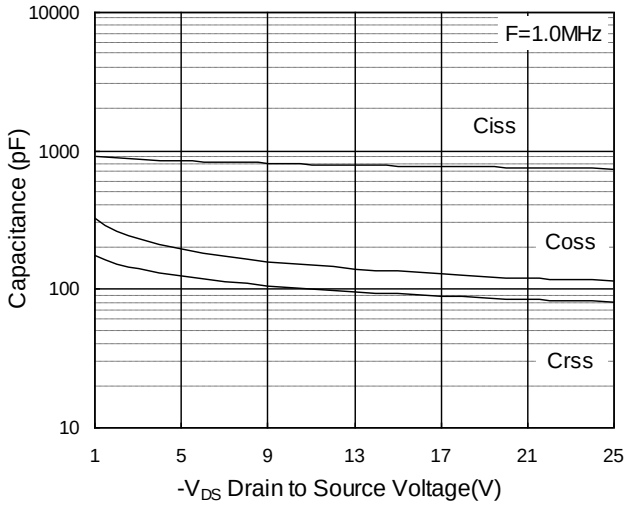


Fig.7 Capacitance

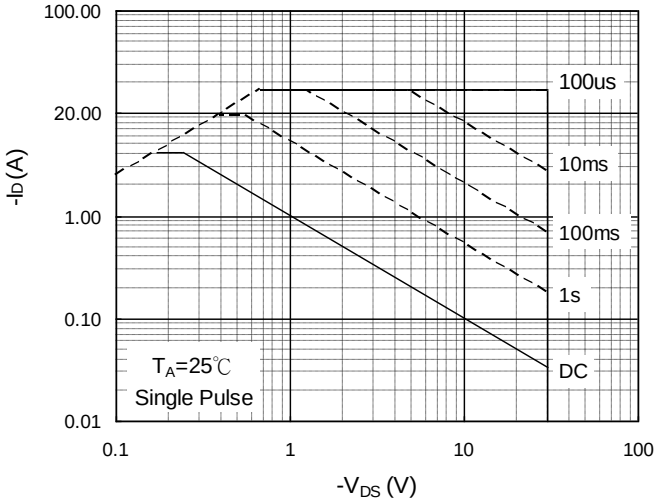


Fig.8 Safe Operating Area

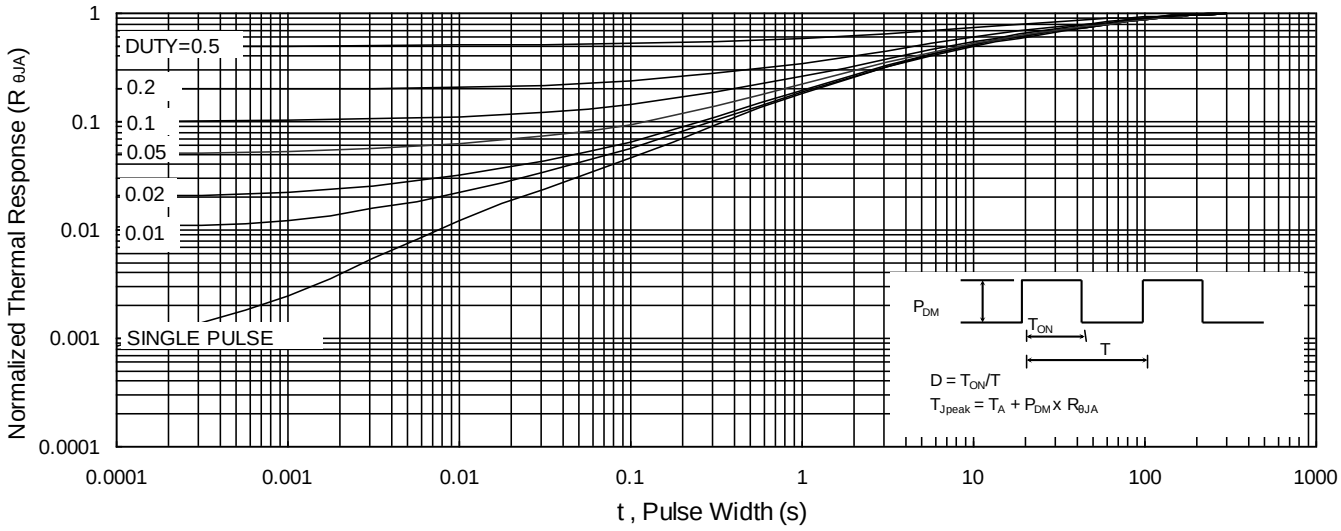


Fig.9 Normalized Maximum Transient Thermal Impedance

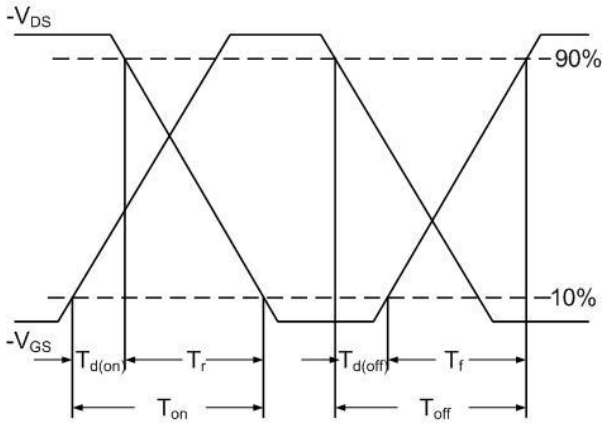


Fig.10 Switching Time Waveform

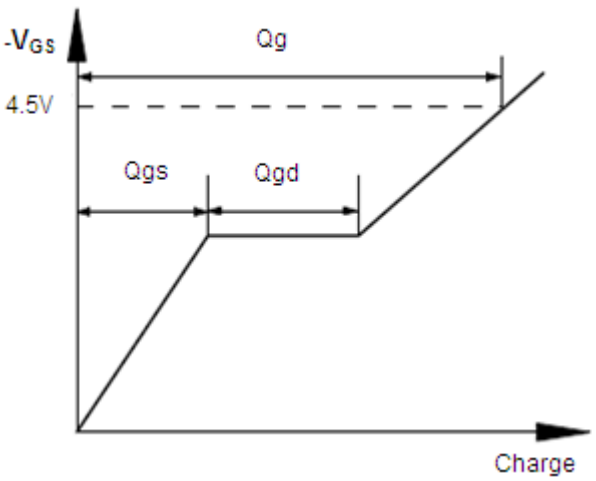
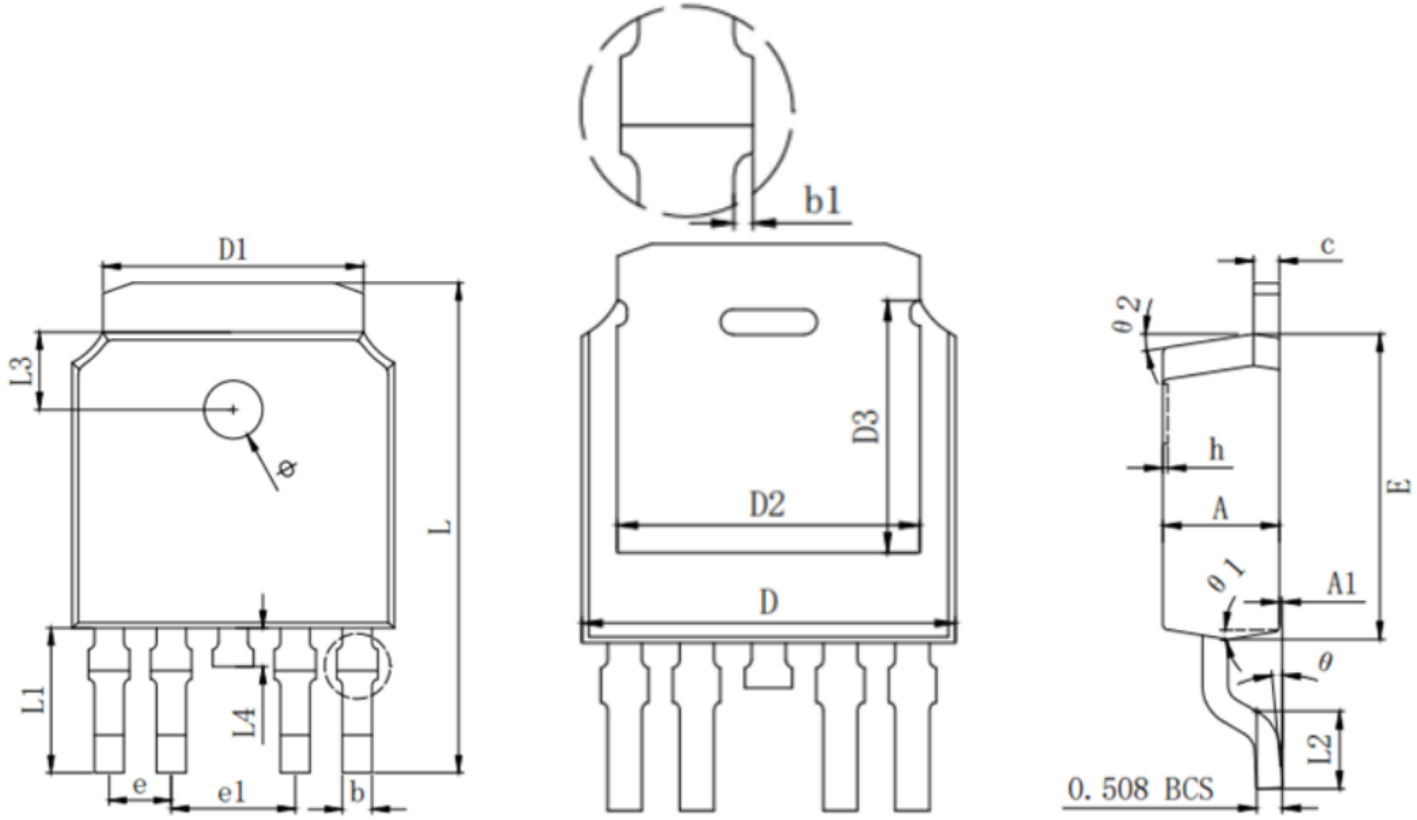


Fig.11 Gate Charge Waveform



	0,6		
	01	5	0$
A	2.200	2.300	2.400
A1	0.000	-	0.127
b	0.550	0.600	0.650
b1	0.000	-	0.120
c(电镀后)	0.460	0.520	0.580
D	6.500	6.600	6.700
D1	5.334 REF		
D2	5.346 REF		
D3	4.490 REF		
E	6.000	6.100	6.200
e	1.270 TYP		
e1	2.540 TYP		
h	0.000	0.100	0.200
L	9.900	10.100	10.300
L1	2.988 REF		
L2	1.400	1.550	1.700
L3	1.600 REF		
L4	0.700	0.800	0.900
Φ	1.100	1.200	1.300
θ	0°	-	8°
θ 1	9° TYP		
θ 2	9° TYP		

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