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

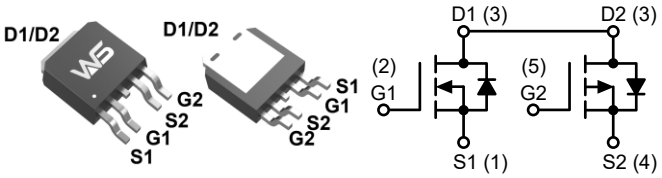
Applications

- 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

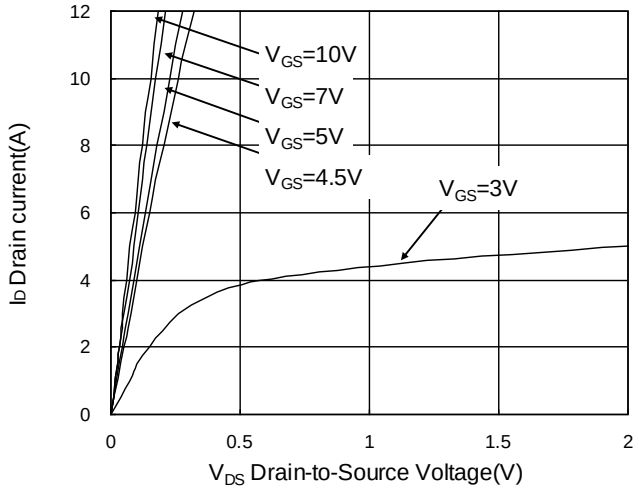


Fig.1 Typical Output Characteristics

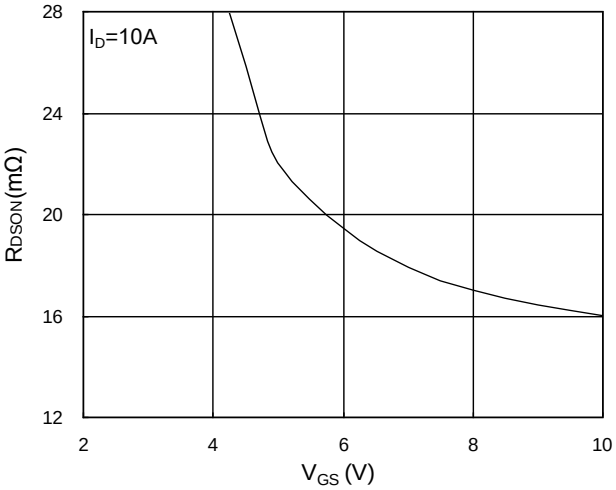


Fig.2 On-Resistance v.s Gate-Source

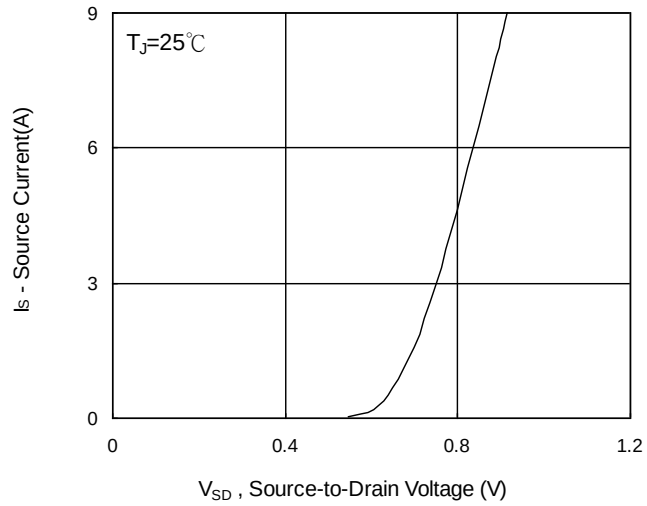


Fig.3 Forward Characteristics Of Reverse

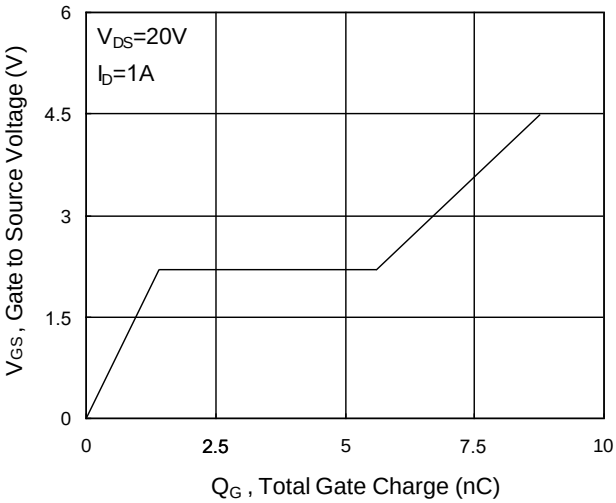


Fig.4 Gate-Charge characteristics

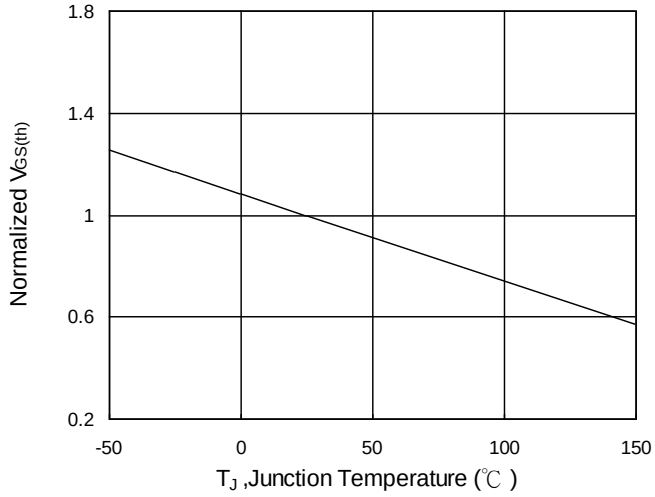


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

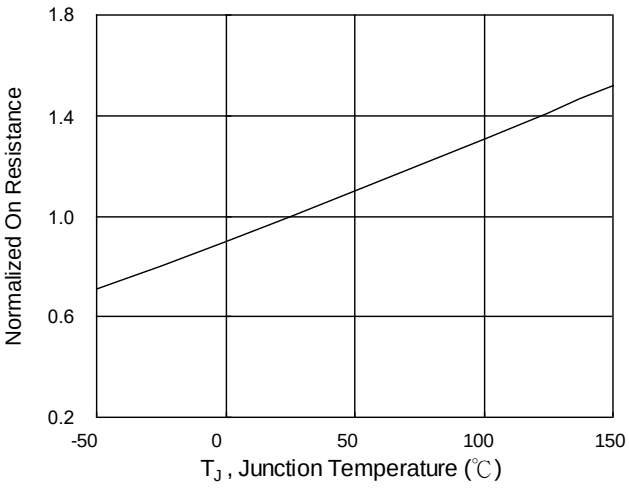


Fig.6 Normalized R_{DSON} v.s T_J

N-Channel Typical Characteristics (Cont.)

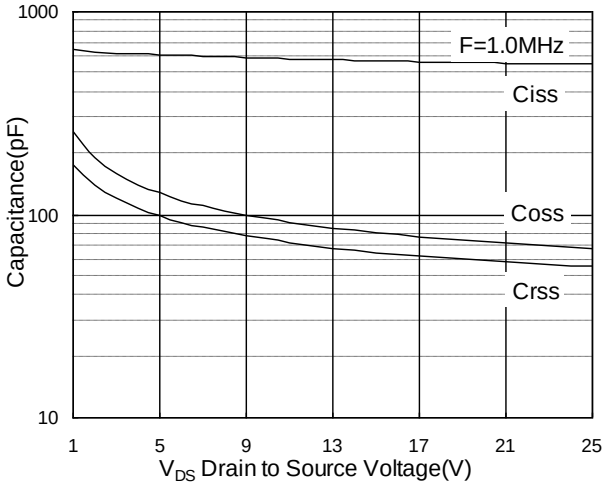


Fig.7 Capacitance

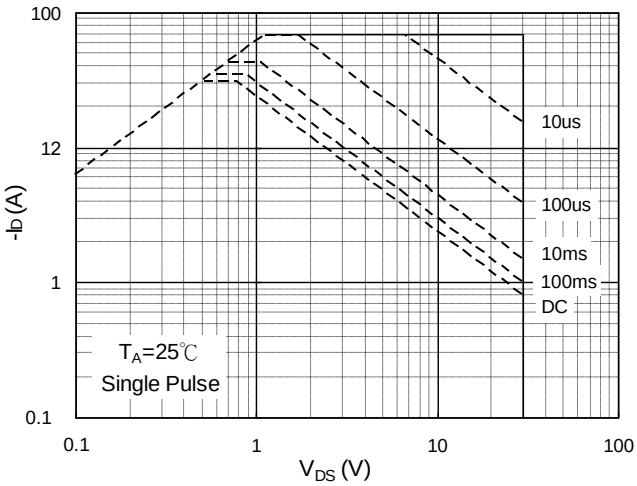


Fig.8 Safe Operating Area

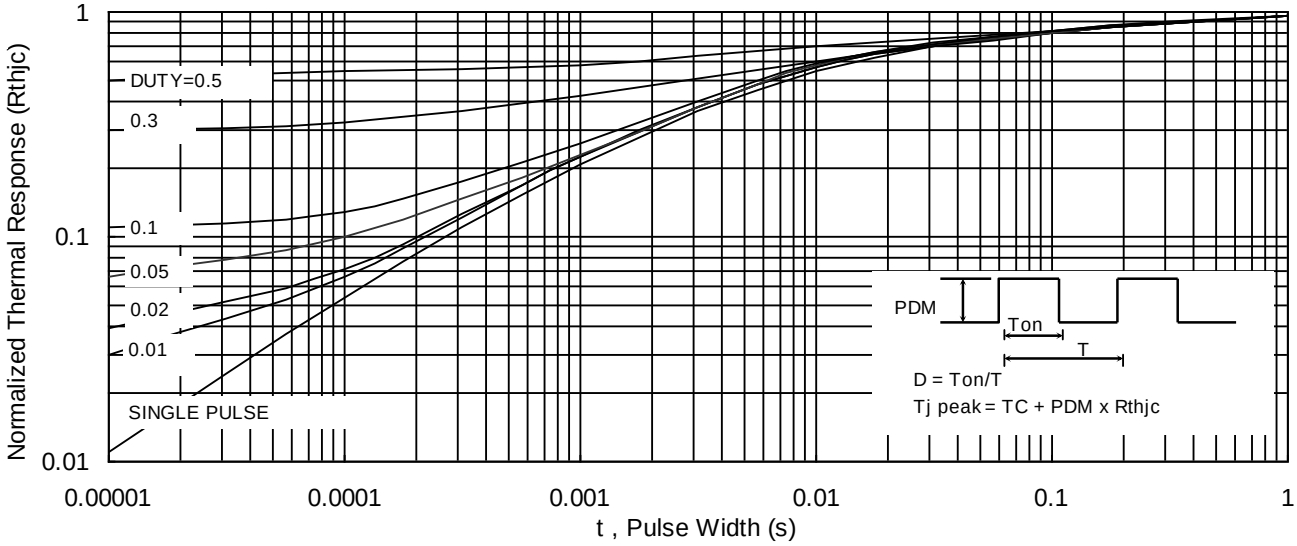


Fig.9 Normalized Maximum Transient Thermal Impedance

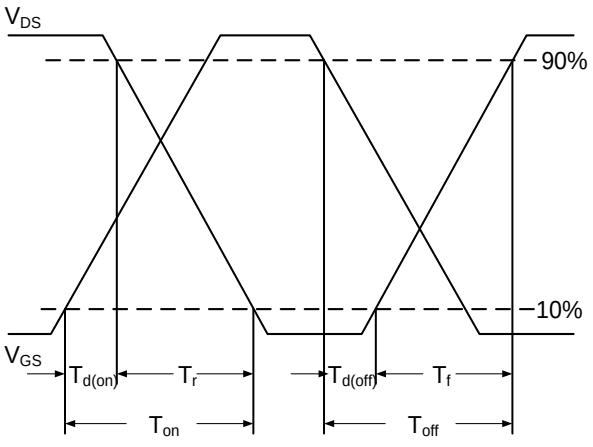


Fig.10 Switching Time Waveform

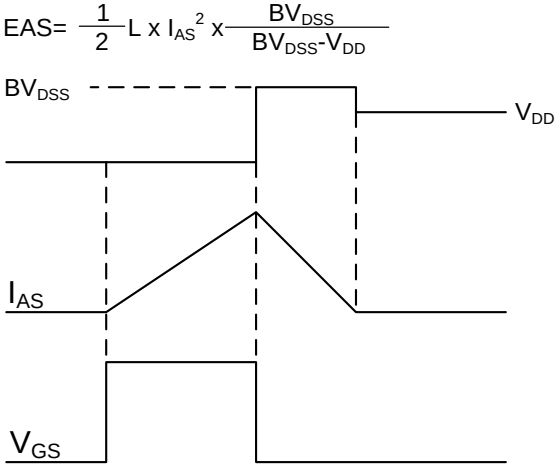


Fig.11 Unclamped Inductive Waveform

P-Channel Typical Characteristics

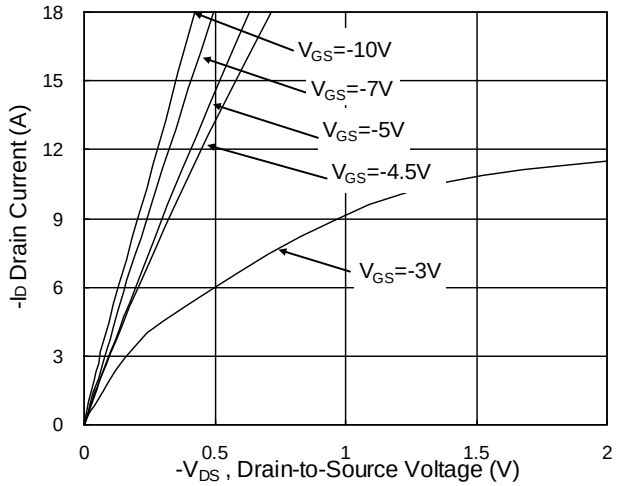


Fig.1 Typical Output Characteristics

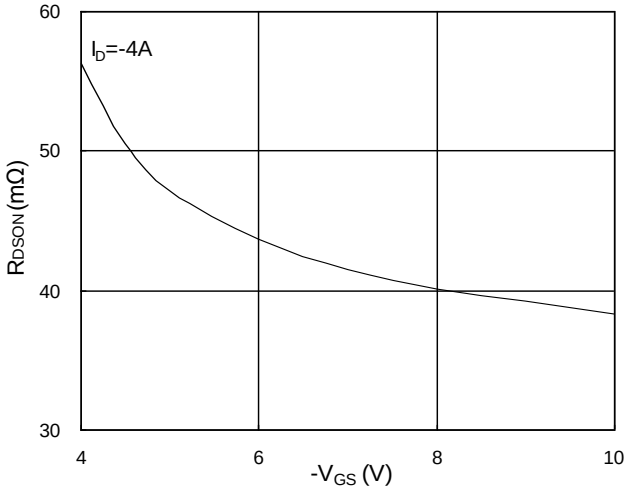


Fig.2 On-Resistance v.s Gate-Source

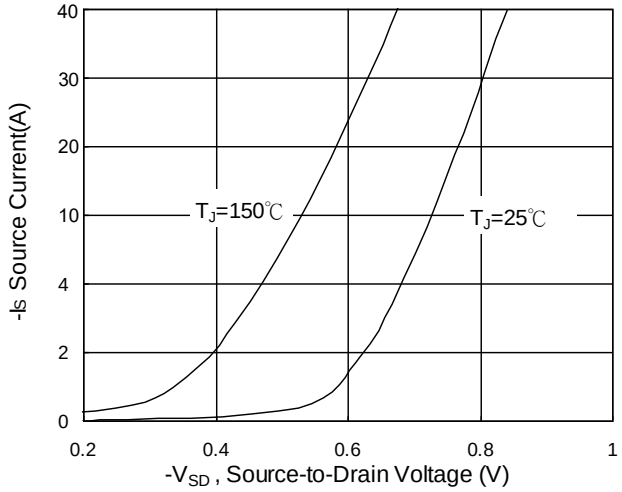


Fig.3 Forward Characteristics of Reverse

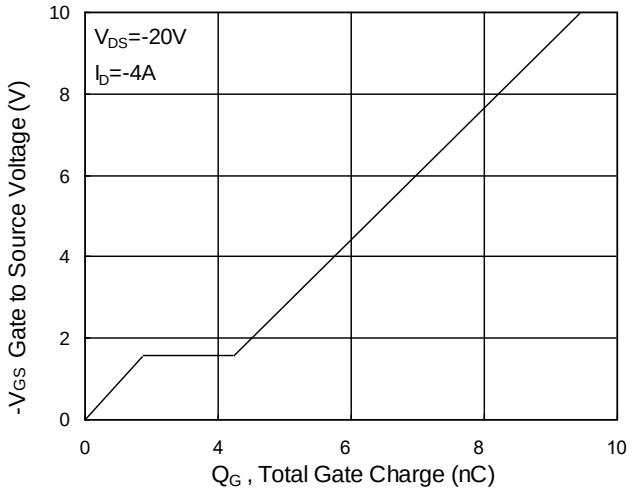


Fig.4 Gate-Charge Characteristics

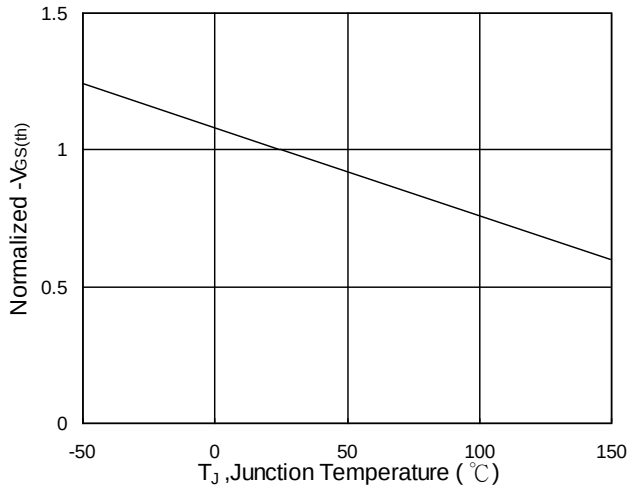


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

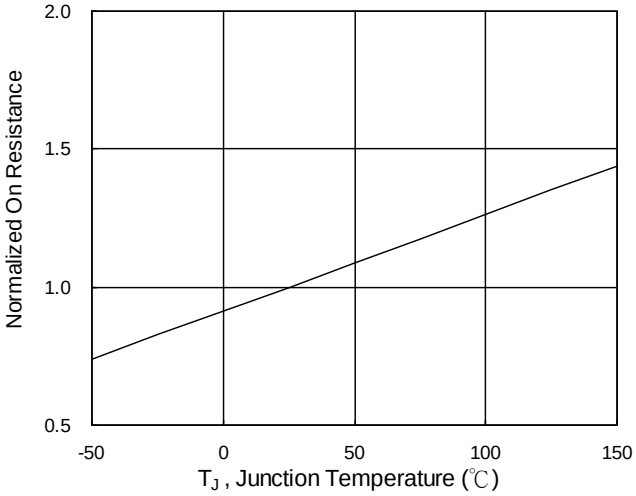


Fig.6 Normalized R_{DSON} v.s T_J

P-Channel Typical Characteristics (Cont.)

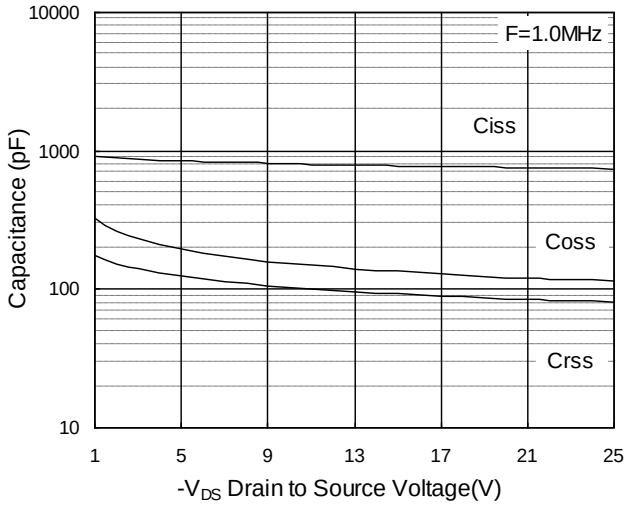


Fig.7 Capacitance

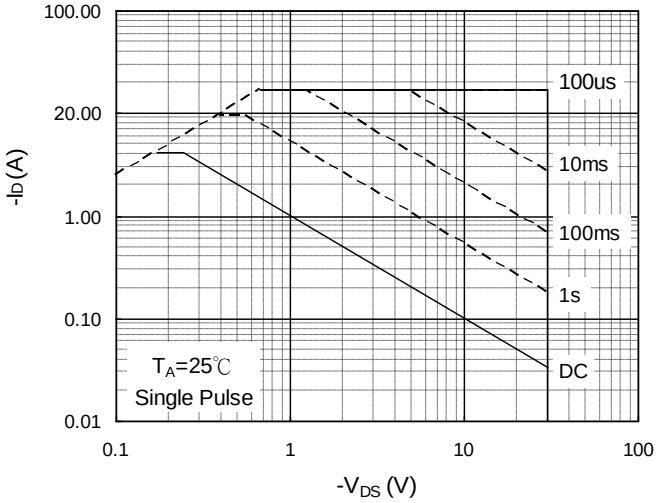


Fig.8 Safe Operating Area

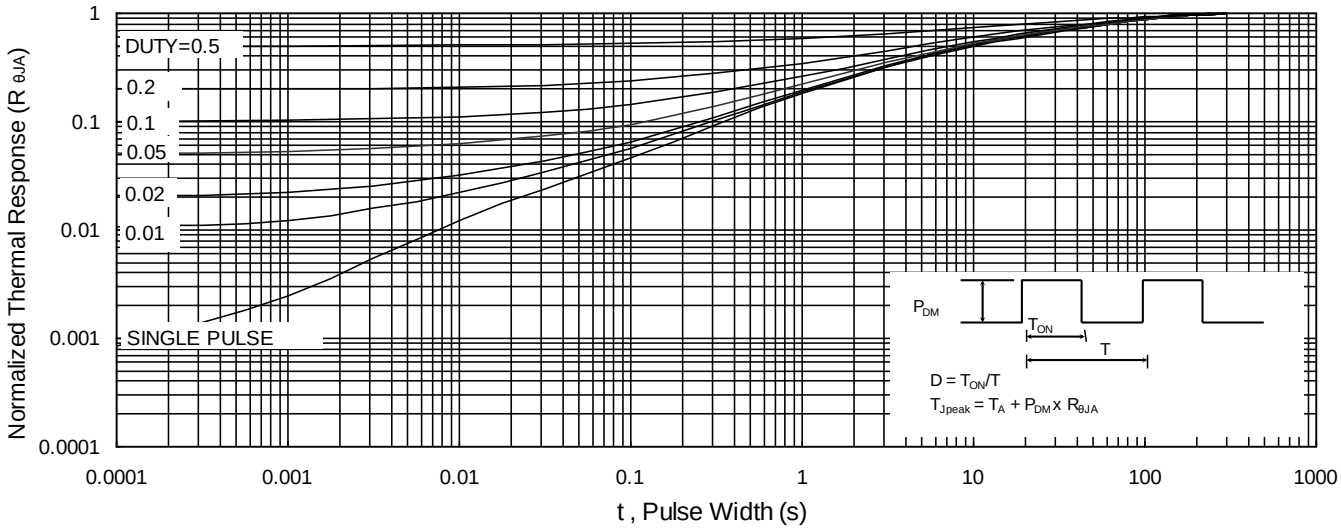


Fig.9 Normalized Maximum Transient Thermal Impedance

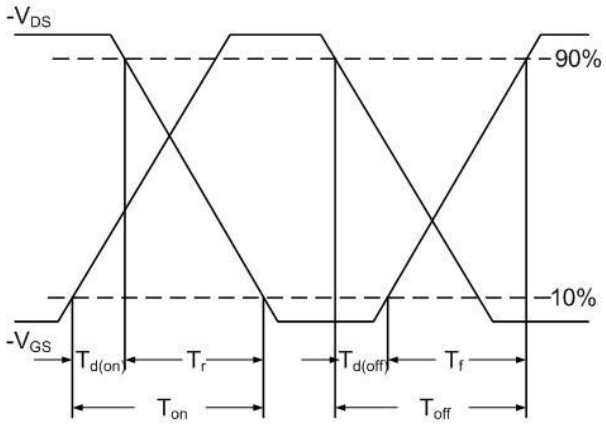


Fig.10 Switching Time Waveform

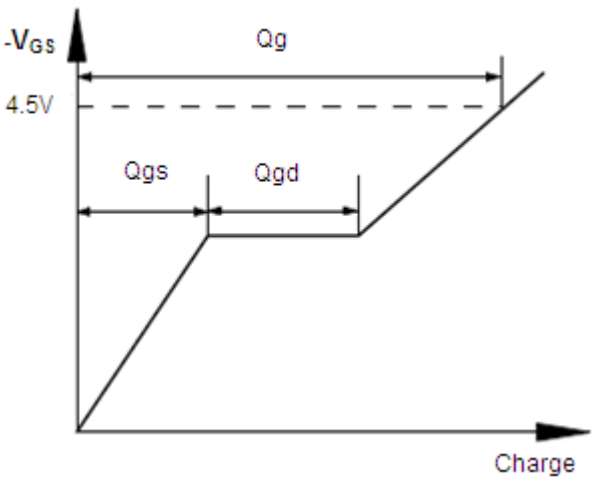
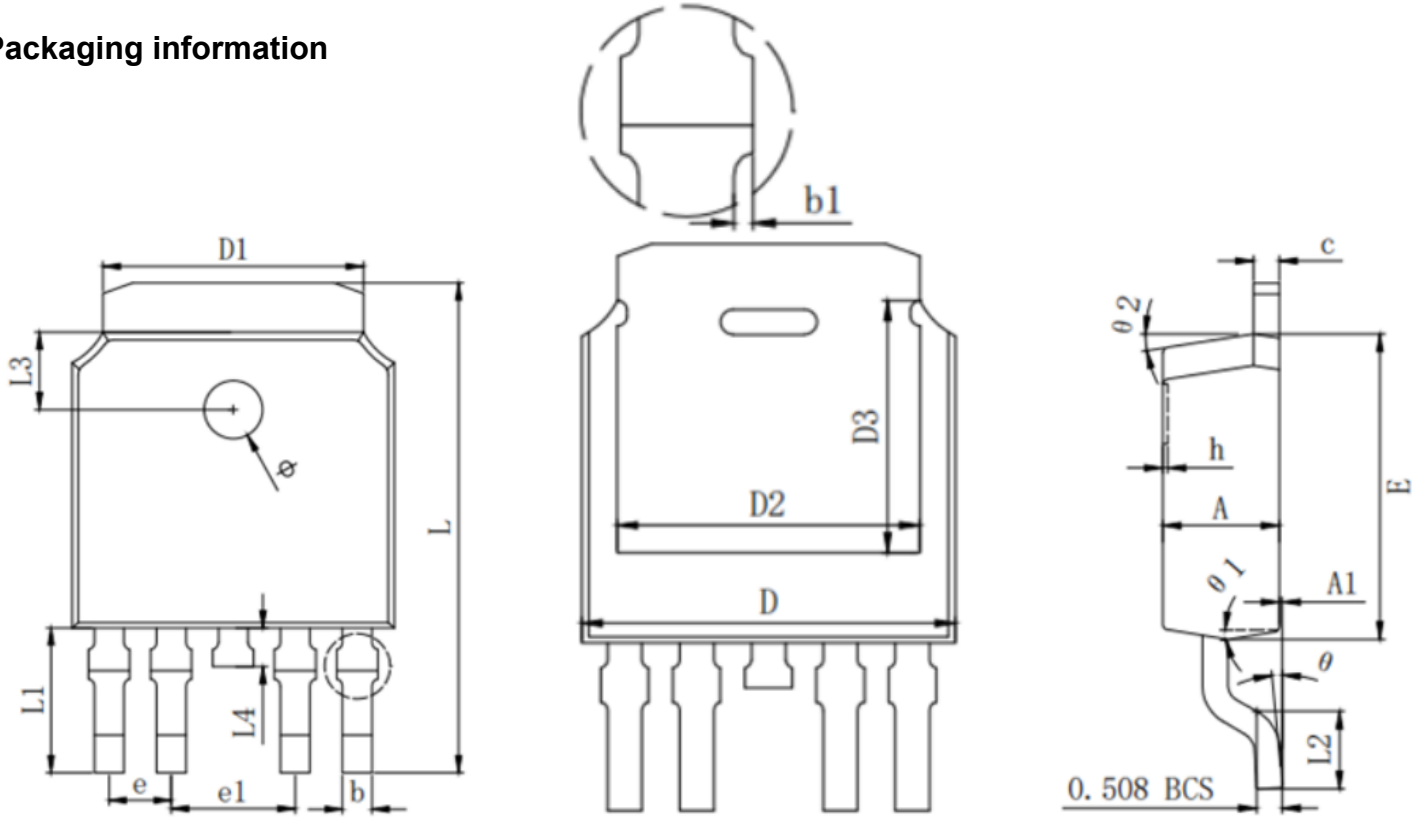


Fig.11 Gate Charge Waveform

Packaging information



SYMBOLS	MILLIMETERS		
	MIN.	Typ.	MAX.
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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