

General Description

The WSF3015 is the highest performance trench N-ch and P-ch MOSFETs with extreme high cell density, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The WSF3015 meet the RoHS and Green Product requirement 100% EAS guaranteed with full function reliability approved.

Features

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

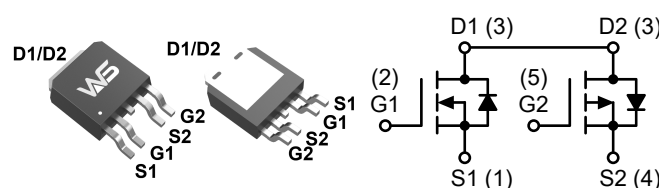
Product Summary

BV_{DSS}	$R_{DS(on)}$	I_D
30V	15mΩ	22A
-30V	25mΩ	-19A

Applications

- High Frequency Point-of-Load Synchronous Buck Converter for MB/NB/UMPC/VGA
- Networking DC-DC Power System
- CCFL Back-light Inverter

TO-252-4L Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating		Units
		N-Ch	P-Ch	
V_{DS}	Drain-Source Voltage	30	-30	V
V_{GS}	Gate-Source Voltage	± 20	± 20	V
I_D	Continuous Drain Current, $V_{GS(NP)}=10V, T_c=25^\circ C$	22	-19	A
	Continuous Drain Current, $V_{GS(NP)}=10V, T_c=100^\circ C$	10	-8	A
I_{DP}^a	Pulse Drain Current Tested, $V_{GS(NP)}=10V$	52	-45	A
E_{AS}^c	Avalanche Energy, Single pulse, L=0.5mH	22	45	mJ
I_{AS}^c	Avalanche Current, Single pulse, L=0.5mH	21	-30	A
P_D	Total Power Dissipation, $T_c=25^\circ C$	18	18	W
T_{STG}	Storage Temperature Range	-55 to 150	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	150	150	$^\circ C$
$R_{\theta JA}^b$	Thermal Resistance-Junction to Ambient, Steady State	62	62	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance-Junction to Case, Steady State	5.0	5.0	$^\circ C/W$

Note *: Max. current is limited by bonding wire.

Note a : Pulse width limited by max. junction temperature.

Note b : $R_{\theta JA}$ steady state $t=999s$. $R_{\theta JA}$ is measured with the device mounted on 1in², FR-4 board with 2oz. Copper.

Note c : UIS tested and pulse width limited by maximum junction temperature 150 $^\circ C$ (initial temperature $T_J=25^\circ C$).

N-Channel Electrical Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	30	---	---	V
$R_{DS(ON)}^d$	Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=10A$	---	15	22	m Ω
		$V_{GS}=4.5V, I_D=5A$	---	20	30	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.0	1.6	2.5	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=20V, V_{GS}=0V, T_J=25^\circ C$	---	---	1	uA
		$V_{DS}=20V, V_{GS}=0V, T_J=85^\circ C$	---	---	30	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
R_g	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1MHz$	---	2.5	5.0	Ω
Q_g^e	Total Gate Charge	$V_{DS}=20V, V_{GS}=4.5V, I_{DS}=10A$	---	7.2	---	nC
Q_{gs}^e	Gate-Source Charge		---	1.4	---	
Q_{gd}^e	Gate-Drain Charge		---	2.2	---	
$T_{d(on)}^e$	Turn-On Delay Time	$V_{DD}=15V, I_{DS}=5A, V_{GS}=10V, R_G=3.3R.$	---	4.1	---	ns
T_r^e	Rise Time		---	9.8	---	
$T_{d(off)}^e$	Turn-Off Delay Time		---	15.5	---	
T_f^e	Fall Time		---	6.0	---	
C_{iss}^e	Input Capacitance	$V_{DS}=15V, V_{GS}=0V, f=1MHz$	---	572	---	pF
C_{oss}^e	Output Capacitance		---	81	---	
C_{rss}^e	Reverse Transfer Capacitance		---	65	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_G=V_D=0V$, Force Current	---	---	10	A
V_{SD}^d	Diode Forward Voltage	$V_{GS}=0V, I_S=1A, T_J=25^\circ C$	---	---	1.2	V

Note d : Pulse test ; pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

Note e : Guaranteed by design, not subject to production testing.

P-Channel Electrical Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-30	---	---	V
$R_{DS(ON)}^d$	Static Drain-Source On-Resistance	$V_{GS}=-10V, I_D=-7A$	---	25	33	m Ω
		$V_{GS}=-4.5V, I_D=-5A$	---	37	54	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1.0	---	-2.8	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-20V, V_{GS}=0V, T_J=25^\circ C$	---	---	-1	μA
		$V_{DS}=-20V, V_{GS}=0V, T_J=85^\circ C$	---	---	-30	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
Q_g^e	Total Gate Charge	$V_{DS}=-15V, V_{GS}=-4.5V, I_D=-12A$	---	9.8	---	nC
Q_{gs}^e	Gate-Source Charge		---	2.2	---	
Q_{gd}^e	Gate-Drain Charge		---	3.4	---	
$T_{d(on)}^e$	Turn-On Delay Time	$V_{DD}=-15V, V_{GS}=-10V, R_G=6\Omega, I_D=-1A, R_L=15\Omega,$	---	16.4	---	ns
T_r^e	Rise Time		---	20.2	---	
$T_{d(off)}^e$	Turn-Off Delay Time		---	55	---	
T_f^e	Fall Time		---	10	---	
C_{iss}^e	Input Capacitance	$V_{DS}=-15V, V_{GS}=0V, f=1MHz$	---	930	---	pF
C_{oss}^e	Output Capacitance		---	148	---	
C_{rss}^e	Reverse Transfer Capacitance		---	115	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_G=V_D=0V$, Force Current	---	---	-8	A
V_{SD}^e	Diode Forward Voltage	$V_{GS}=0V, I_S=-1A, T_J=25^\circ C$	---	---	-1.2	V

Note d : Pulse test; pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

Note e : Guaranteed by design, not subject to production testing.

N-Channel Typical Characteristics

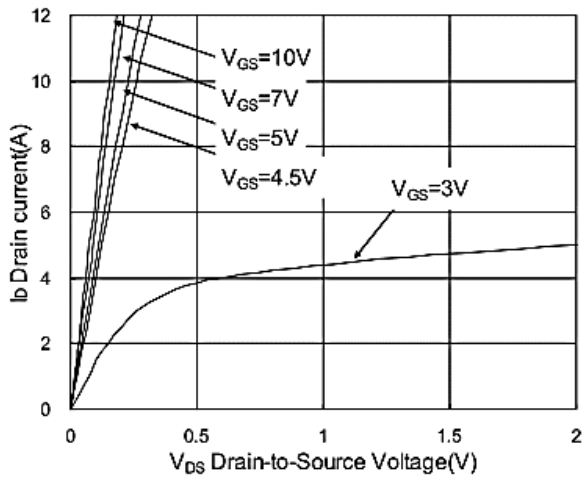


Fig.1 Typical Output Characteristics

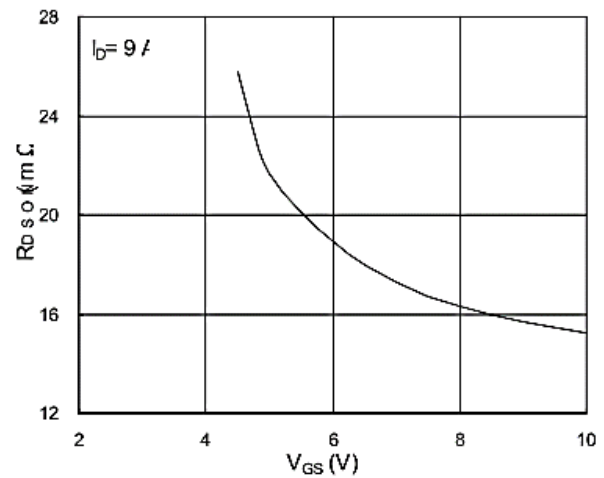


Fig.2 On-Resistance v.s Gate-Source

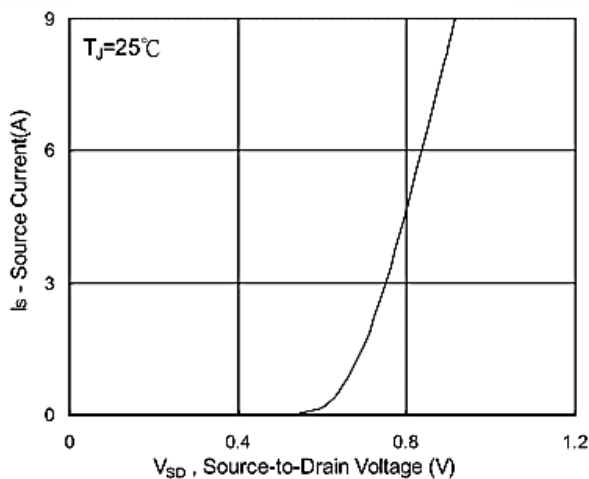


Fig.3 Forward Characteristics Of Reverse

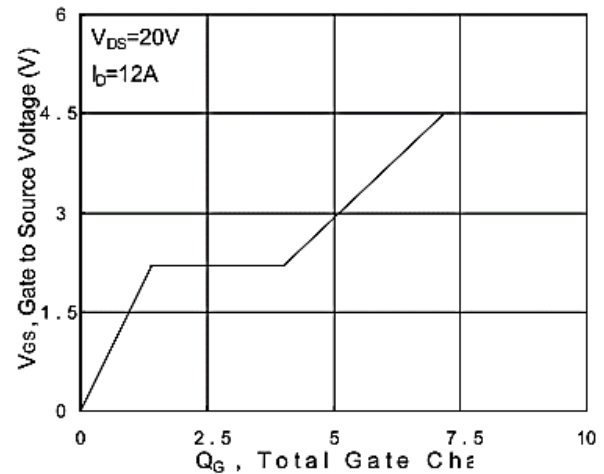


Fig.4 Gate-Charge characteristics

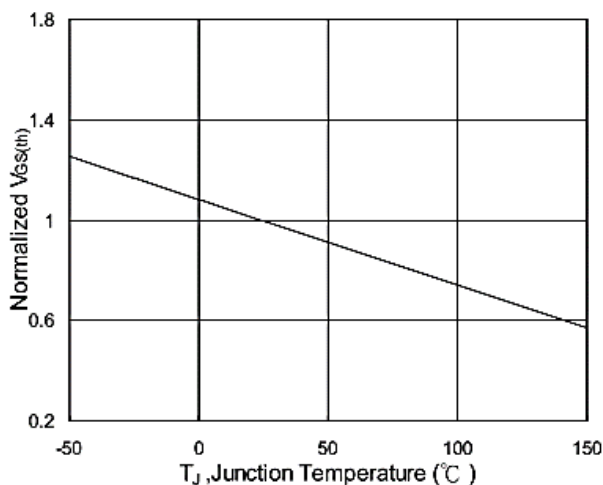


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

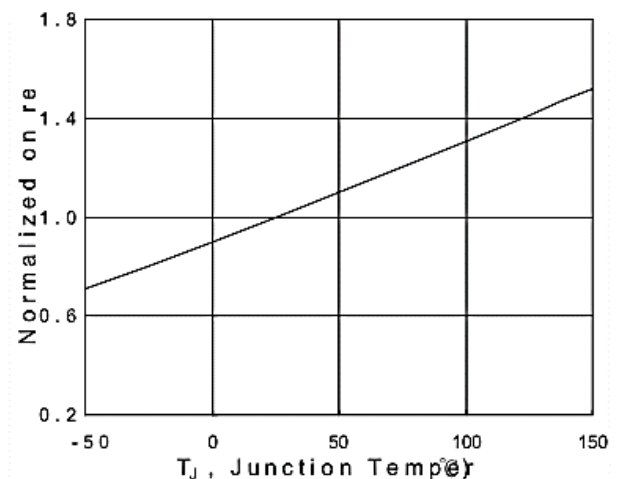


Fig.6 Normalized $R_{DS(on)}$ v.s T_J

N-Channel Typical Characteristics (Cont.)

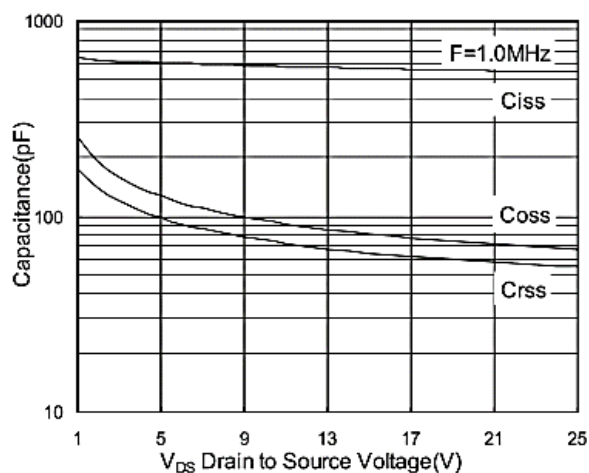


Fig.7 Capacitance

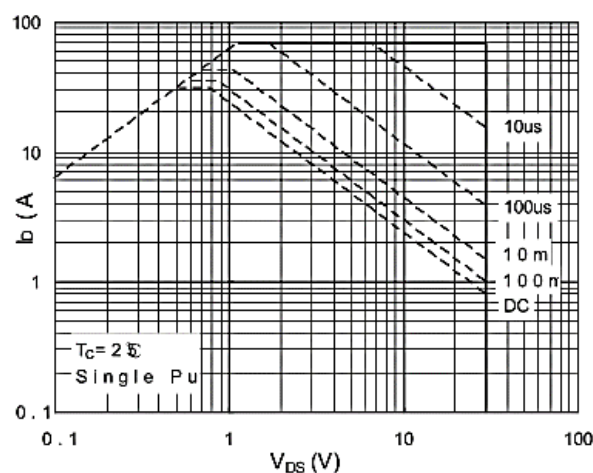


Fig.8 Safe Operating Area

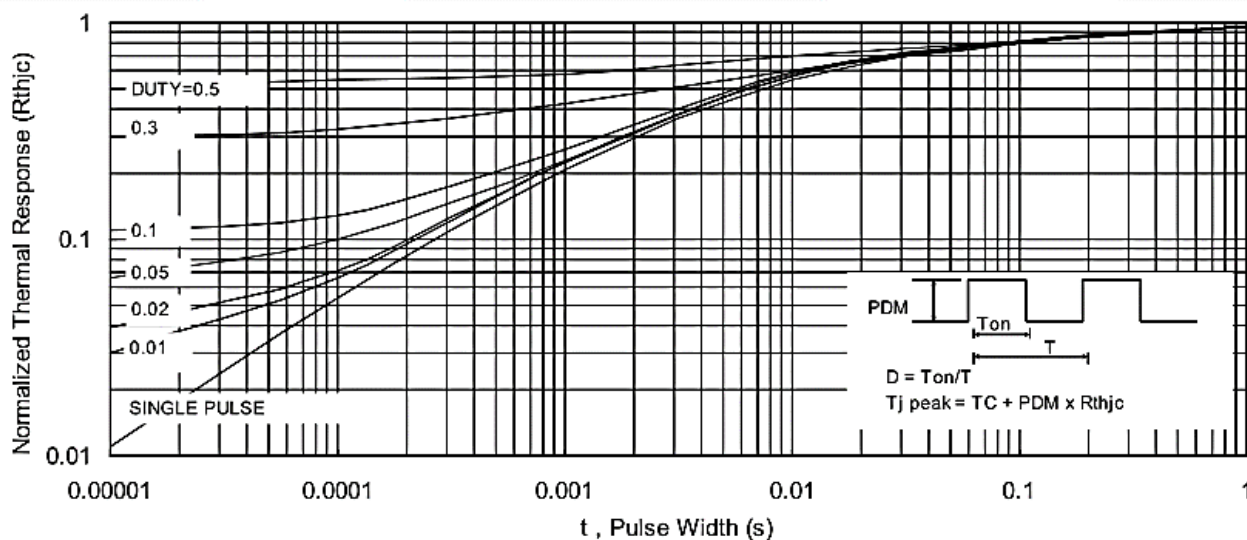


Fig.9 Normalized Maximum Transient Thermal Impedance

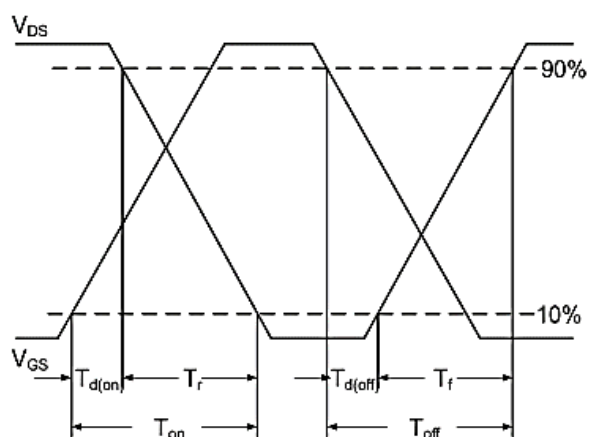


Fig.10 Switching Time Waveform

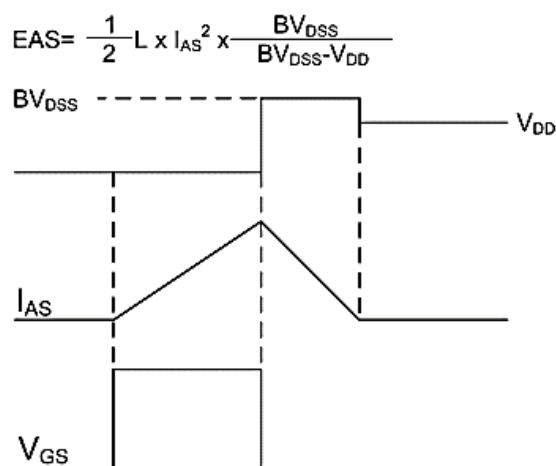


Fig.11 Unclamped Inductive Waveform

P-Channel Typical Characteristics

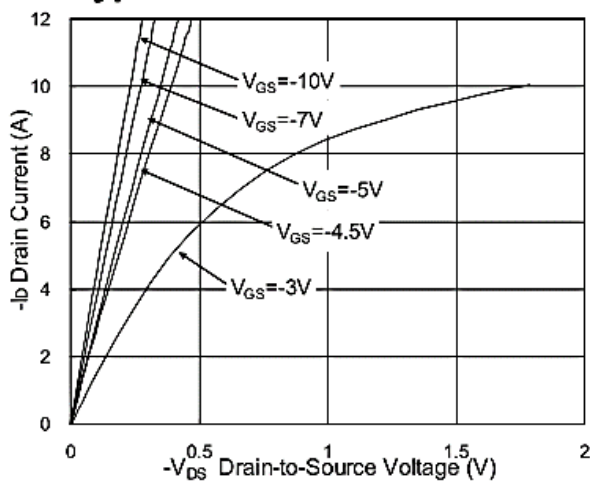


Fig.1 Typical Output Characteristics

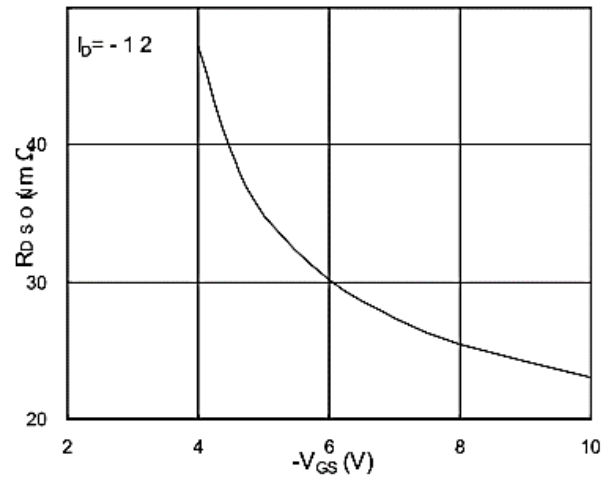


Fig.2 On-Resistance v.s Gate-Source

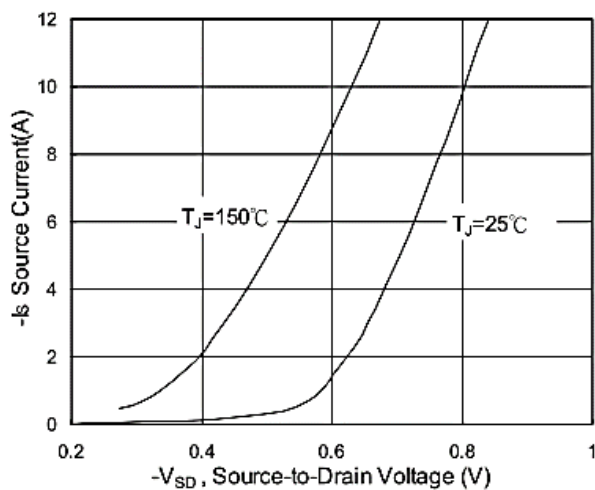


Fig.3 Forward Characteristics Of Reverse

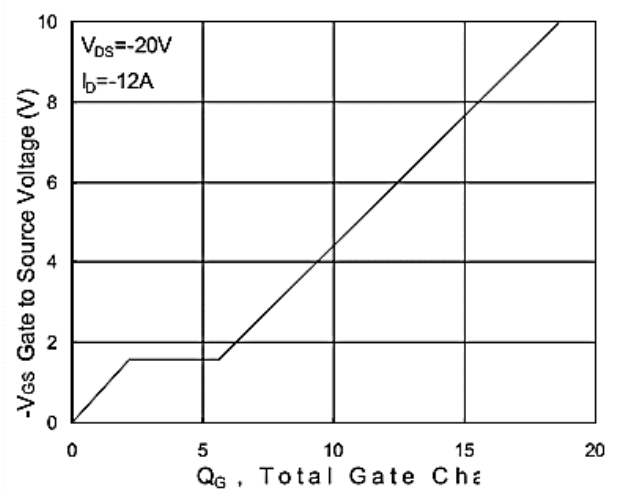


Fig.4 Gate-Charge Characteristics

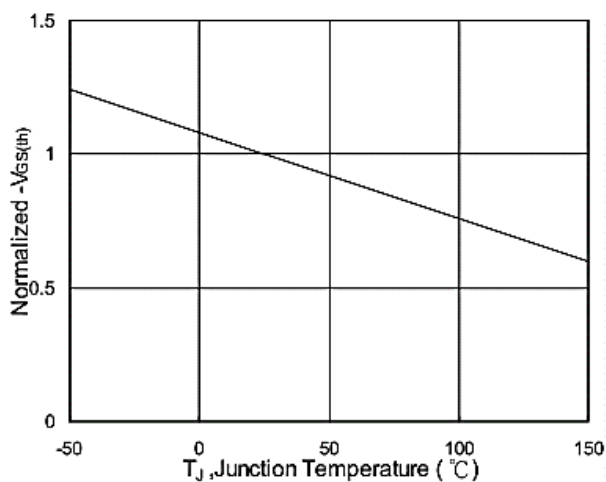


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

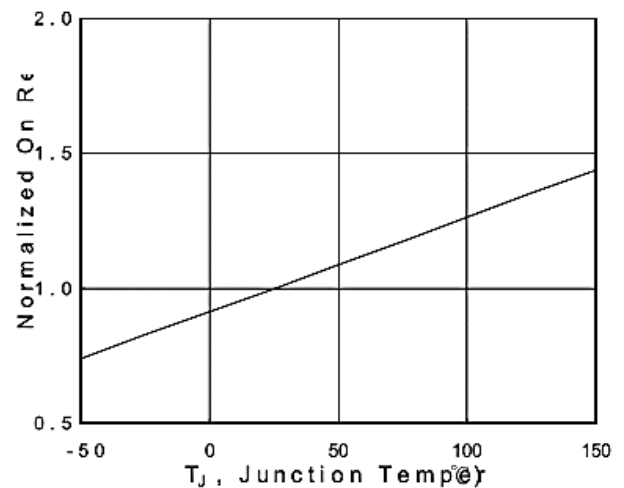


Fig.6 Normalized $R_{DS(on)}$ v.s T_J

P-Channel Typical Characteristics (Cont.)

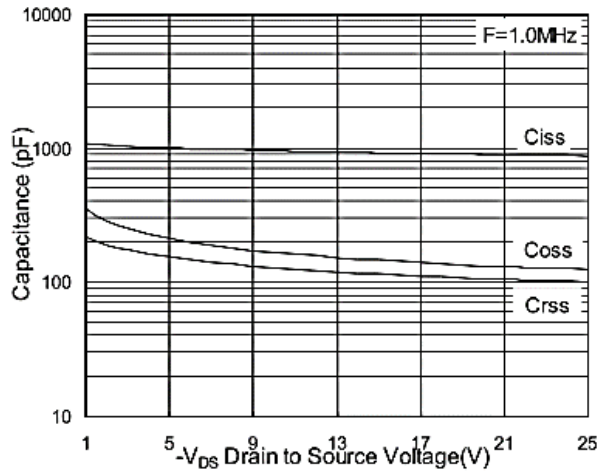


Fig.7 Capacitance

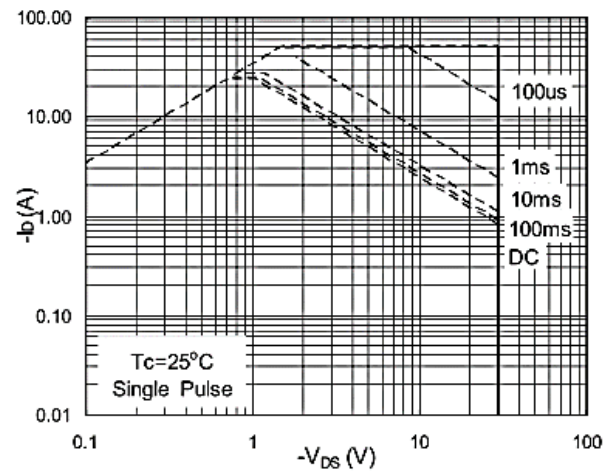


Fig.8 Safe Operating Area

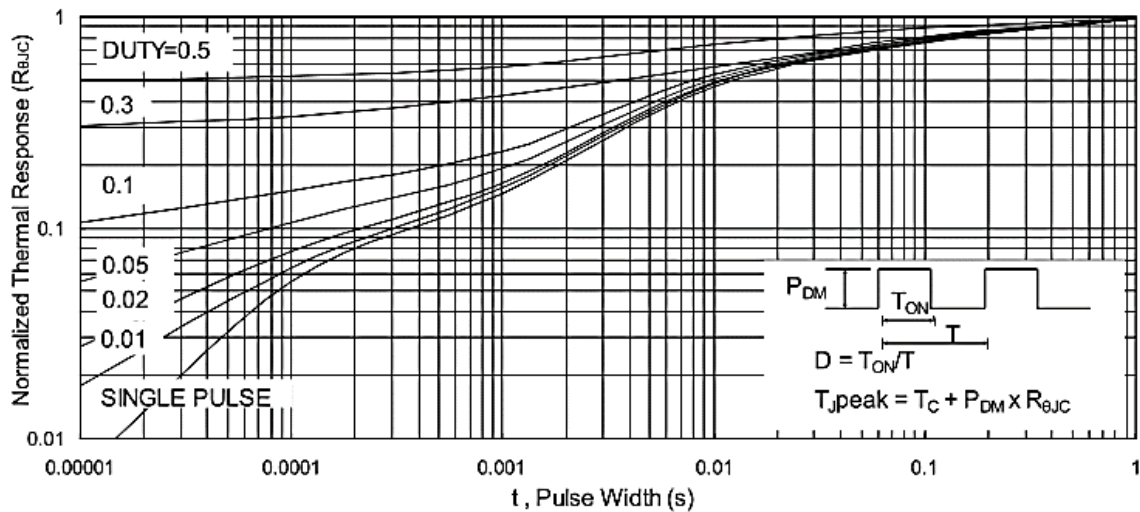


Fig.9 Normalized Maximum Transient Thermal Impedance

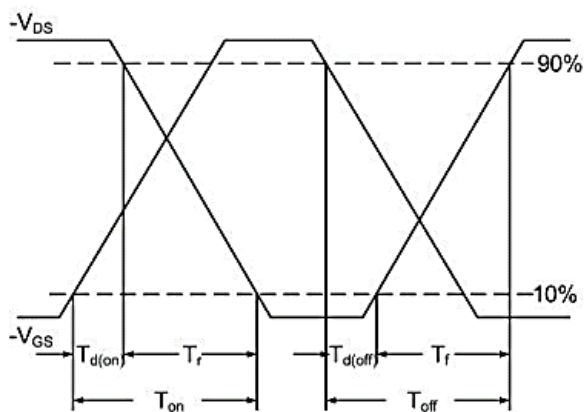


Fig.10 Switching Time Waveform

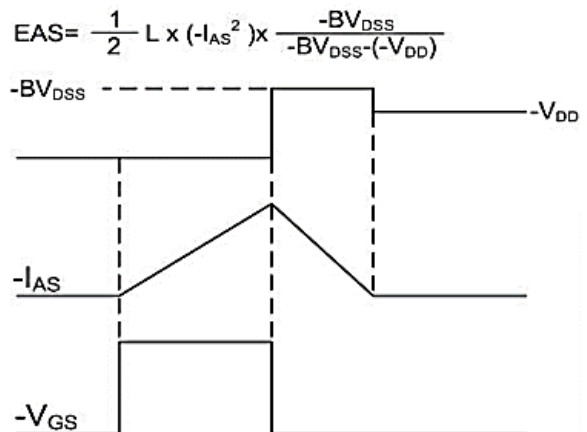
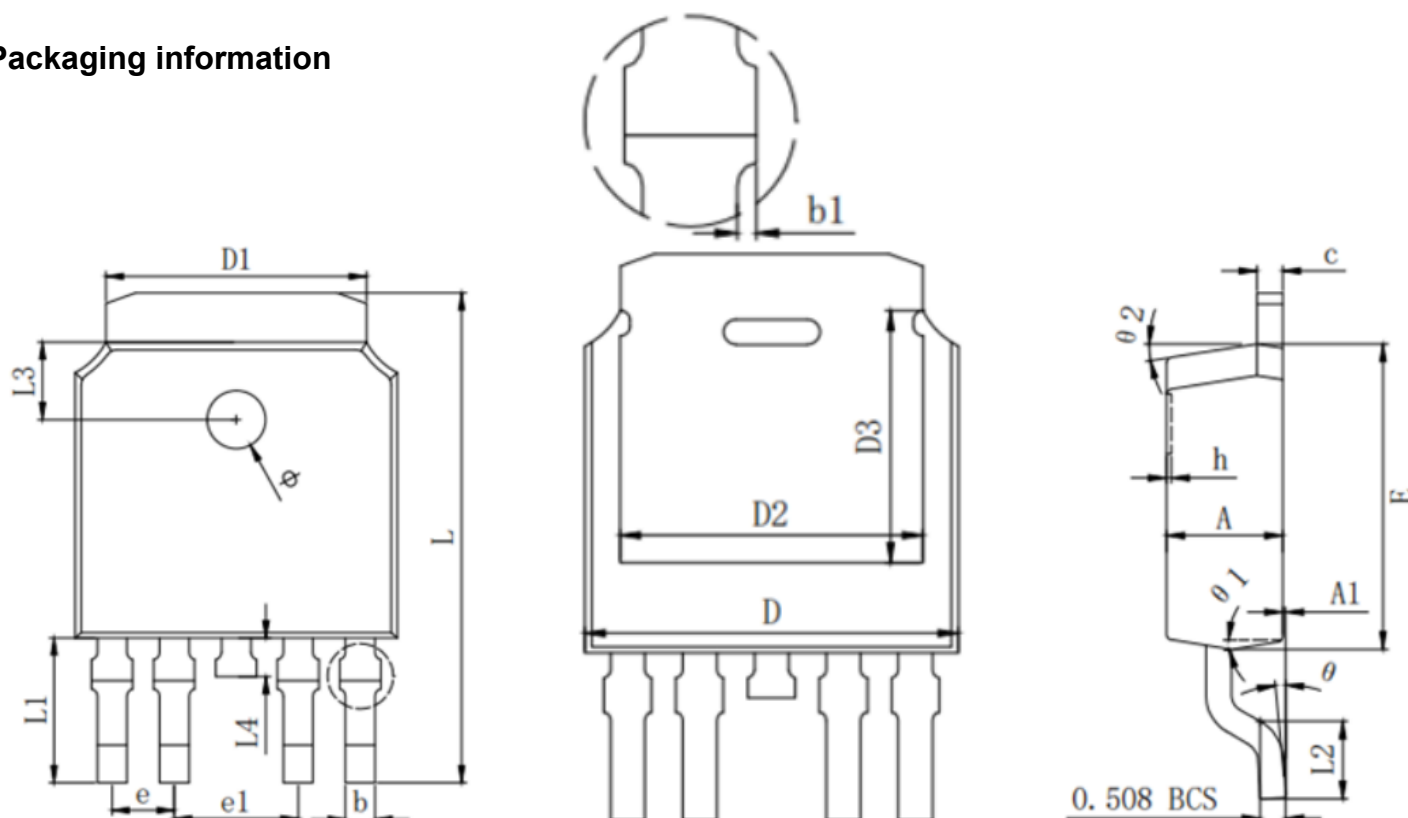


Fig.11 Unclamped Inductive Waveform

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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