General Description

The WSF34V10 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

The WSF34V10 meet the RoHS and Green Product requirement 100% E_{AS} guaranteed with full function reliability approved.

Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- 100% E_{AS} Guaranteed
- Green Device Available

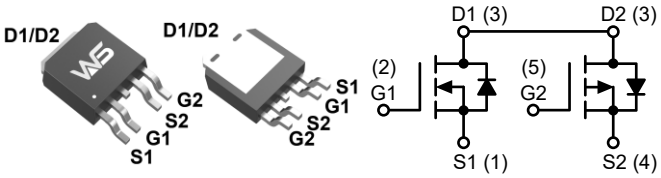
Product Summery

BV_{DSS}	$R_{DS(ON)}$	I_D
100V	38mΩ	30A
-100V	84mΩ	-26A

Applications

- High Frequency Point-of-Load Synchronous Buck Converter.
- Networking DC-DC Power System
- Load Switch

TO-252-4L Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating		Units
		N-Channel	P-Channel	
V_{DS}	Drain-Source Voltage	100	-100	V
V_{GS}	Gate-Source Voltage	±20	±20	
I_D@T_A=25°C	Continuous Drain Current, V_{GS} @ 10V [1]	30	-26	A
I_D@T_A=70°C	Continuous Drain Current, V_{GS} @ 10V [1]	19	-16.1	
I_{DM}	Pulsed Drain Current [2]	90	-85	
E_{AS}	Single Pulse Avalanche Energy [3]	138	147	mJ
I_{AS}	Avalanche Current	17	-33	A
P_D@T_A=25°C	Total Power Dissipation [4]	46	46	W
T_{STG}	Storage Temperature Range	-55 to 150		°C
T_J	Operating Junction Temperature Range	-55 to 150		
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient [1]	62.5		°C/W
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case [1]	2.6		

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	100	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V , I_D=10A	---	38	50	mΩ
		V_{GS}=4.5V , I_D=6A	---	42	58	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D=250μA	1.0	1.5	2.2	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=100V , V_{GS}=0V , T_J=25°C	---	---	1.0	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
Q_g	Total Gate Charge	V_{DS}=80V , I_D=20A , V_{GS}=4.5V	---	20	---	nC
Q_{gs}	Gate-Source Charge		---	3.1	---	
Q_{gd}	Gate-Drain Charge		---	14	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DS}=80V , I_D=20A , R_G=3.1Ω , V_{GS}=4.5V	---	11	---	ns
T_r	Rise Time		---	91	---	
$T_{d(off)}$	Turn-Off Delay Time		---	40	---	
T_f	Fall Time		---	71	---	
C_{iss}	Input Capacitance	V_{DS}=25V , V_{GS}=0V , f = 1.0MHz	---	1964	---	pF
C_{oss}	Output Capacitance		---	90	---	
C_{rss}	Reverse Transfer Capacitance		---	74	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
I_S	Maximum Continuous Drain to Source Diode Forward Current		---	---	30	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		---	---	80	
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS}=0V , I_S=20A	---	---	1.2	V
t_{rr}	Body Diode Reverse Recovery Time	I_F=20A , dI/dt=100A/μs	---	64	---	ns
Q_{rr}	Body Diode Reverse Recovery Charge		---	152	---	nC

Note:

1. The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper,t≤10sec.
2. The data tested by pulsed , pulse width ≤ 300μs , duty cycle ≤ 2%
3. The E_{AS} data shows Max. rating . The test condition is V_{DD}=80V, V_{GS}=10V, L=0.1mH, I_{AS}=17A
4. The power dissipation is limited by 150°C junction temperature.
5. The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

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	-100	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=-10V , I_D=-10A	---	84	105	mΩ
		V_{GS}=-4.5V , I_D=-6A	---	90	130	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D=-250μA	-1.2	-1.6	-2.5	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-100V , V_{GS}=0V , T_J=25°C	---	---	-1.0	μA
		V_{DS}=-100V , V_{GS}=0V , T_J=100°C	---	---	-100	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
g_{fs}	Forward Transconductance	V_{DS}=-10V , I_D=-10A	---	30	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f = 1.0MHz	---	4.0	---	Ω
Q_g	Total Gate Charge	V_{DS}=-50V , V_{GS}=-10V , I_D=-10A	---	65	---	nC
Q_{gs}	Gate-Source Charge		---	10.2	---	
Q_{gd}	Gate-Drain Charge		---	13	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DS}=-50V , V_{GS}=-10V , R_G=3Ω , I_D=-10A	---	12.8	---	ns
T_r	Rise Time		---	30	---	
$T_{d(off)}$	Turn-Off Delay Time		---	82	---	
T_f	Fall Time		---	61	---	
C_{iss}	Input Capacitance	V_{DS}=-50V , V_{GS}=0V , f = 1.0MHz	---	3985	---	pF
C_{oss}	Output Capacitance		---	85	---	
C_{rss}	Reverse Transfer Capacitance		---	71	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
I_S	Continuous Source Current, T_J=25°C	I_S=-10A , V_{GS}=0V	---	---	-18	
V_{SD}	Diode Forward Voltage		---	---	1.2	V
t_{rr}	Body Diode Reverse Recovery Time	I_F=-10A , dI/dt=100A/μs	---	62	---	ns
Q_{rr}	Body Diode Reverse Recovery Charge		---	56	---	nC

Note:

1. The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper,t≤10sec.
2. The data tested by pulsed , pulse width ≤ 300μs , duty cycle ≤ 2%
3. The E_{AS} data shows Max. rating . The test condition is V_{DD}=-72V, V_{GS}=-10V, L=0.1mH, I_{AS}=-33A
4. The power dissipation is limited by 150°C junction temperature.
5. The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

N-Channel Typical Characteristics

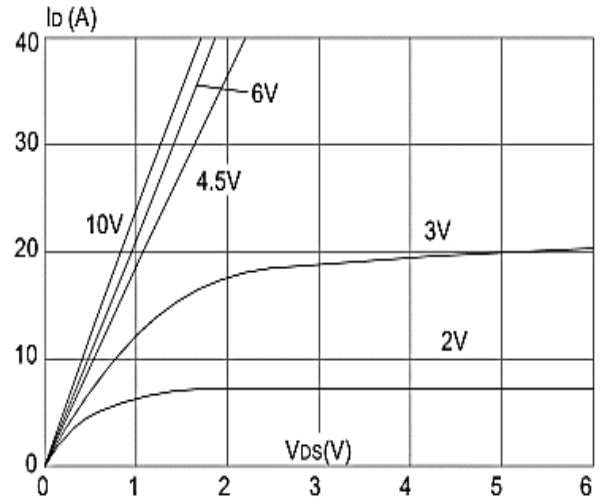


Figure1: Output Characteristics

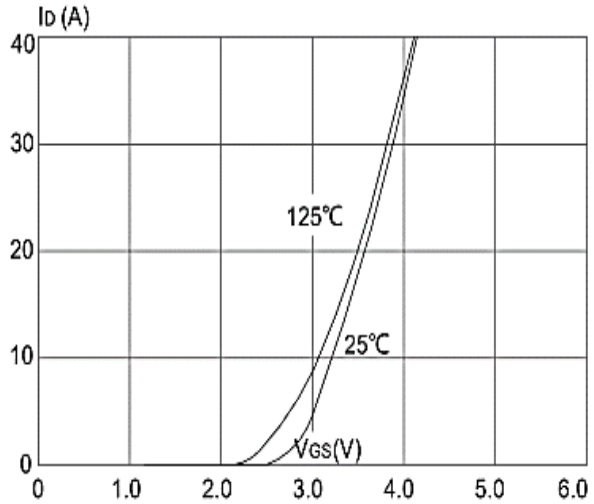


Figure 2: Typical Transfer Characteristics

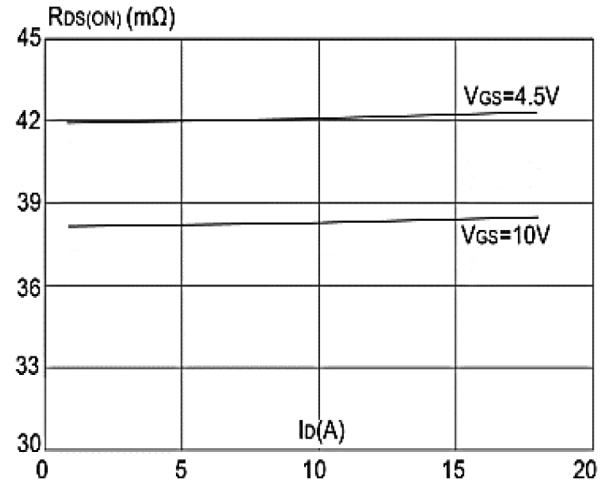


Figure 3:On-resistance vs. Drain Current

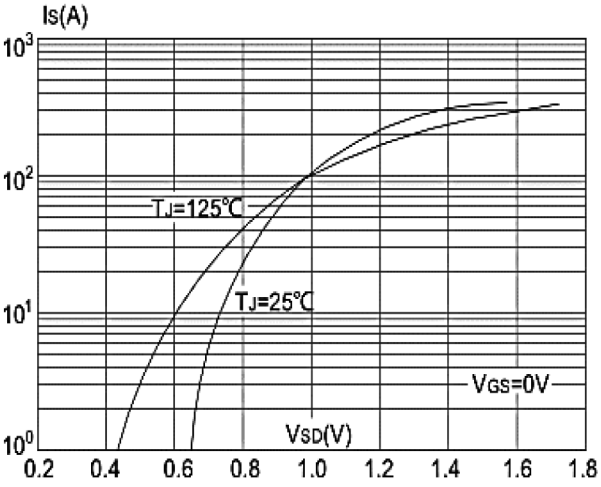


Figure 4: Body Diode Characteristics

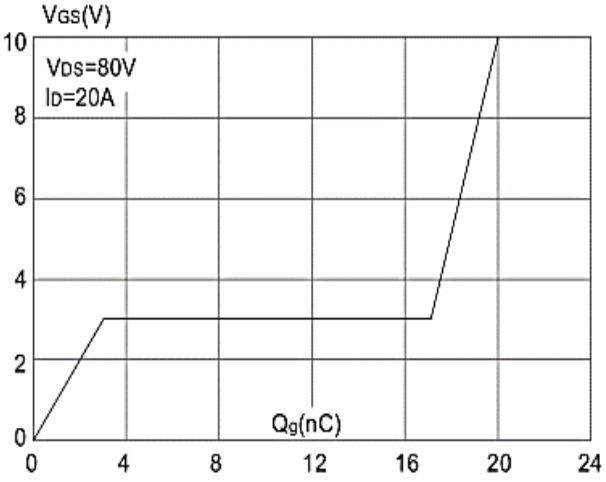


Figure 5: Gate Charge Characteristics

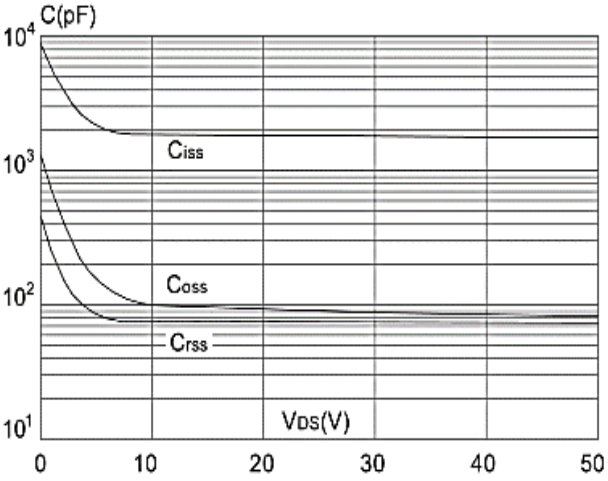


Figure 6: Capacitance Characteristics

N-Channel Typical Characteristics (Cont.)

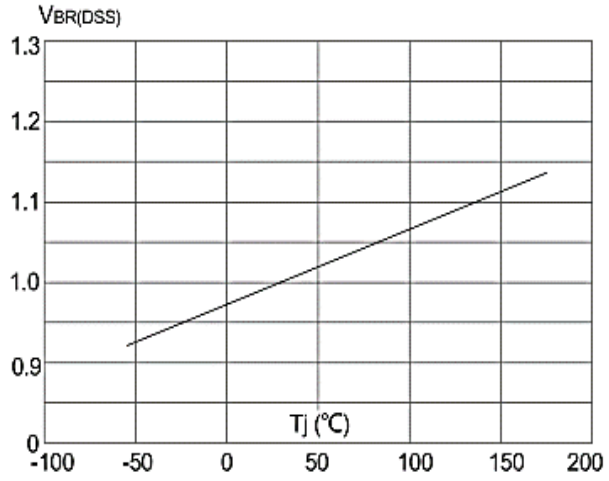


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

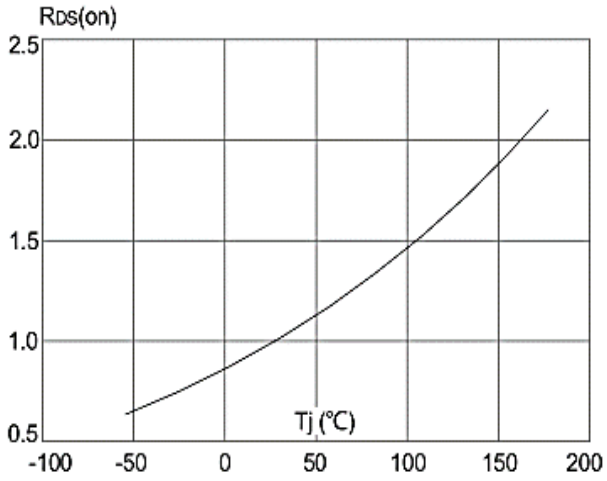


Figure 8: Normalized on Resistance vs Junction Temperature

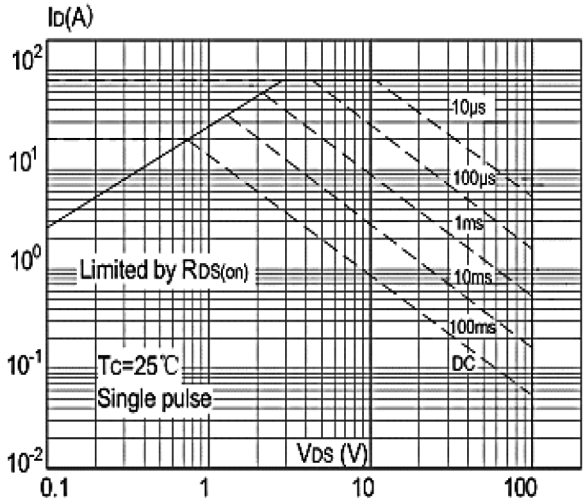


Figure 9: Maximum Safe Operating Area vs. Case Temperature

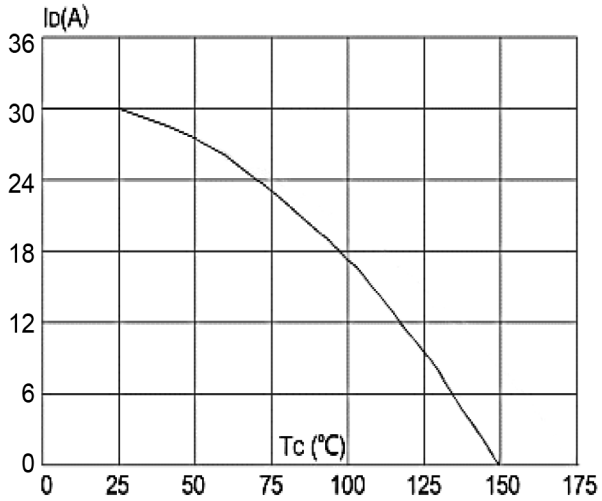


Figure 10: Maximum Continuous Drain Current

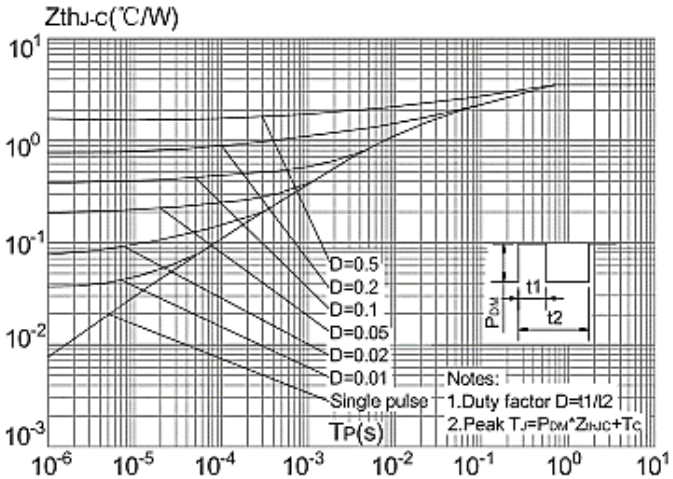


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

P-Channel Typical Characteristics

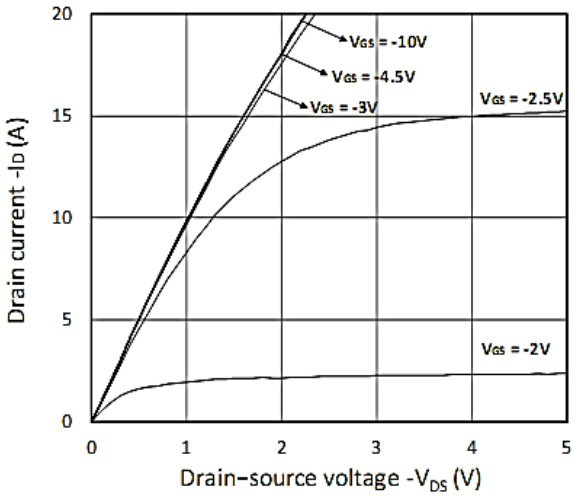


Figure 1. Output Characteristics

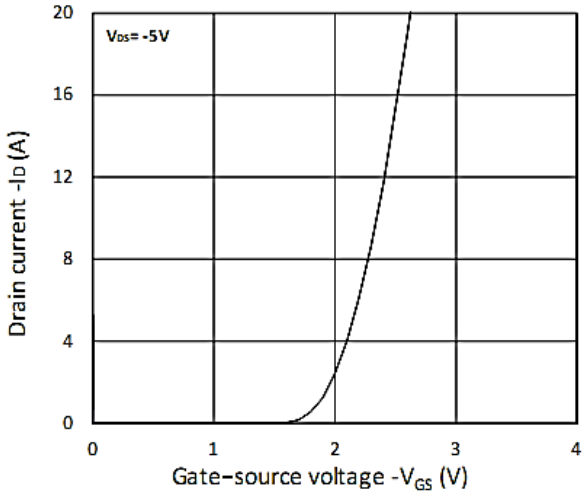


Figure 2. Transfer Characteristics

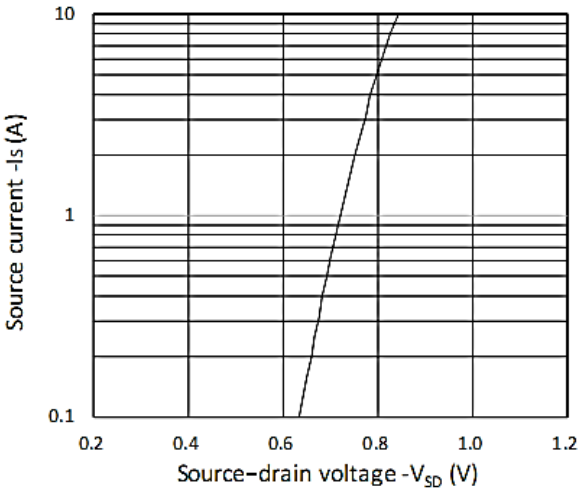


Figure 3. Forward Characteristics of Reverse

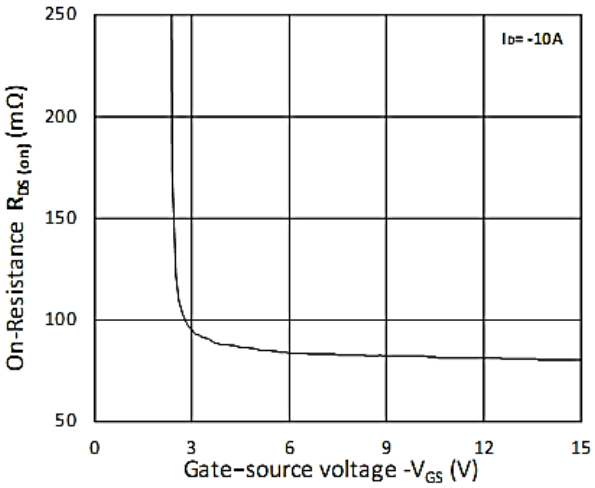


Figure 4. RDS(ON) vs. VGS

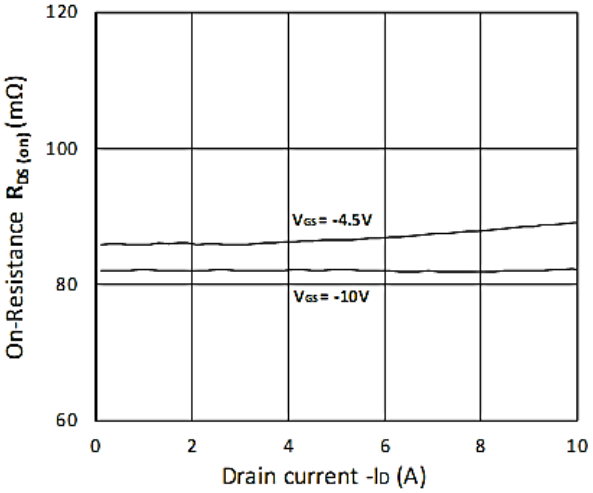


Figure 5. RDS(ON) vs. ID

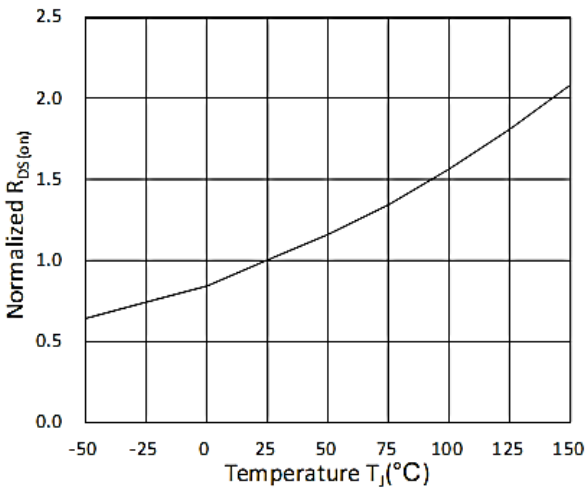


Figure 6. Normalized RDS(on) vs. Temperature

P-Channel Typical Characteristics (Cont.)

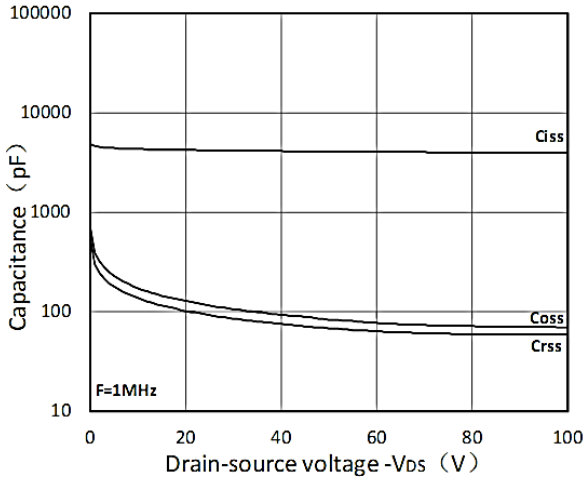


Figure 7. Capacitance Characteristics

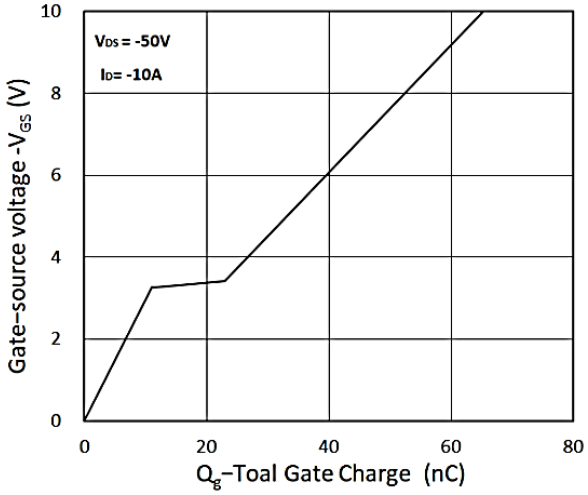


Figure 8. Gate Charge Characteristics

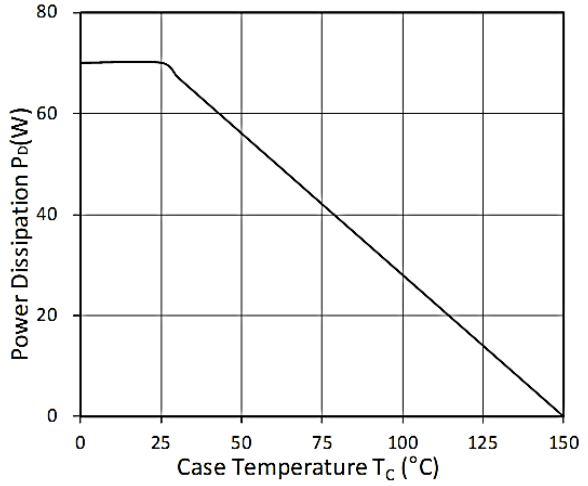


Figure 9. Power Dissipation

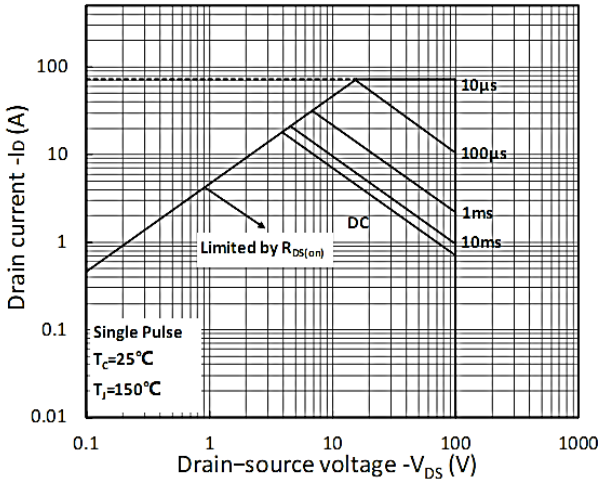


Figure10. Safe Operating Area

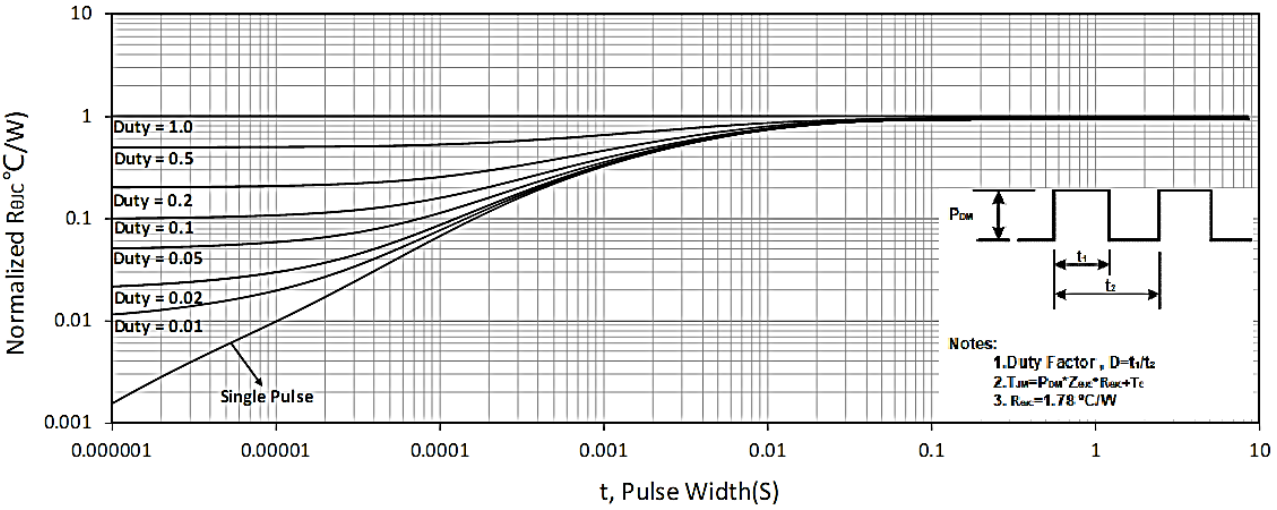
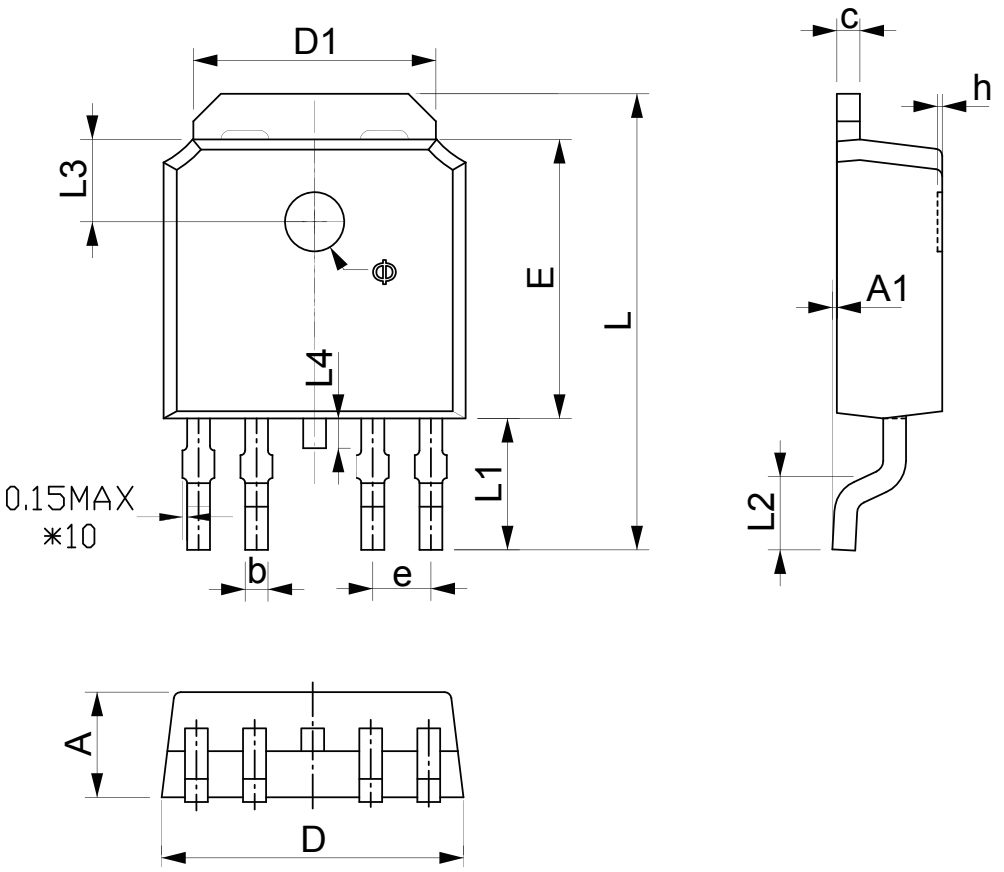


Figure 11. Normalized Maximum Transient Thermal Impedance

Packaging information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.400	0.600		
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.712	10.312	0.382	0.406
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
h	0.000	0.300	0.000	0.012

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