RoHS Pb-Free HF

Features

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

Application

- Battery protection
- Load switch
- Uninterruptible power supply

Product Summary

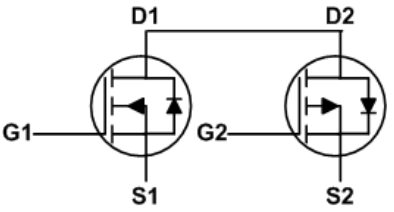
● N-Channel

V_{DS}	40	V
$R_{DS(on).Typ}$ V_{GS}=10V	18	mΩ
$R_{DS(on).Typ}$ V_{GS}=4.5V	21	mΩ
I_D	21	A

● P-Channel

V_{DS}	-40	V
$R_{DS(on),Typ}$ V_{GS}=-10V	31	mΩ
$R_{DS(on),Typ}$ V_{GS}=-4.5V	41	mΩ
I_D	-20	A

TO252-4



N-Channel&P-Channel

Absolute Maximum Ratings (T_C=25℃unless otherwise noted)

Symbol	Parameter	Rating		Units
		N-Ch	P-Ch	
V_{DS}	Drain-Source Voltage	40	-40	V
V_{GS}	Gate-Source Voltage	±20	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	21	-20	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	17	-16	A
I_{DM}	Pulsed Drain Current[2]	84	-80	A
EAS	Single Pulse Avalanche Energy[3]	32.1	38	mJ
I_{AS}	Avalanche Current	17.5	-26.1	A
P_D@T_C=25℃	Total Power Dissipation[4]	21	25	W
T_{STG}	Storage Temperature Range	-55 to 150	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	-55 to 150	℃
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	62	62	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	6	5	℃/W

N-Channel Electrical Characteristics (T_C=25℃unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	40	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BVDSS Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.032	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=15A	---	18	23	mΩ
		V_{GS}=4.5V , I_D=10A	---	21	27	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.0	1.7	2.5	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-4.8	---	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=32V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=32V , V_{GS}=0V , T_J=55℃	---	---	5	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=5V , I_D=15A	---	35	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	2.8	---	Ω
Q_g	Total Gate Charge (4.5V)	V_{DS}=32V , V_{GS}=4.5V , I_D=15A	---	11	---	nC
Q_{gs}	Gate-Source Charge		---	2.61	---	
Q_{gd}	Gate-Drain Charge		---	4.7	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=20V , V_{GS}=10V , R_G=3.3 I_D=15A	---	2.8	---	ns
T_r	Rise Time		---	11.6	---	
$T_{d(off)}$	Turn-Off Delay Time		---	23.1	---	
T_f	Fall Time		---	6.4	---	
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1MHz	---	891	---	pF
C_{oss}	Output Capacitance		---	86	---	
C_{rss}	Reverse Transfer Capacitance		---	68	---	
I_S	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	21	A
I_{SM}	Pulsed Source Current[2,5]		---	---	84	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1.2	V
t_{rr}	Reverse Recovery Time	I_F=15A , dI/dt=100A/μs , T_J=25℃	---	11	---	nS
Q_{rr}	Reverse Recovery Charge		---	3.3	---	nC

Note :

1 .The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.

2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%

3 .The EAS data shows Max. rating . The test condition is V_{DD}=25V,V_{GS}=10V,L=0.1mH,I_{AS}=25A

4.The power dissipation is limited by 150℃ 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_C=25℃unless otherwise noted)

Parameter		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics							
Drain-Source Breakdown Voltage		$V_{(BR)DSS}$	V_{GS} = 0V, I_D = -250μA	-40	-	-	V
Gate-body Leakage current		I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
Zero Gate Voltage Drain Current	T_J=25°C	I_{DSS}	V_{DS} = -40V, V_{GS} = 0V	-	-	-1	μA
	T_J=100°C			-	-	-100	
Gate-Threshold Voltage		$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = -250μA	-1.0	-1.6	-2.5	V
Drain-Source On-Resistance[4]		$R_{DS(on)}$	V_{GS} = -10V, I_D = -8A	-	31	45	mΩ
			V_{GS} = -4.5V, I_D = -4A	-	41	58	
Forward Transconductance[4]		g_{fs}	V_{DS} = -10V, I_D = -6A	-	16	-	S
Dynamic Characteristics[5]							
Input Capacitance		C_{iss}	V_{DS} = -20V, V_{GS} =0V, f =1MHz	-	1080	-	pF
Output Capacitance		C_{oss}		-	87	-	
Reverse Transfer Capacitance		C_{rss}		-	77	-	
Gate Resistance		R_g	f =1MHz	-	10.3	-	Ω
Switching Characteristics[5]							
Total Gate Charge		Q_g	V_{GS} = -10V,V_{DS} = -20V, I_D= -5A	-	17	-	nC
Gate-Source Charge		Q_{gs}		-	4.2	-	
Gate-Drain Charge		Q_{gd}		-	3.7	-	
Turn-On Delay Time		$t_{d(on)}$	V_{GS} = -10V, V_{DD} = -20V, R_G = 3Ω, I_D= -5A	-	5.9	-	ns
Rise Time		t_r		-	7.1	-	
Turn-Off Delay Time		$t_{d(off)}$		-	25	-	
Fall Time		t_f		-	8.2	-	
Drain-Source Body Diode Characteristics							
Diode Forward Voltage[4]		V_{SD}	I_S = -5A, V_{GS} = 0V	-	-	-1.2	V
Continuous Source Current	T_A=25°C	I_S	-	-	-	-26.1	A

Note :

1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C.
2. The EAS data shows Max. rating . The test condition is V_{DD}= -25V, V_{GS}= -10V, L= 0.1mH
3. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
4. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
5. This value is guaranteed by design hence it is not included in the production test.

N-Channel Typical Characteristics

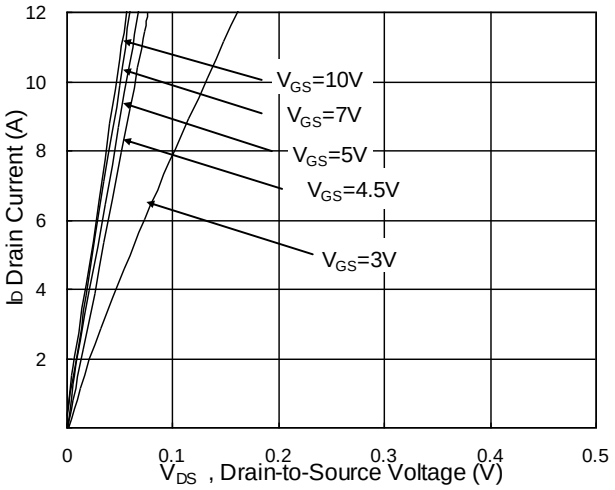


Fig.1 Typical Output Characteristics

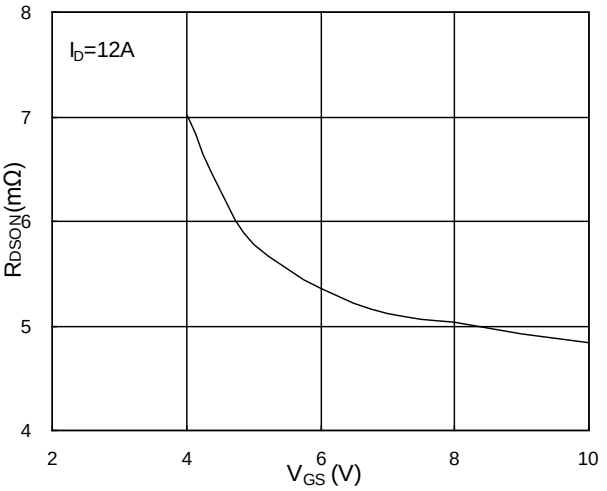


Fig.2 On-Resistance vs. G-S Voltage

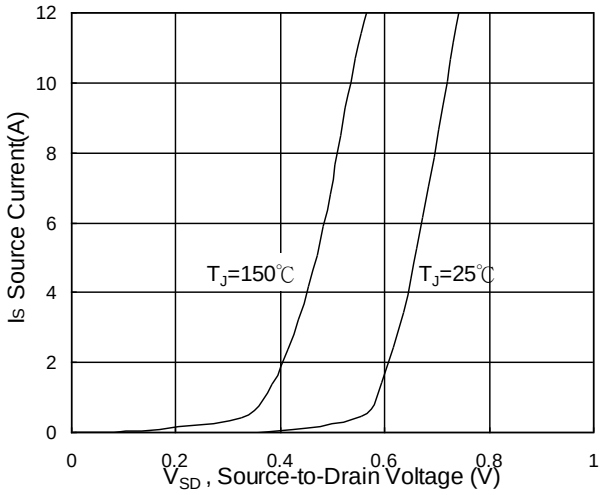


Fig.3 Forward Characteristics Of Reverse

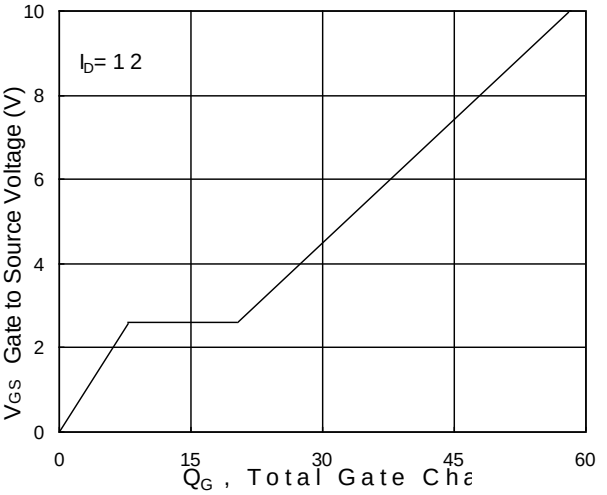


Fig.4 Gate-Charge Characteristics

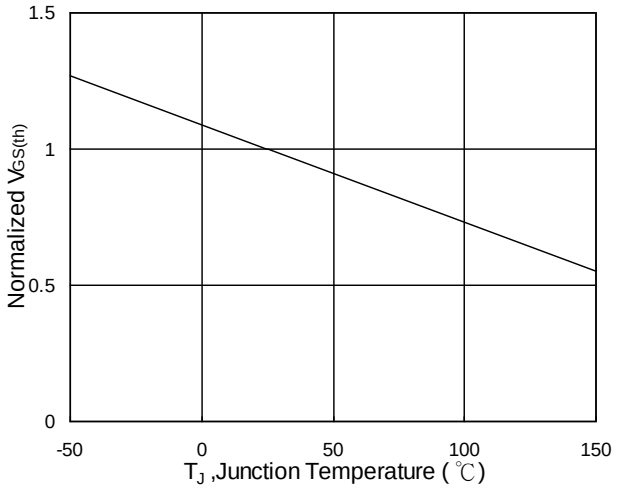


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

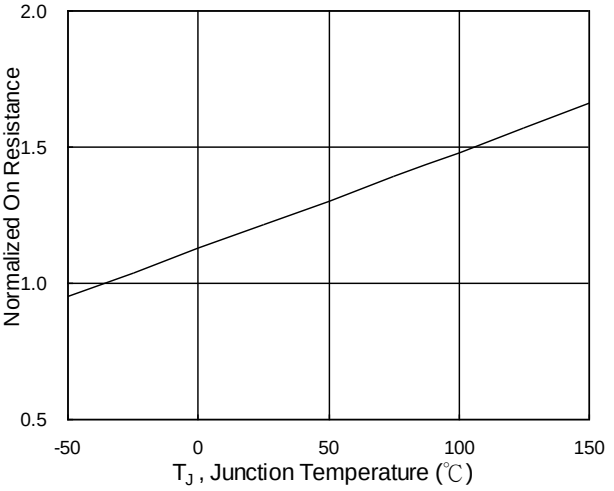


Fig.6 Normalized R_{DSON} vs. T_J

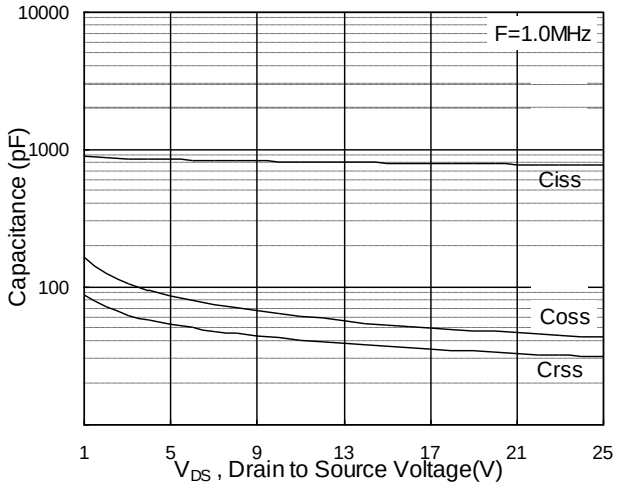


Fig.7 Capacitance

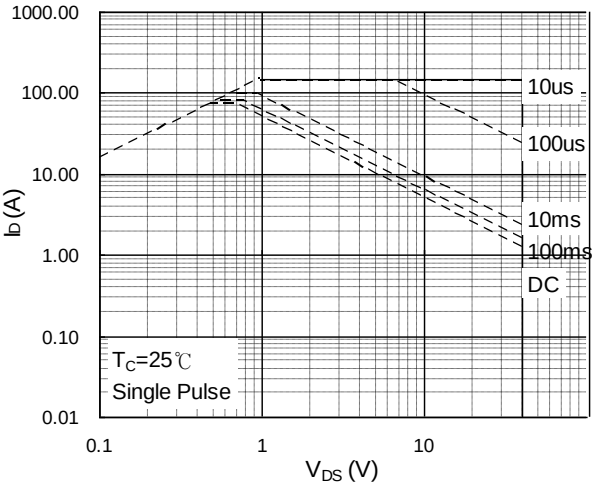


Fig.8 Safe Operating Area

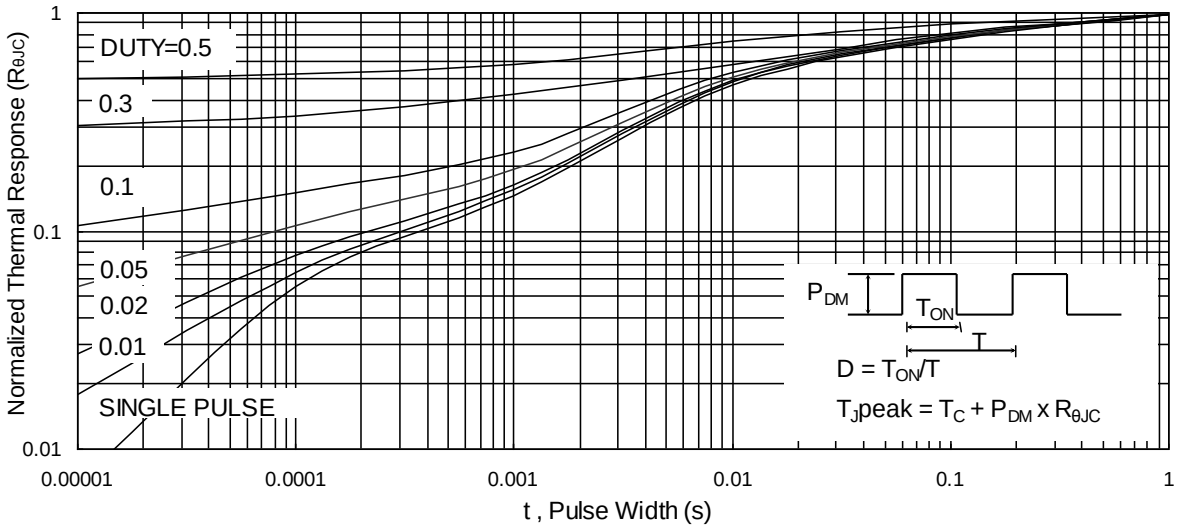


Fig.9 Normalized Maximum Transient Thermal Impedance

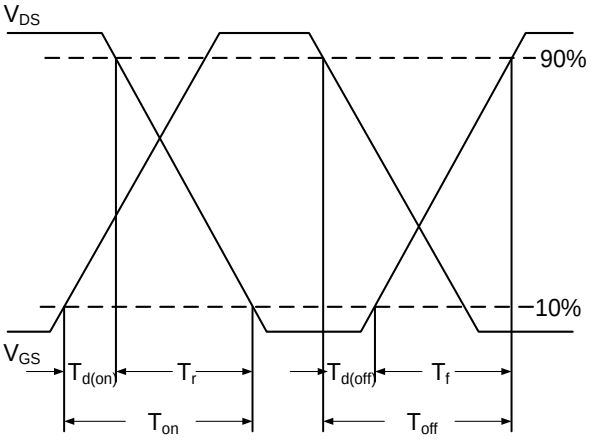


Fig.10 Switching Time Waveform

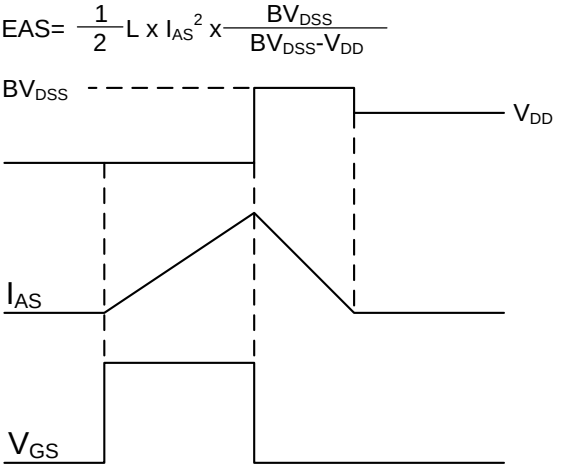


Fig.11 Unclamped Inductive Switching Wave

P-Channel Typical Characteristics

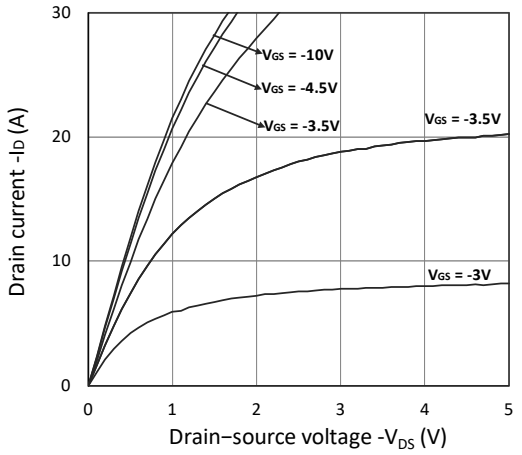


Figure 1. Output Characteristics

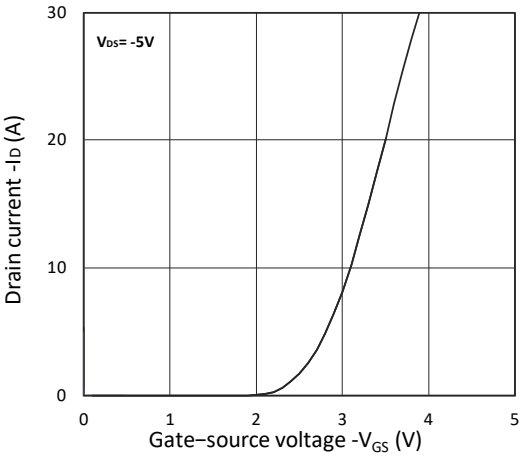


Figure 2. Transfer Characteristics

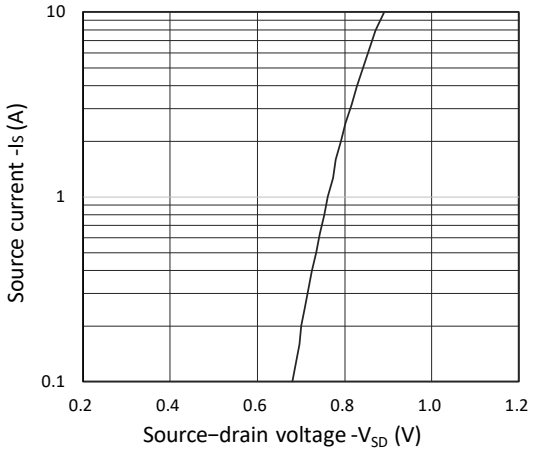


Figure 3. Forward Characteristics of Reverse

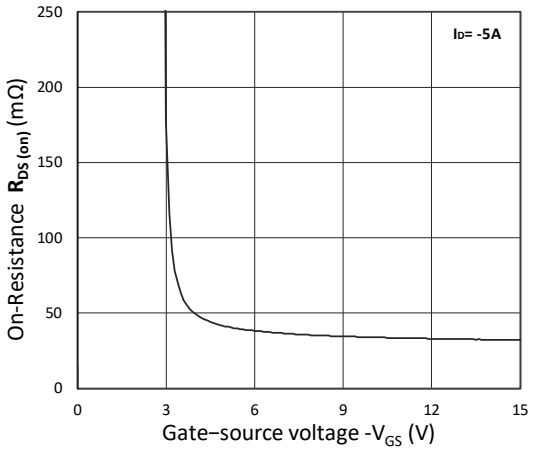


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

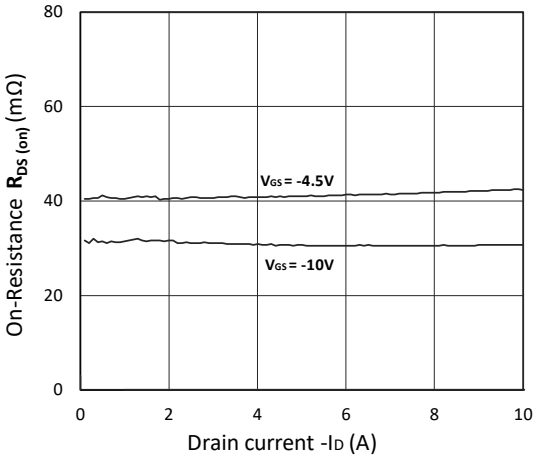


Figure 5. $R_{DS(ON)}$ vs. I_D

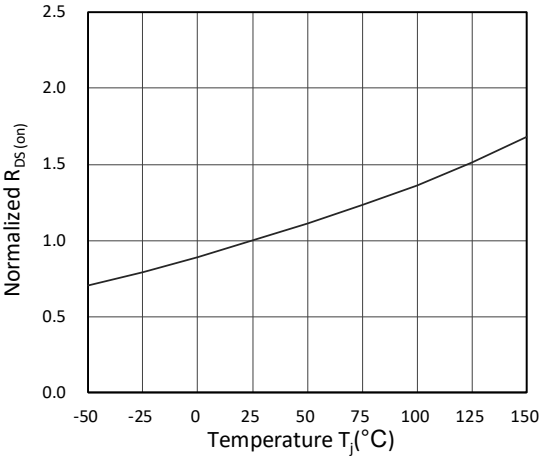


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

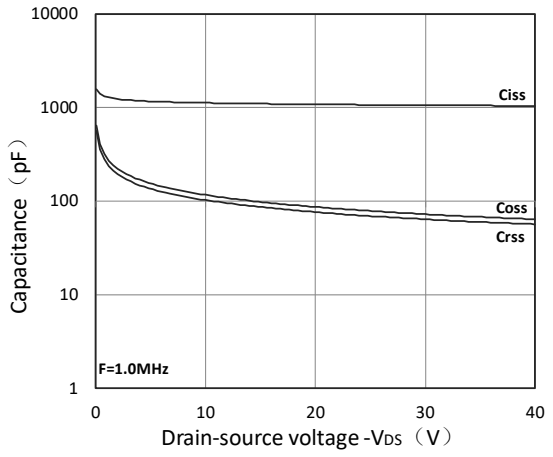


Figure 7. Capacitance Characteristics

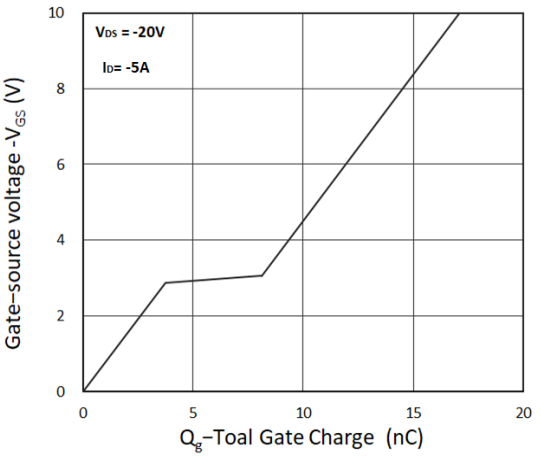


Figure 8. Gate Charge Characteristics

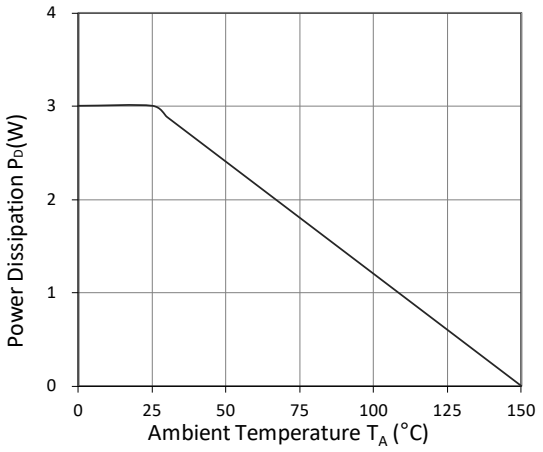


Figure 9. Power Dissipation

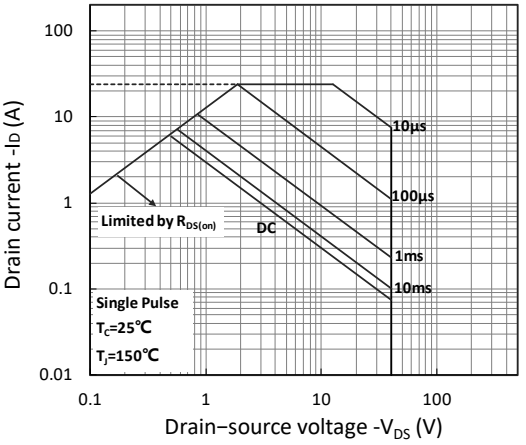


Figure10. Safe Operating Area

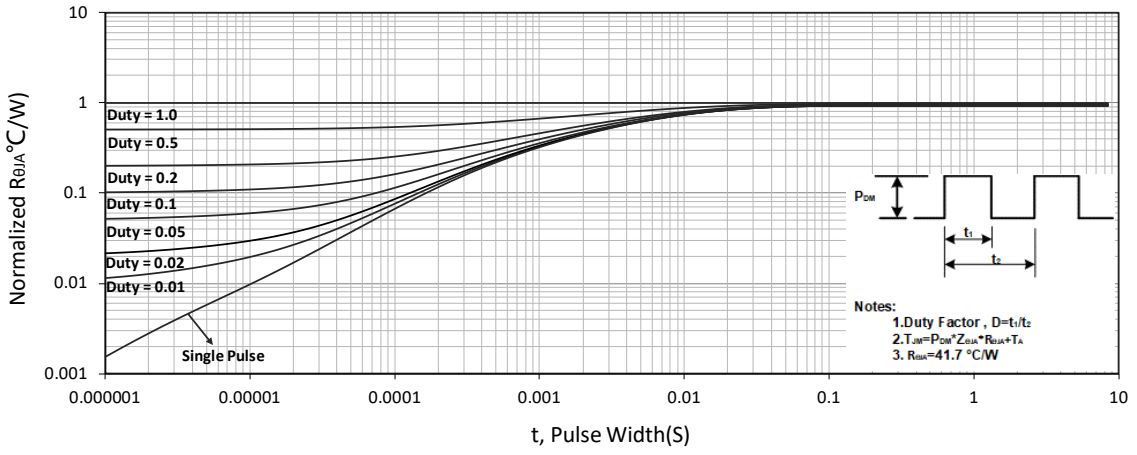
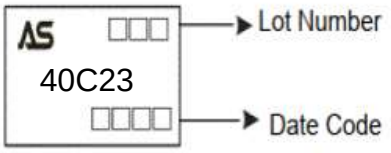


Figure 11. Normalized Maximum Transient Thermal Impedance

Ordering and Marking Information

Ordering Device No.	Marking	Package	Packing	Quantity
ASDM40C23JQ-R	40C23	TO-252-4	Tape&Reel	2500/Reel

PACKAGE	MARKING
TO-252-4	

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