A4R30N1200MD03X

1200V 75A, 30mΩ, N-Channel, Silicon Carbide MOSFET

Features

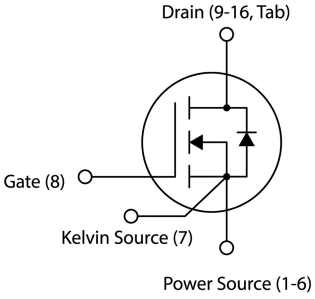
- High Speed Switching with Low Capacitances
- High Blocking Voltage with Low $R_{DS(on)}$
- Low Impedance Package with Driver Source Pin
- Easy to parallel and simple to drive
- ROHS Compliant, Halogen free

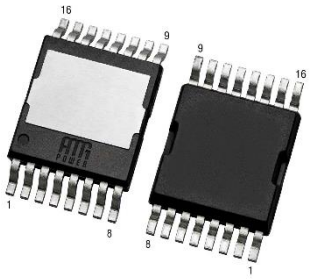
Application

- EV Charging
- High Voltage DC/DC Converters
- Switch Mode Power Supplies
- Solar inverters

Product Summary

V_{DS}	1200V
I_D	75A





Ordering Information

Part Number	Marking	Package	Packaging
A4R30N1200MD03X	A4R30N1200MD03	TOLT	Reel

Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage	1200	V
I_D	Drain Current (continuous) at T_C=25°C	75	A
I_D	Drain Current (continuous) at T_C=100°C	52	A
I_{DM}	Drain Current (pulsed)	200	A
V_{GS}	Gate-Source Voltage	-10/+22	V
P_D	Power Dissipation T_C=25°C	242	W
T_J, T_{stg}	Junction and Storage Temperature Range	-55 to +175	°C

Electrical Characteristics (T_J=25°C unless otherwise specified)

Typical Performance-Static

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
BV_{DS}	Drain-source Breakdown Voltage	I_D=250uA, V_{GS}=0V	1200			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=1200V, V_{GS}=0V, T_J=25°C		5	100	uA
I_{GSS}	Gate-body Leakage Current	V_{DS}=0V, V_{GS}=-10 to 20V		10	250	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=10mA	2.2	2.5	3.6	V
V_{GSon}	Recommended turn-on Voltage	Static		15/18		V
V_{GSoff}	Recommended turn-off Voltage			-5		V
$R_{DS(on)}$	Static Drain-source On Resistance	V_{GS}=15V, I_D=33A		36	43	mΩ
		V_{GS}=15V, I_D=33A, T_J=175°C		54		mΩ
		V_{GS}=18V, I_D=33A		30	36	mΩ
		V_{GS}=18V, I_D=33A, T_J=175°C		45		mΩ

Typical Performance-Dynamic

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
C_{iss}	Input Capacitance	V_{DS}=1000V, f=1MHz V_{AC}=25mV		2220		pF
C_{oss}	Output Capacitance			105		pF
C_{rss}	Reverse Transfer Capacitance			7		pF
g_{fs}	Transconductance	V_{DS}=20V, I_D=33A		23		S
E_{OSS}	C_{OSS} Stored Energy	V_{DS}=1000V, f=1MHz		48		uJ
E_{ON}	Turn-On Energy (Body Diode)	V_{DS}=800V V_{GS}=-5/18V, I_D=33A L=100uH, T_J=175°C		378		uJ
E_{OFF}	Turn-Off Energy (Body Diode)			98		uJ
Q_g	Total Gate Charge	V_{DS}=800V V_{GS}=-5/18V I_D=33A		72		nC
Q_{gs}	Gate-source Charge			26		nC
Q_{gd}	Gate-Drain Charge			19		nC
$R_{G(int)}$	Internal Gate Resistance	f=1MHz, V_{AC}=25mV		1.2		Ω
$t_{d(on)}$	Turn-on Delay Time	V_{DS}=800V V_{GS}=-5/18V, I_D=33A L=100uH, R_{ext}=2.5Ω		17		ns
t_r	Rise Time			16		ns
$t_{d(off)}$	Turn-off Delay Time			25		ns
t_f	Fall Time			9		ns

Typical Performance-Body Diode (T_J=25°C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{FSD}	Forward Voltage	V_{GS}=0V, I_F=20A, T_J=25°C		3.6	6	V
		V_{GS}=0V, I_F=20A, T_J=175°C		3.2	6	V
I_S	Continuous Diode Forward Current	V_{GS}=0V, T_C=25°C		68		A
t_{rr}	Reverse Recovery Time	V_{GS}=-5V, I_F=33A V_R=800V di/dt=2600A/μs, T_J=175°C		32		ns
Q_{rr}	Reverse Recovery Charge			325		nC
I_{rrm}	Peak Reverse Recovery Current			22		A

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	0.62	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	40	°C/W

The values are based on the junction-to case thermal impedance which is measured with the device mounted to a large heat sink assuming maximum junction temperature of T_j(max)=175°C.

Electrical Characteristics

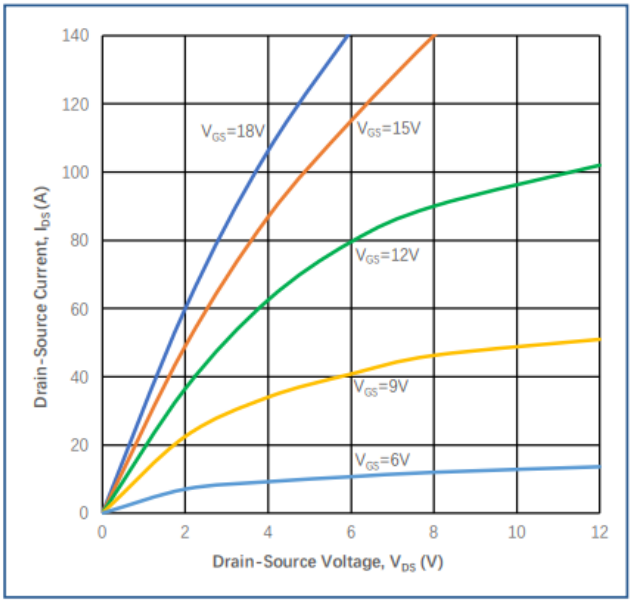


Figure 1
Output Characteristics (T_J=25°C)

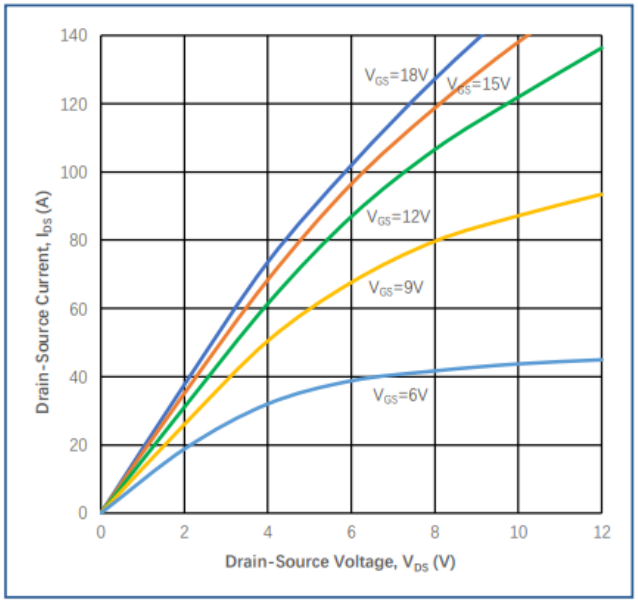


Figure 2
Output Characteristics (T_J=175°C)

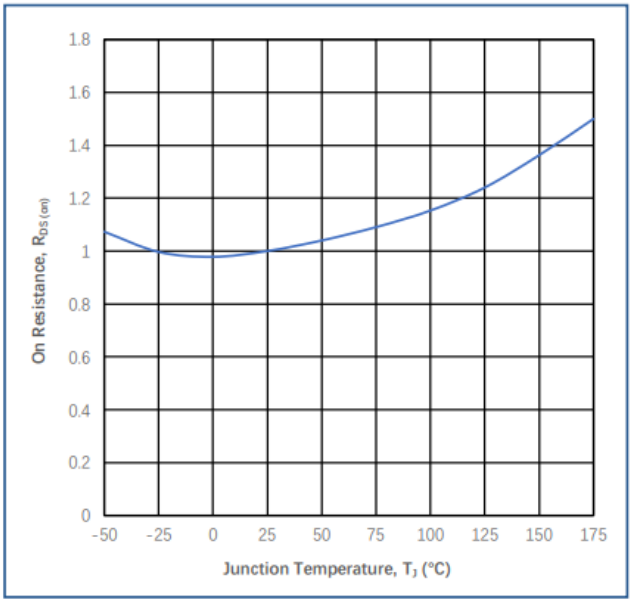


Figure 3
Normalized On-Resistance vs. Temperature

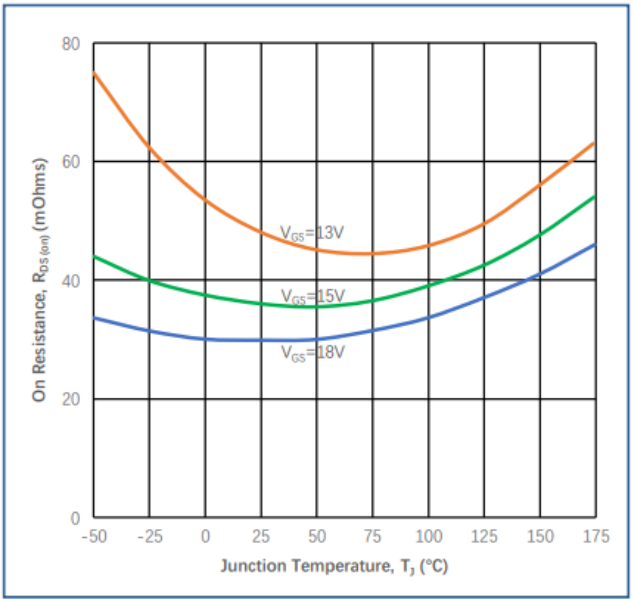


Figure 4
On-Resistance vs. Temperature

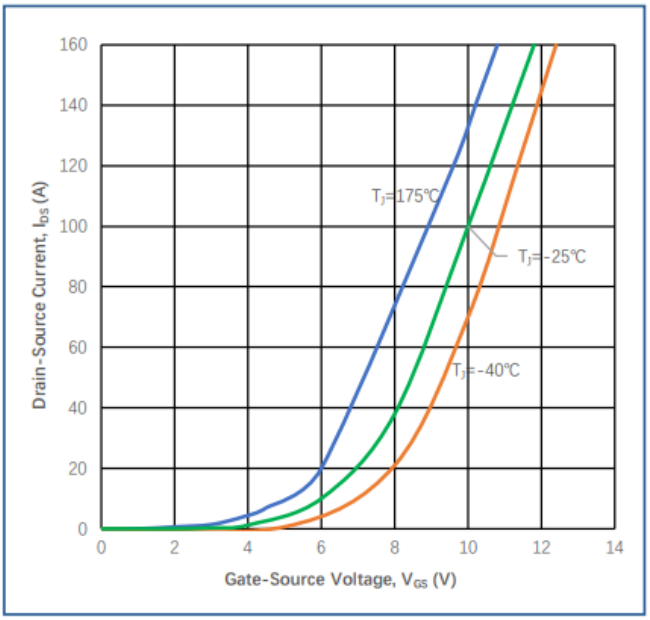


Figure 5
Transfer Characteristic

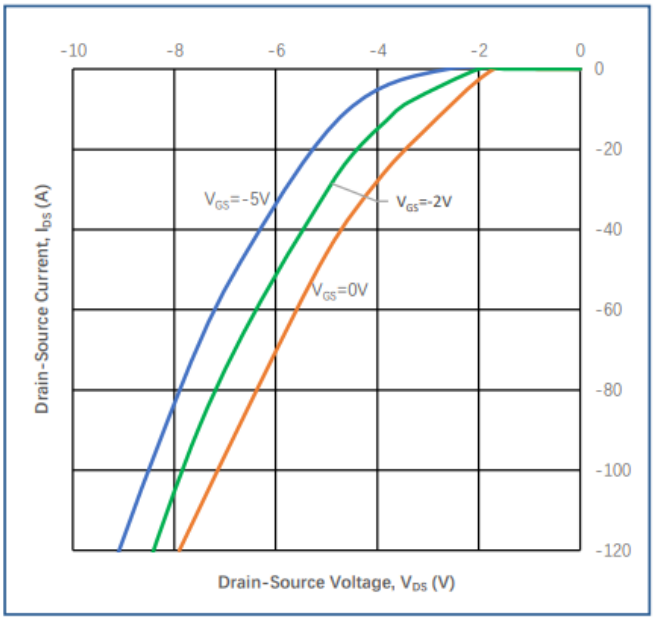


Figure 6
Body Diode Characteristic at 25°C

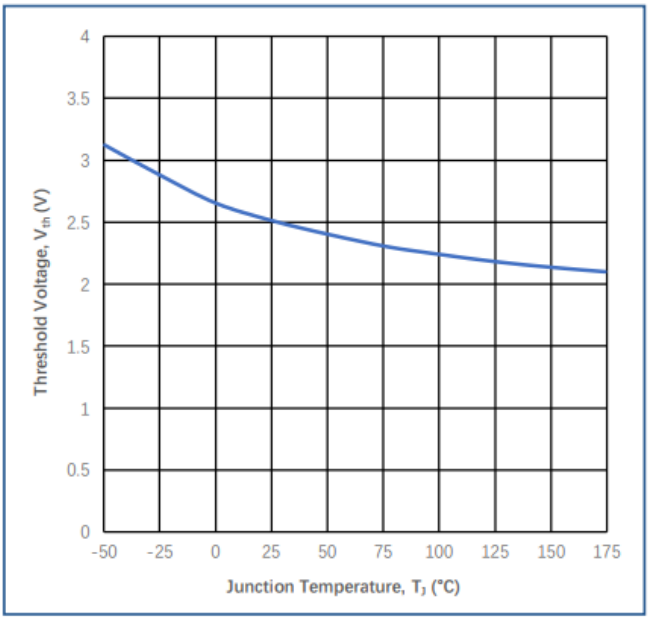


Figure 7
Threshold Voltage vs. Temperature

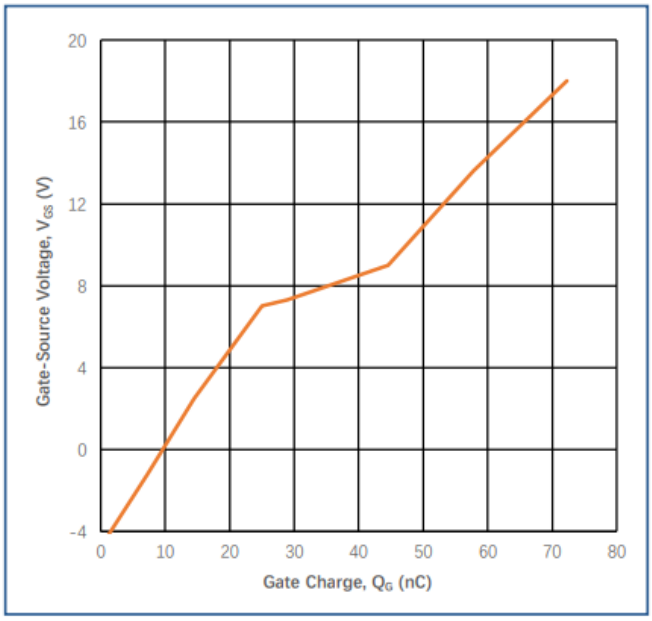


Figure 8
Gate Charge Characteristics

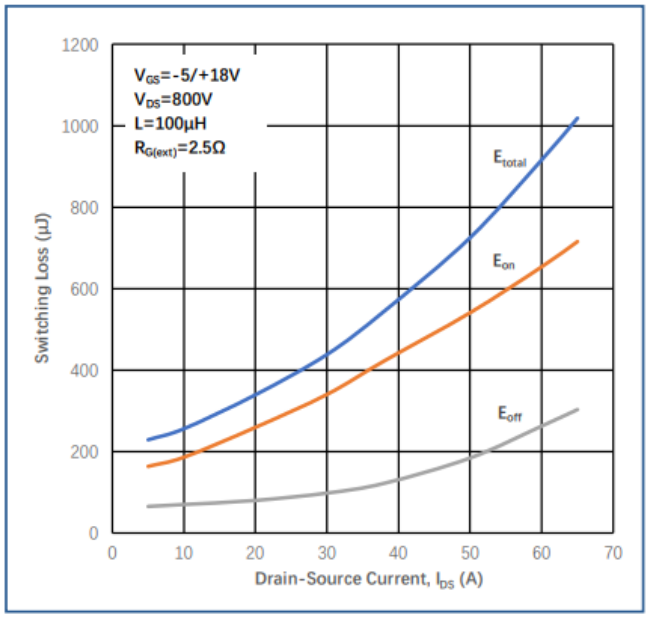


Figure 13
Switching Energy vs. Drain Current

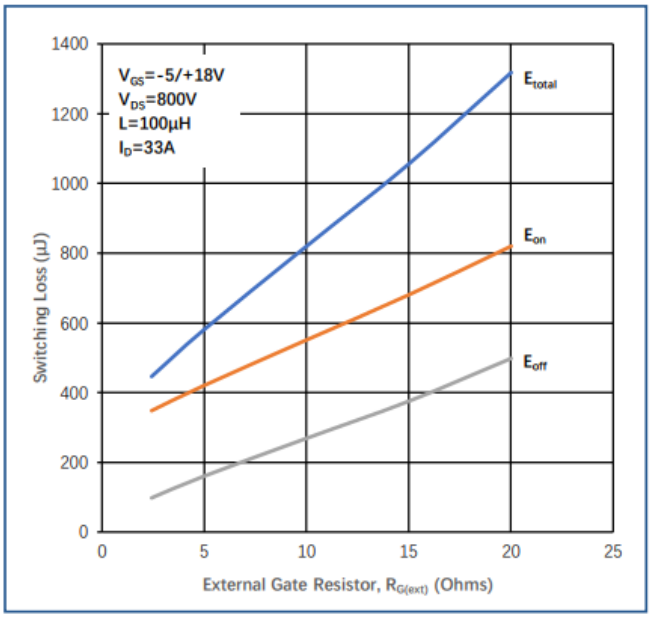


Figure 14
Switching Energy vs. $R_{G(ext)}$

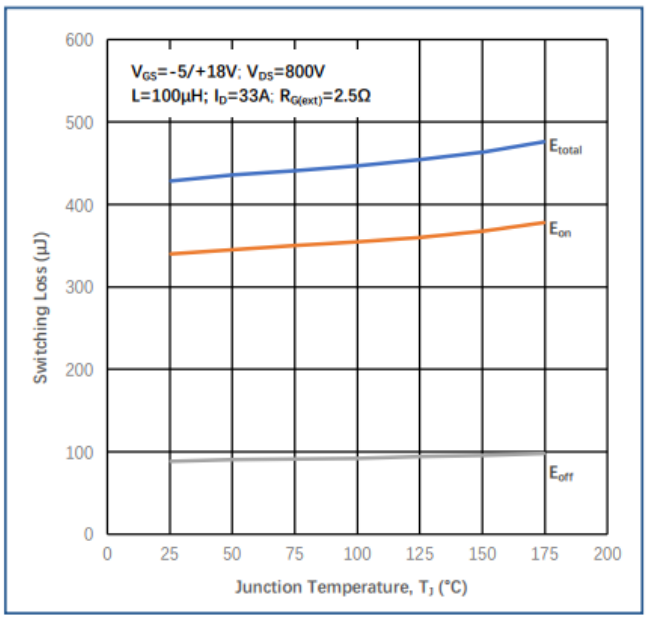


Figure 15
Switching Energy vs. Temperature

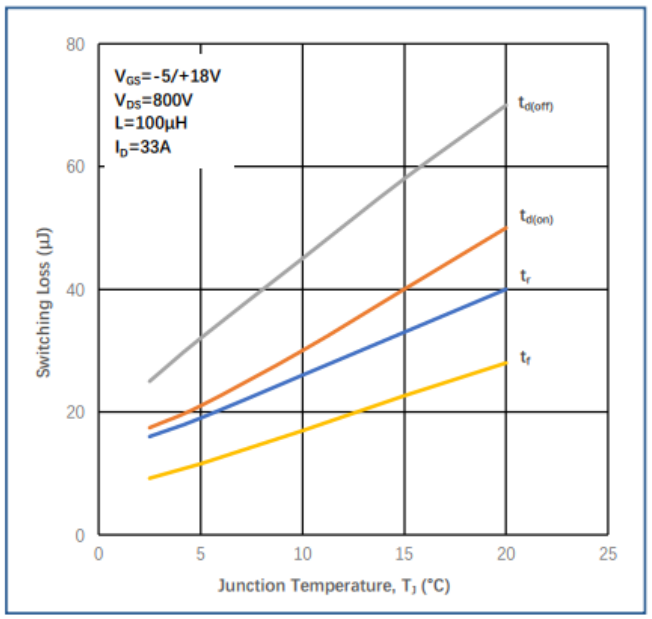


Figure 16
Switching Times vs. $R_{G(ext)}$

Package Drawing

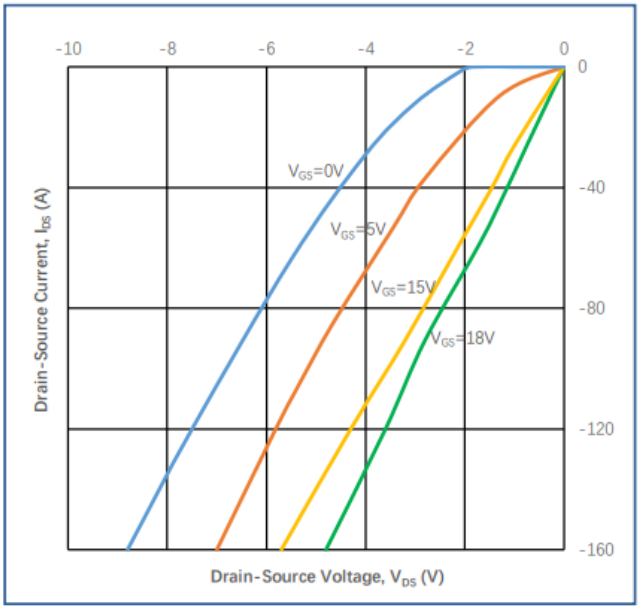


Figure 9

3rd Quadrant Characteristic at 25°C

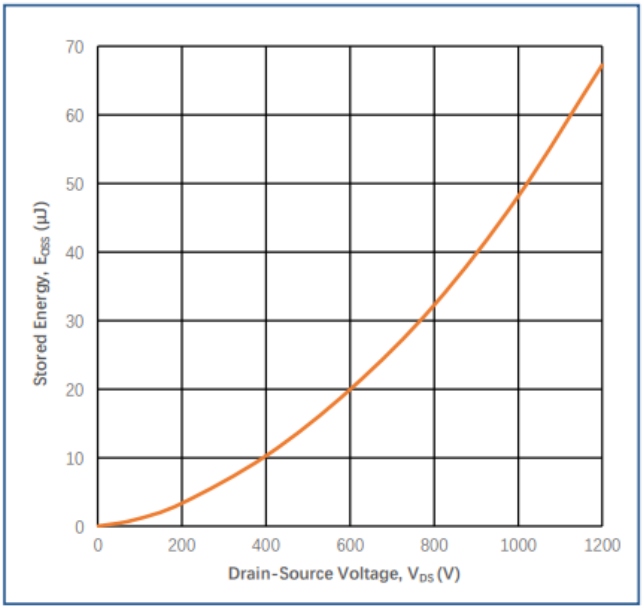


Figure 10

Output Capacitor Stored Energy

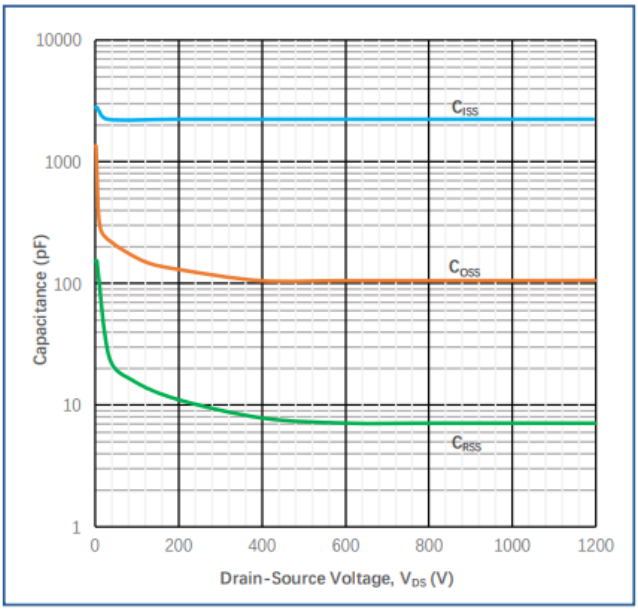


Figure 11

Capacitances vs. Drain-Source

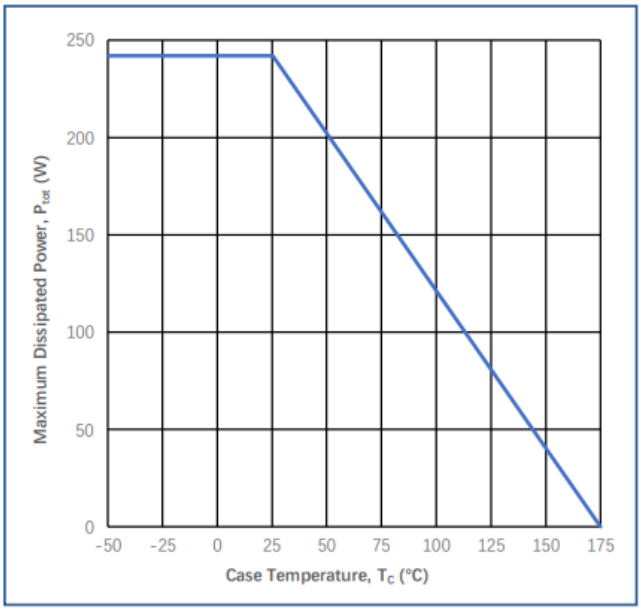


Figure 12

Max Power Dissipation Derating vs T_C

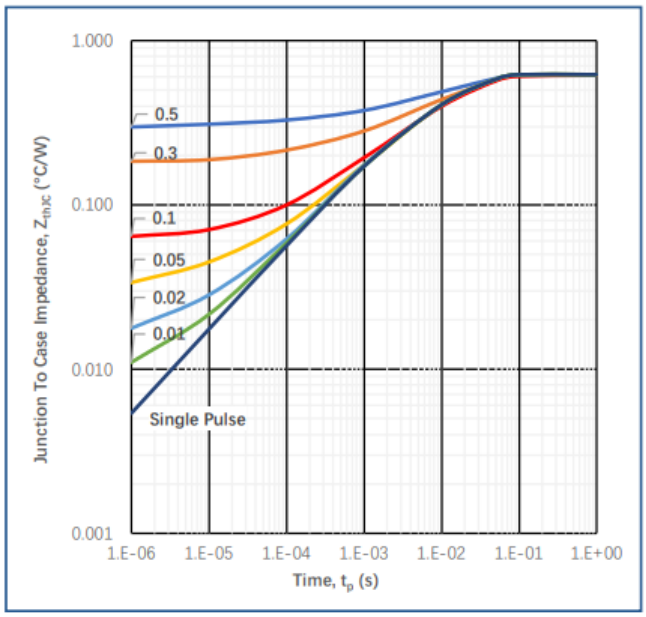


Figure 17
Transient Thermal Impedance

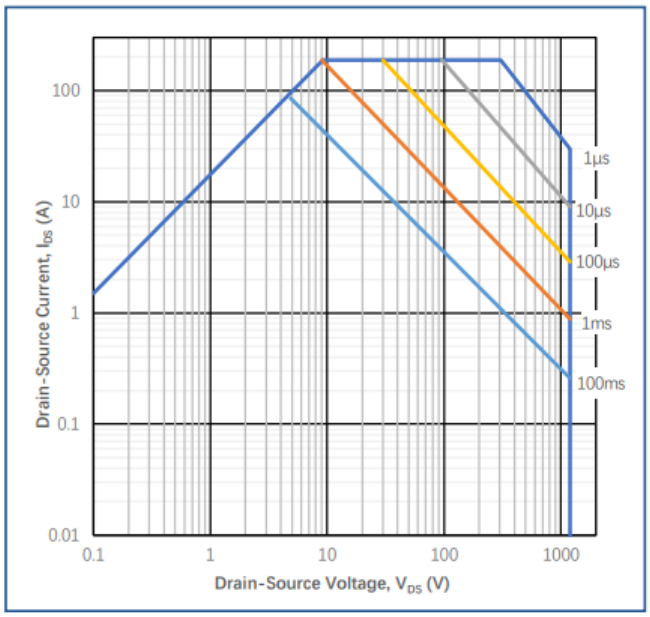
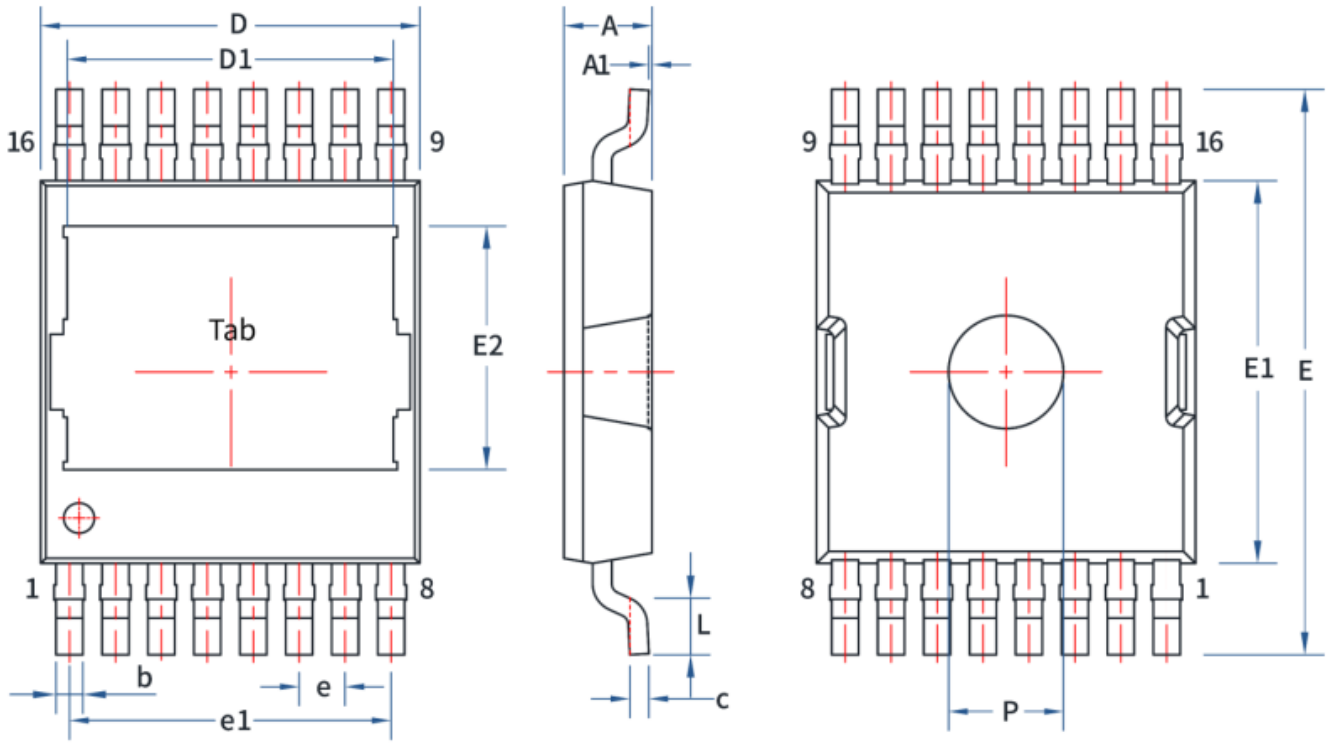


Figure 18
Safe Operating Area

Package TOLT



Dimensions (Unit: mm)

Symbols	Dimensions in millimeters		
	Min.	Type	Max.
A	2.25	2.30	2.35
A1	0.01	-	0.16
b	0.65	0.70	0.75
C	0.45	0.50	0.55
D	9.70	9.90	11.10
D1	8.37	5.52	8.67
E	14.8	15.00	15.20
E1	10.00	10.15	10.30
E2	6.31	6.46	6.61
e	1.20 Type		
e1	8.40 Type		
L	1.4	1.50	1.60
P	2.90	3.00	3.10

Pin	Symbol	Description
1-6	S	Power Source
7	KS	Kelvin Source
8	G	Gate
9-16, Tab	D	Drain

Revision version	Description	Date
1	Initial	03.2026