GOSTONE

RoHS COMPLIANT

GMS014N06M1

N-Channel 60V, 1.4mΩ max., TOLT MOSFET

Product Summary

| V_{DS} (V)	$R_{DS(on),max}$ (mΩ)	I_D (A)
60	1.4 @ V_{GS} = 10V	420 [1]

General Information

Shipping
- One shipping options is offered as standard
- Un-sawn wafer

Handling
- Product must be handled only at ESD safe workstations. Standard ESD precautions and safe work environments are as defined in MIL-HDBK-263.
- Product must be handled only in a class 10,000 or better-designated clean room environmen

Features

- Low RDS(on)
- Trench power MOSFET
- Low Gate Charge

Application

- Stored energy
- Electric motorcycle

TOLT

TOLT-16L
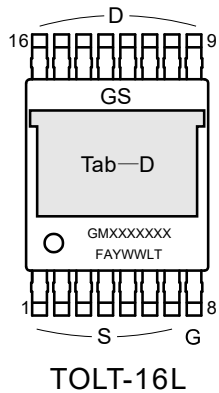
NOTE:
LOGO - GS
GM - Part number code
F - Fab location code
A - Assembly location code
Y - Year code
WW - Week code
L&T - Assembly lot code

Equivalent circuit

Drain
Pin 9-16, Tab

Gate
Pin 8
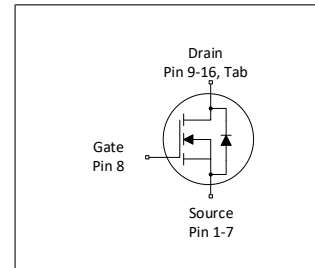
Source
Pin 1-7

Absolute Maximum Rating (Ta=25°C)

Parameter		Symbol	Limit	Unit
Drain-source voltage		V_{DS}	60	V
Gate-source voltage		V_{GS}	± 20	
Continuous drain current	T_C=25°C [1]	I_D	420	A
	T_C=100°C [1]		294	
Pulsed drain current[2]		$I_{D,pulse}$	1678	
Avalanche energy, single pulse[3]		E_{AS}	1750	mJ
Power dissipation	T_C=25°C	P_D	431	W
Operating junction and storage temperature range		T_J, T_{stg}	-55 to 175	°C

Thermal Characteristic (Ta=25°C)

Parameter		Symbol	Max.	Unit
Thermal resistance, junction-to-case	Steady state	$R_{θJC}$	0.29	°C/W
Thermal resistance, junction-to-ambient [4]	Steady state	$R_{θJA}$	40	

Electrical characteristics (Ta=25°C ± 3°C)

Parameter	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Static parameter						
Drain to source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 1 mA	60			V
Gate-source threshold voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	2.0	3.0	4.0	V
Gate-body leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V			±100	nA
Zero gate voltage drain current	I_{DSS}	V_{DS} = 60 V, V_{GS} = 0 V			1	µA
Drain-source on-resistance	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 20 A		1.1	1.3	mΩ
Forward transconductance[5]	g_{fs}	V_{DS} = 5 V, I_D = 20 A		56		S
Gate resistance	R_g	f = 1 MHz, open drain		2.4		Ω
Dynamic[5]						
Total gate charge	Q_g			108		
Gate-source charge	Q_{gs}	V_{DS} = 30 V, I_D = 20 A, V_{GS} = 10 V		26		nC
Gate-drain charge	Q_{gd}			24		
Turn-on delay time	$t_{d(on)}$			28		
Rise time	t_r	V_{DS} = 30 V, I_D = 20 A, V_{GS} = 10 V,		45		ns
Turn-off delay time	$t_{d(off)}$	R_{GEN} = 3.0 Ω		73		
Fall time	t_f			95		
Input capacitance	C_{iss}			7204		
Output capacitance	C_{oss}	V_{DS} = 30 V, V_{GS} = 0 V, f = 1 MHz		3129		pF
Reverse transfer capacitance	C_{rss}			202		
Reverse Diode Characteristics(5)						
Diode forward voltage	V_{SD}	V_{GS} = 0 V, I_F = 2.0 A		0.7	1.2	V
Reverse recovery time	t_{rr}	I_F = 20 A, di/dt = 100 A/µs		73		ns
Reverse recovery charge	Q_{rr}			95		nC

Notes

(1) Package limited.
(2) Pulse width limited by maximum junction temperature.
(3) V_{DS} = 60 V, V_{GS} = 10 V, L = 1.0 mH.
(4) $R_{θJA}$ is determined with the device mounted on a 1 in^2 pad 2 oz copper pad on a 1.5x1.5 in. board of FR-4 material.
(5) Guaranteed by design, not subject to production testing.

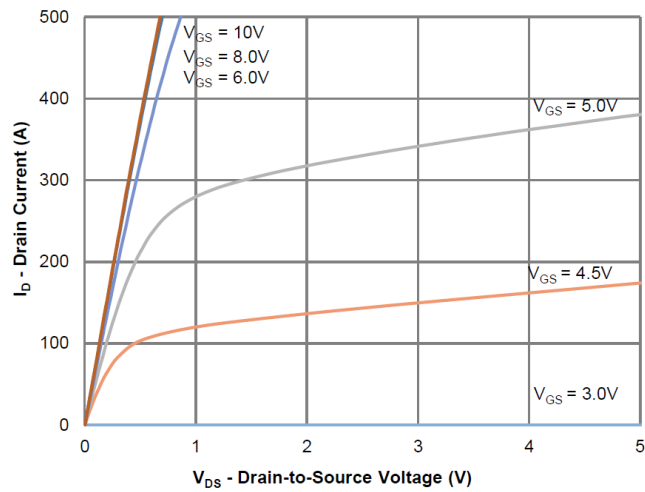## Electrical characteristics diagrams
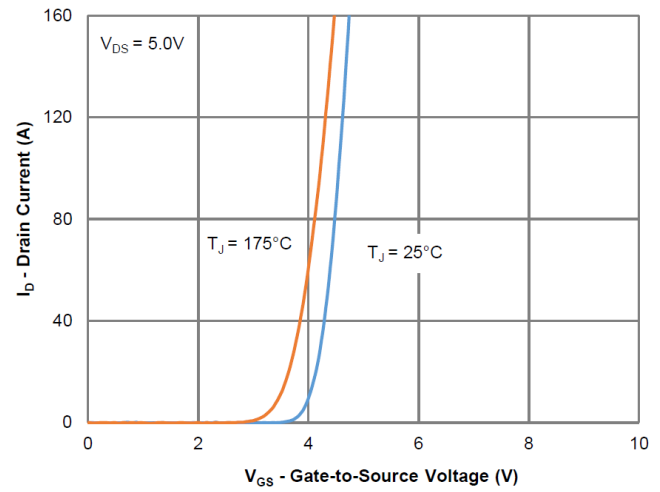

Figure 1: Output Characteristics
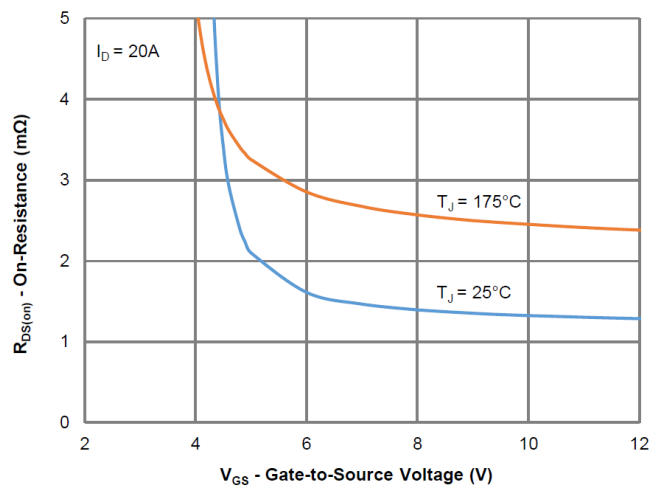

Figure 2: Transfer Characteristics

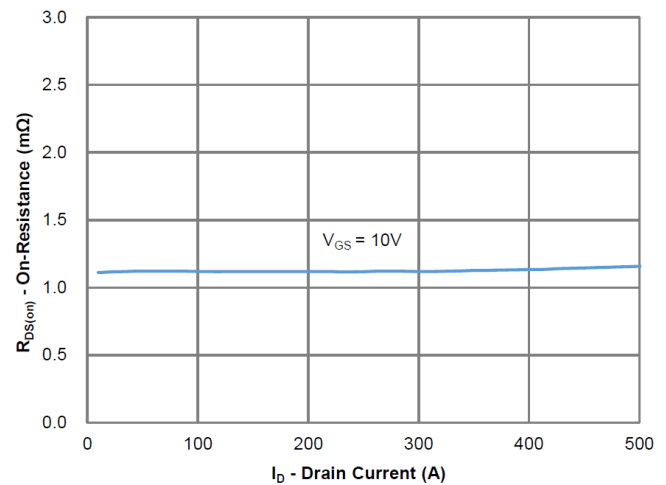Figure 3: On-Resistance vs. Gate-Source Voltage

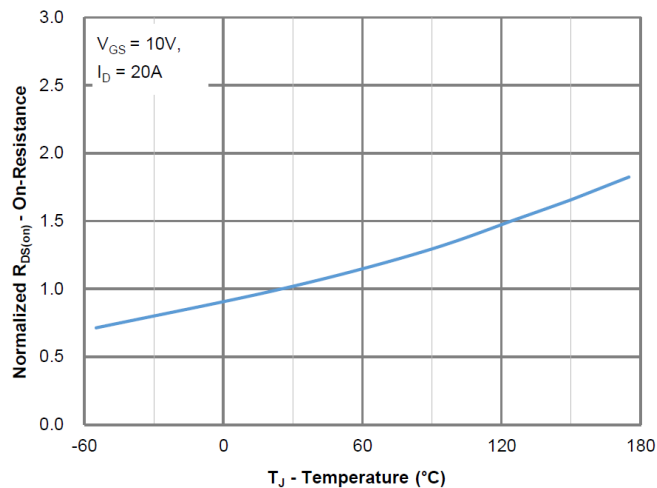Figure 4: On-Resistance vs. Gate-Source Voltage

Figure 5: On-Resistance vs. Junction Temperature
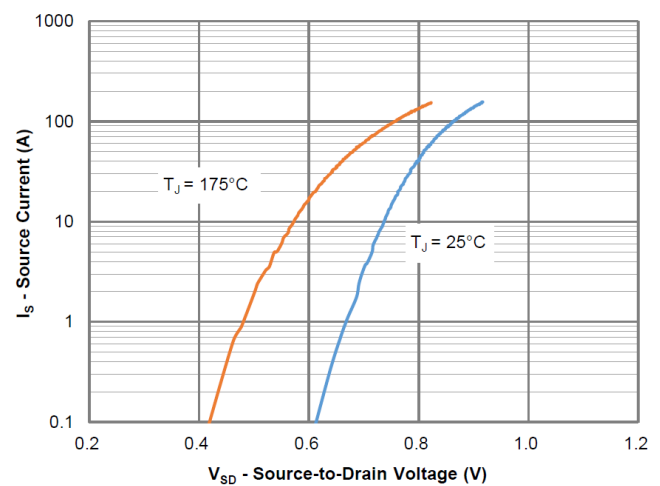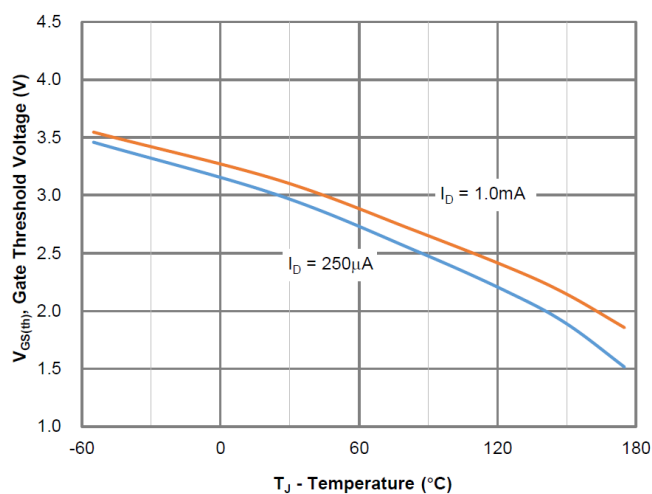

Figure 6: Source-Drain Diode Forward Voltage

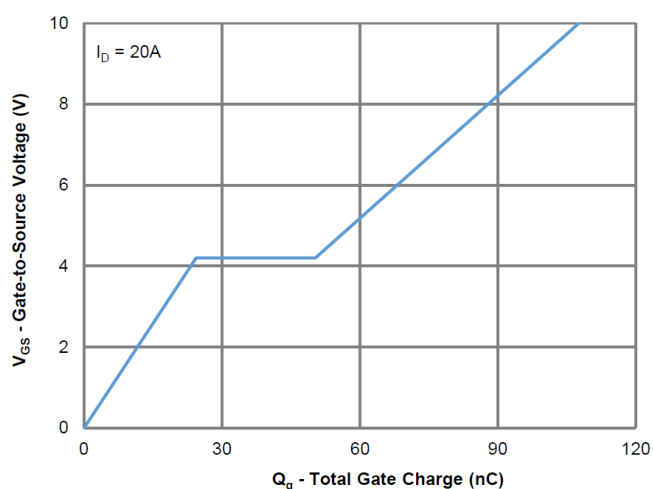Figure 7: Gate Threshold Variation vs. Junction Temperature

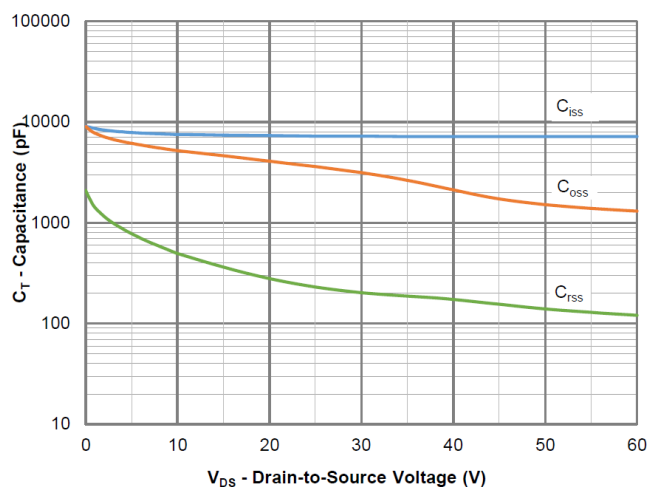Figure 8: Gate Charge Characteristics
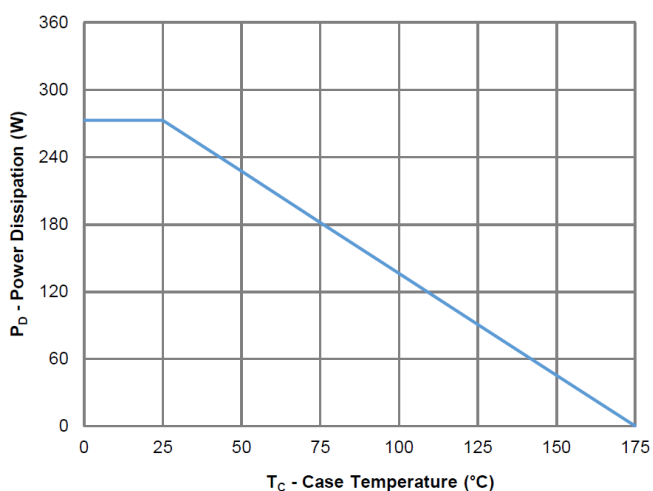

Figure 9: Capacitance Characteristics
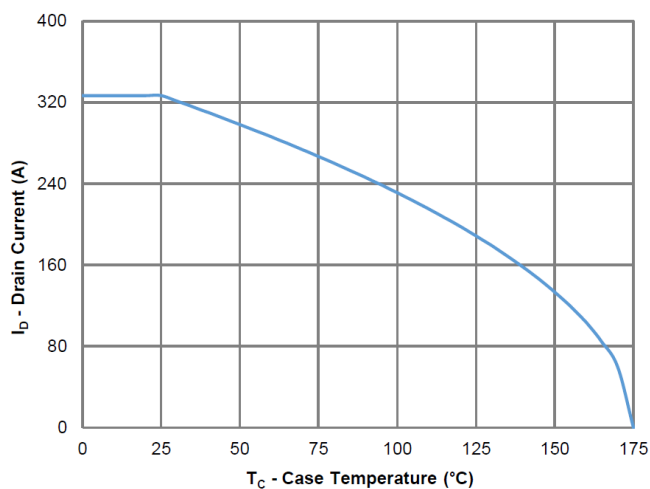

Figure 10: Power Derating
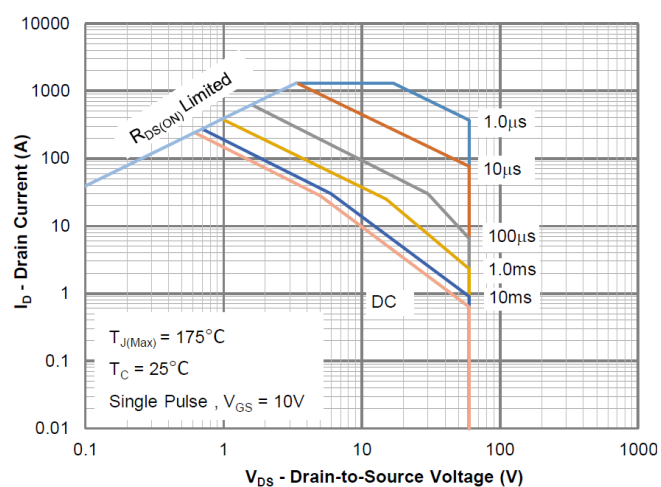

Figure 11: Current Derating
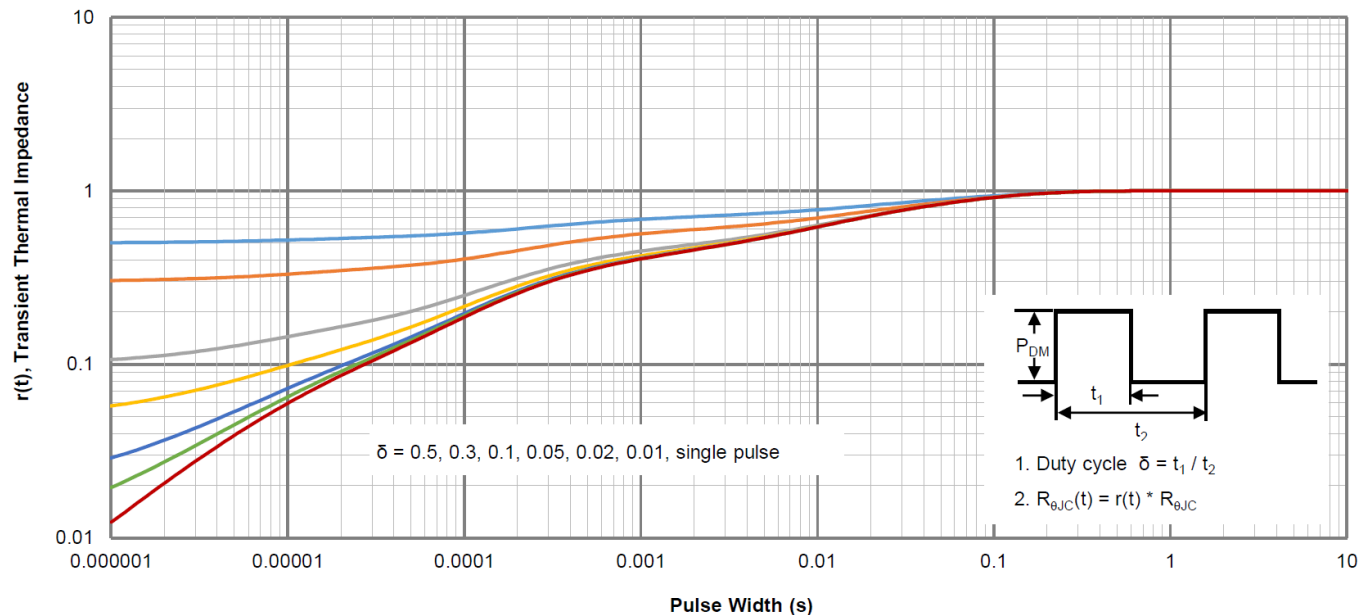

Figure 12: Safe Operating Area
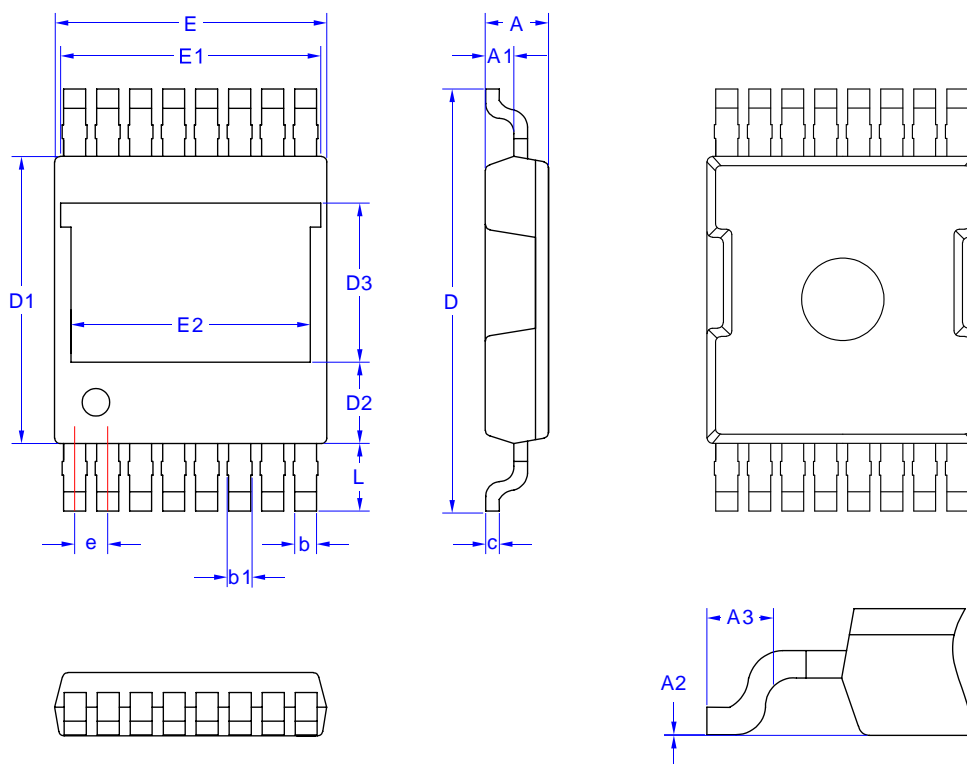
Figure 13: Normalized Maximum Transient Thermal Impedance

Package outline dimensions：TOLT

Symbol	Dimensions in Millimeters		
	MIN	NOM	MAX
A	2.20	2.30	2.40
A1	0.99	1.04	1.09
A2	0.00	0.08	0.16
A3	1.50 REF		
b	0.70	0.75	0.80
b1	0.65	0.70	0.75
c	0.45	0.50	0.55
D	14.50	15.00	15.50

Symbol	Dimensions in Millimeters		
	MIN	NOM	MAX
D1	9.60	10.10	10.60
D2	2.30	2.80	3.30
D3	5.77 REF		
E	9.40	9.90	10.40
E1	9.46 REF		
E2	8.70 REF		
e	1.15	1.20	1.25
L	2.40	2.45	2.50

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