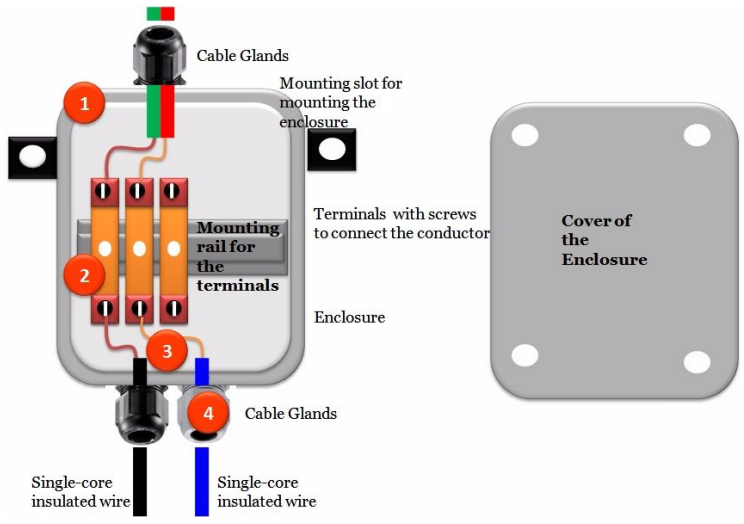
Maker Semiconductor
power of conductor

24062016TDS
Junction Power

Ordering Information

Part Number	Package Option
24062016TDS-O13	MA-123
24062016TDS-I23	MA-145



Description

Junction power box power supply is a 24 V hardwired power supply. The Box power supply is mounted on a 4 inch square junction box. The power supply is protected electronically in the event of a output miswire, and will automatically reset when wiring is corrected.

Features

- High junction temperature capability
- Avalanche-rated
- Low leakage current
- Good trade-off between leakage current and forward voltage drop

Benefits

- Simple wiring scheme uses 4-conductor, low voltage link to provide power and communication for both QS electronic drive units (EDUs) and seeTouchR QS keypads
- Flexible wiring topology for easy installation and integration
- Form factor allows the power supply to be hidden in utility spaces

Application

- Notebook & LCD adaptors
- desktop SMPS

Parameter	Value	Unit
V_{DSS} @ T_{jmax}	780	V
RDS(on) max	<89	mΩ
Qg typ	20	nC
I_{Dmax} @ 25 ºC	24	A

Revision no: 00
Publish Date: 05.10.2017

1. Maximum Ratings

Table 2 Maximum Ratings

@ T_j = 25ºC, unless otherwise specified

Parameter	Symbol	Values			Unit	Condition
		Min	Typ	Max		
Continuous drain current	ID	-14		10.5	A	TC= 100ºC
		-19		12.4	A	TC = 25ºC
Pulsed drain current	ID, pulse	-30		19.5	A	TC = 25ºC
Avalanche energy, single pulse	E_{AS}	-14		10.0	mJ	I_D = 5.1A; V_{DD} = 50V, VGS = 10V, L=10mH, RG=25 Ohms
Avalanche energy, repetitive	EAR	-14		20.0	mJ	I_D = 2.0; V_{DD} = 50V
Avalanche current, single pulse	IAS	4	0.55	15.6	mJ	-
MOSFET dv/dt ruggedness	dv/dt	10		4.1	A	VDS = 0….480V
Gate source voltage (static)	V_{GS}	-14		10	V/ns	Static
Gate source voltage (dynamic)	V_{GS}	-30	0.6	20	V	AC (F>1Hz)
Power dissipation	Ptot	-30		22	V	TO-220, TO-263, TC = 25ºC
Storage temperature	Tstg	-30		34.5	W	-
Operating junction temperature	Tj	-12		17	ºC	-
Mounting torque	-	15	3.4	19	ºC	M3 and M3.5 screws
Continuous diode forward current	ISD	-30		45	N-cm	Tc = 25ºC
Diode pulse current	IS, pulse	-10		19	A	Tc = 25ºC
Reverse diode	dv/dt	-10		15	A	V_{DS}=0…480V, I_{SD}<=I_S, T_j = 25ºC
Maximum diode commutation speed	di_f/dt	-10		11	V/ns	V_{DS}=0…480V, I_{SD}<=I_S, T_j = 25ºC

2. Thermal Characteristics

Table 3 Thermal Characteristics

Symbol	Parameter	Values				Unit
		MA-123	MA-145	MA-113	MA-432	
R_{th-jC}	Thermal resistance, junction-case	1.4	1.3	1.4	1.1	ºC/W
R_{th-jA}	Thermal resistance, junction-ambient	70	70	70	70	ºC/W
T_S	Soldering temperature, wave soldering only allowed at leads	340	330	400	250	ºC

Revision no: 00
Publish Date: 05.10.2017

3. Electrical Characteristics

Table 4 Static Characteristics

@ T_j = 25ºC, unless otherwise specified

Parameter	Symbol	Values			Unit	Condition
		Min	Typ	Max		
Drain-source breakdown voltage	$V_{(BR)DSS}$	650		900	V	I_D = 1mA, V_{GS} = 0V
Gate threshold voltage	$V_{GS(TH)}$	2.5	2.7	2.9	V	V_{DS} = V_{GS}, I_D = 72uA
Zero gate voltage drain current	I_{DSS}	-	-	4	μA	V_{DS} = 650V, T_C = 25ºC, V_{GS} = 0V
		-	-	100		V_{DS} = 650V, T_C = 125ºC, V_{GS} = 0V
Gate-source leakage current	I_{GSS}	-	-	100	mJ	V_{GS} = ±30V, V_{DS} = 0V
Drain-source on-state resistance	$R_{DS(on)}$	-	-	0.23	A	V_{GS} = 10V, I_D = 5.8 A, T_J = 25ºC
Gate resistance	R_G	-	-	0.3	V/ns	-

Table 5 Dynamic Characteristics

Parameter	Symbol	Values			Unit	Condition
		Min	Typ	Max		
Input capacitance	C_{iss}	-	1900	-	pF	V_{DS} = 100V, f = 1MHz, V_{GS} = 0V
Output capacitance	C_{oss}	-	56	-	pF	
Reverse transfer capacitance	C_{rss}	-	8	-	pF	
Turn-on delay time	$t_{d(on)}$	-	4	-	ns	V_{DD} = 400V, I_D = 4.5A R_G = 3.4Ω, V_{GS} = 13V
Rise time	t_r	-	5	-	ns	
Turn-off delay time	$t_{d(off)}$	-	3	-	ns	
Fall time	t_f	-	1	-	ns	

Table 6 Gate Charge Characteristics

Parameter	Symbol	Values			Unit	Condition
		Min	Typ	Max		
Gate to source charge	Q_{gs}		0,6		nC	V_{DD} = 480V, I_D = 5.8A, V_{GS} = 0 to 10V
Gate to drain charge	Q_{gd}		34		nC	
Gate charge total	Q_g		3		nC	
Gate plateau voltage	$t_{d(on)}$		0.8		V	

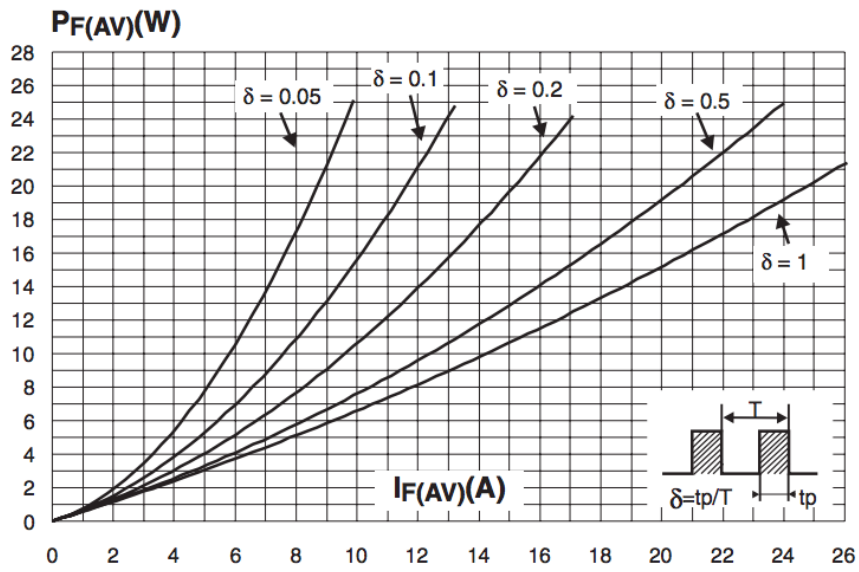
Table 7 Reverse Diode Characteristics

Parameter	Symbol	Values			Unit	Condition
		Min	Typ	Max		
Diode source-drain current	I_{SD}		5		A	
Diode forward voltage	V_{fd}		56		V	I_{SD} = 11.6A, V_{GS} = 0V, T_J = 25ºC
Reverse recovery time	t_{rr}		3		nS	I_F = 11.6A, L = 5mH di/dt = 100A/μS V_{DD} = 60V, T_J = 25ºC
Reverse recovery charge	Q_{rr}		1.4		μC	
Peak reverse recovery current	I_{rrm}				A	

Revision no: 00
Publish Date: 05.10.2017

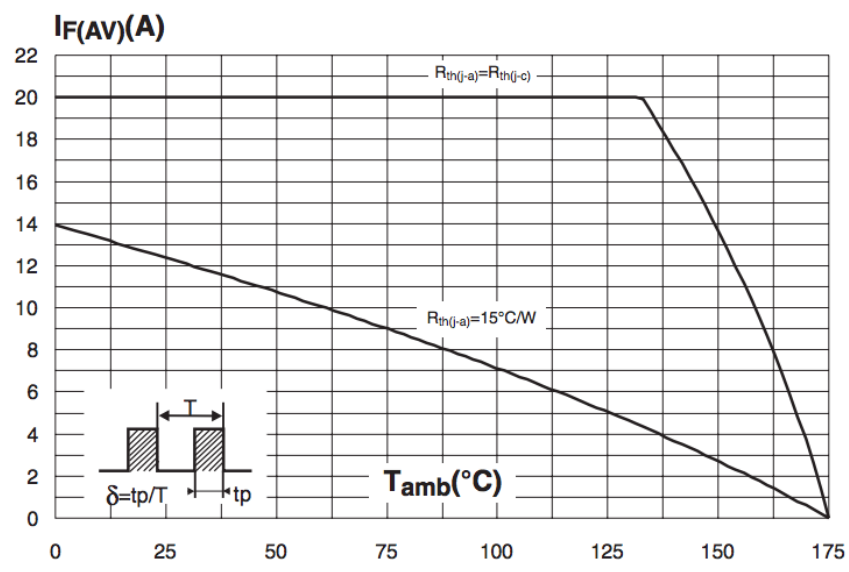
4. Electrical Characteristics Graphs

Power Dissipation



Max power limited by case temperature

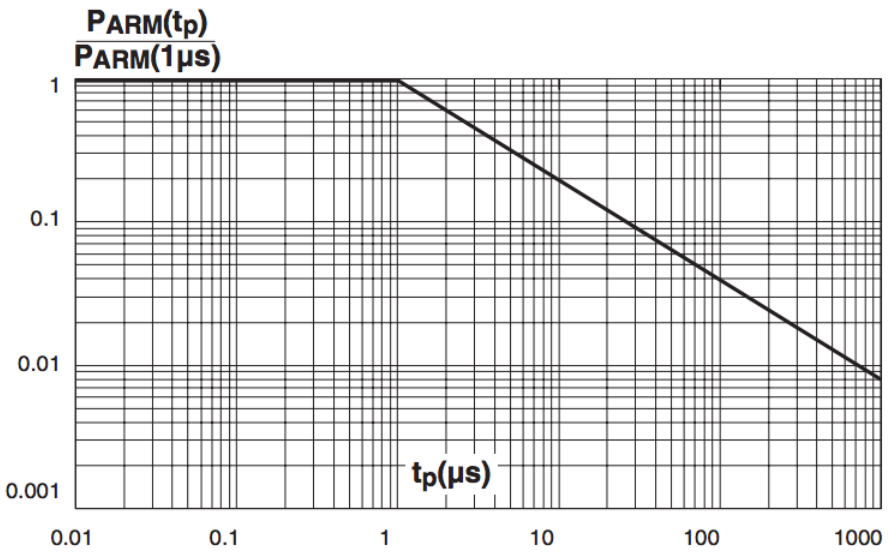
Maximum Transient Thermal Impedance



Variable is pulse time (t_p)

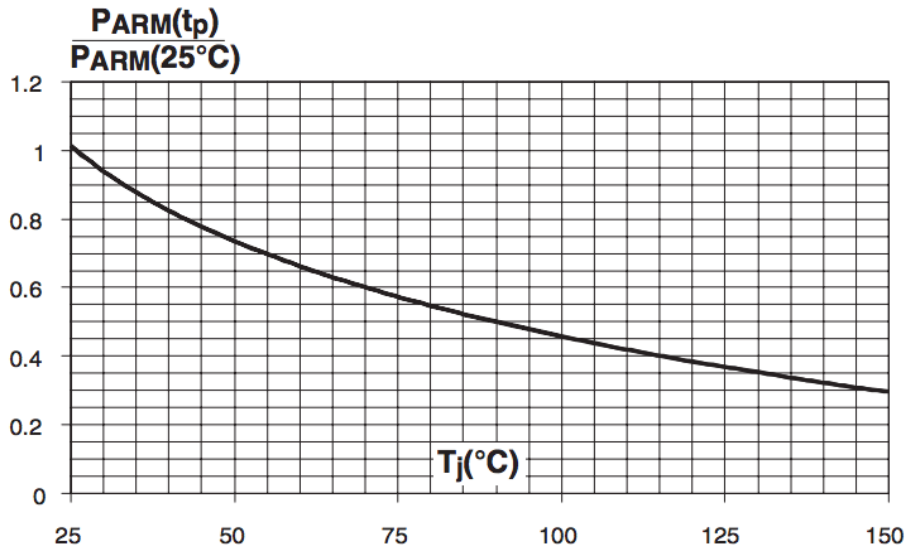
Table 8 Thermal Performance

Typical Output Characteristics



T_C = 25°C; Variable is V_{GS}

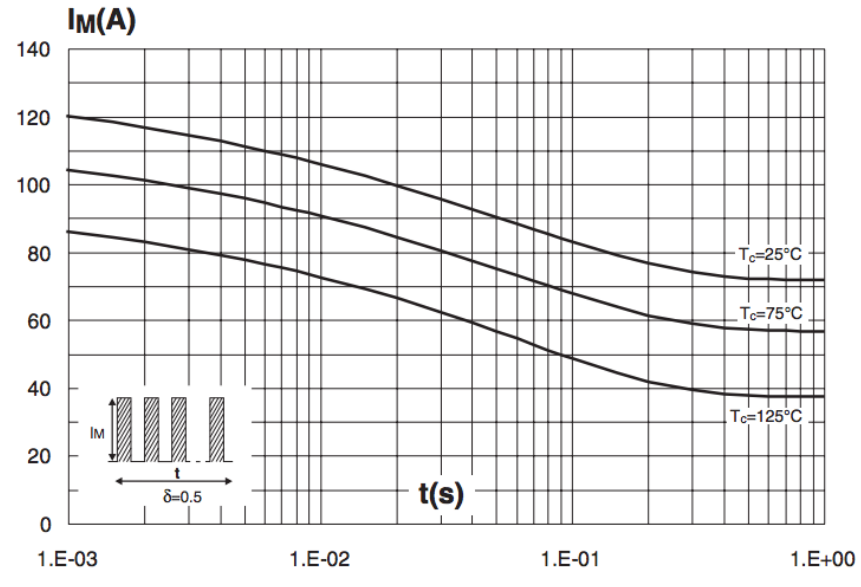
Maximum Transient Thermal Impedance



T_C = 125°C; Variable is V_{GS}

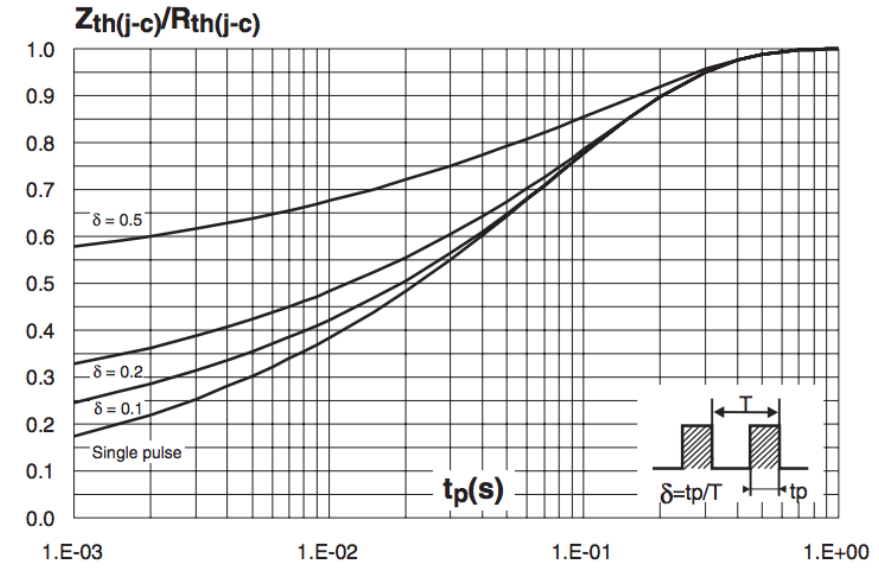
Table 9 Output Characteristics

Typical Output Characteristics



T_C = 25°C; Variable is V_{GS}

Maximum Transient Thermal Impedance

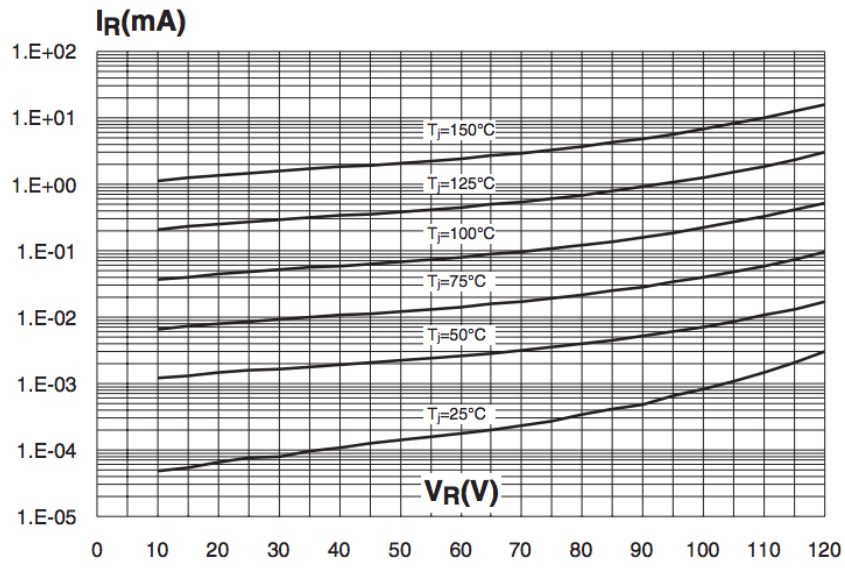


T_C = 125°C; Variable is V_{GS}

Revision no: 00
Publish Date: 05.10.2017

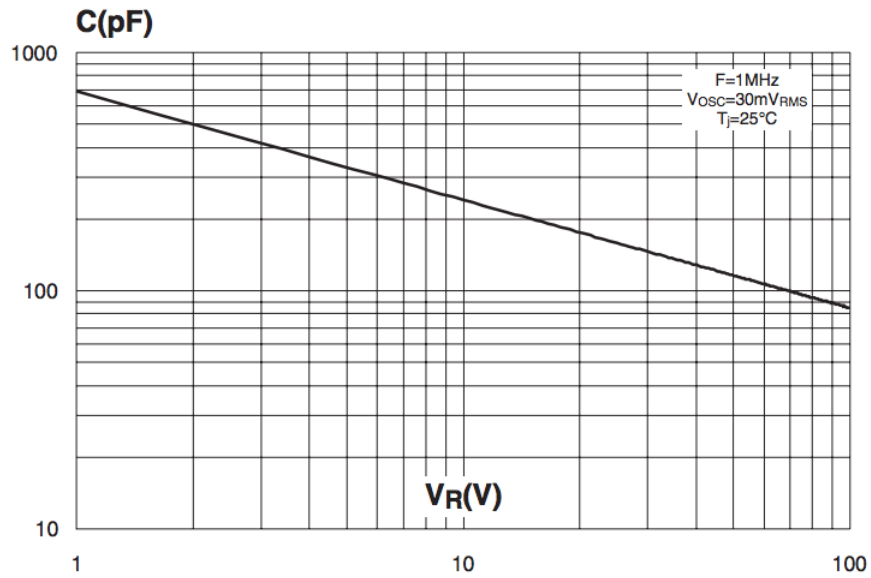
Table 10 Drain-Source Resistance

Typical Drain-Source On-State Resistance



Tj = 25oC; Variable is gate voltage (VGS)

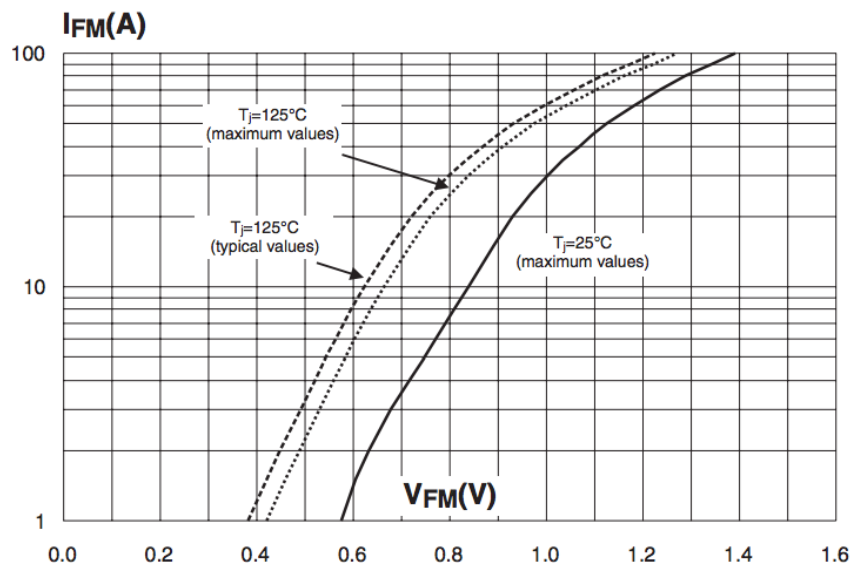
Drain-Source On-State Resistance



I_D = 14.3A, V_{GS}=10V

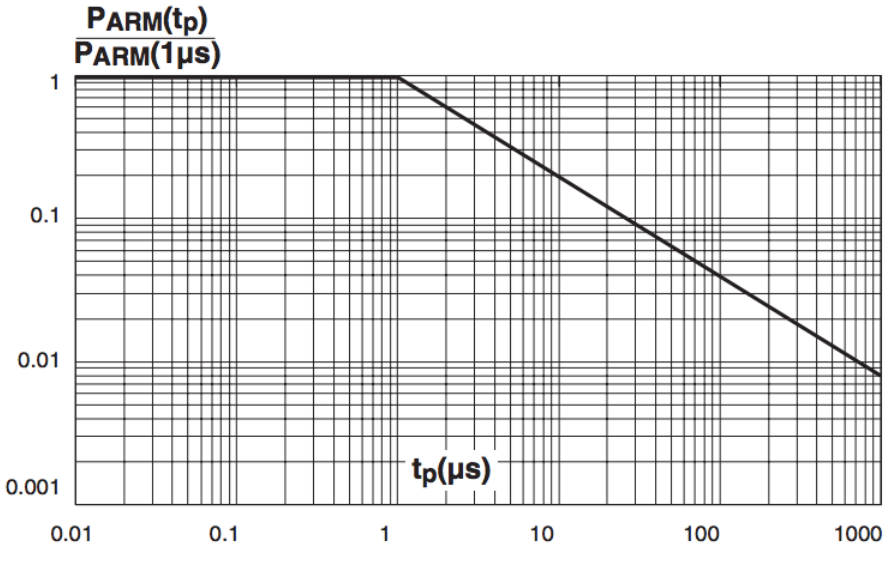
Table 11 Safe Operating Area

Typical Capacitances



V_{GS} = 0V; Freq. = 1MHz

Typical Gate Charge



I_D = 8.6A Pulsed Vdd = 480V

5. Disclaim

The information in this document is provided solely regarding TDSmaker products. The information is not a guarantee of performance or characteristics. TDSmaker reserves the right to modify, change, amend, improve or make corrections to this document, and its products, at any time and its sole discretion without prior written consent or notice. No license to any intellectual property rights is granted or implied under this document. TDSmaker disclaims warranties and liabilities of any kind including non-infringement of intellectual property rights of any third party. TDSmaker products may be used in applications such as automotive, military, aerospace, medical or other applications where failure or malfunction may result in personal injury, death or severe property or environmental damage only with express written approval from TDSmaker. Sale of TDSmaker products are subject toTDSmaker's standard terms and conditions. Products not purchased through TDSmaker'sauthorized distributors, agents or sales representatives are void of warranty.