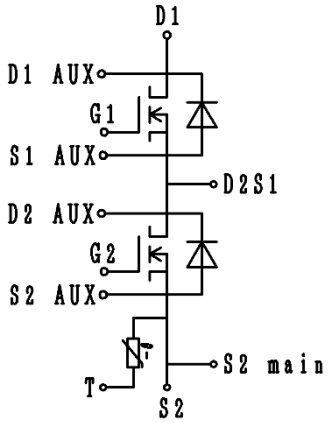
MSM900GS17CLT

Target Specification

SiC MOSFET 1700V



FEATURES

- Ultra low switching loss with SiC MOSFET
- High current density package
- Low stray inductance & low Rth(j-c)
- Half-bridge (2in1)
- Built in temperature sensor
- Scalable large current easily handled by paralleling
- Equipped with current sensing terminals

ABSOLUTE MAXIMUM RATINGS (Tc=25ºC)

Item		Symbol	Unit	MSM900GS17CLT
Drain Source Voltage		V_{DSS}	V	1,700
Gate Source Voltage		V_{GSS}	V	+20/-15
Drain Current	DC	I_D	A	900
	1ms	I_{DM}		1,800
Source Current	DC	I_S	A	900
	1ms	I_{SM}		1,800
Junction Temperature		$T_{vj\ op}$	ºC	-50 ~ +150
Storage Temperature		T_{stg}	ºC	-55 ~ +150
Isolation Voltage		V_{ISO}	V_{RMS}	4,000(AC 1 minute)
Screw Torque	Terminals (M3/M8)	M	N·m	0.8/15
	Mounting (M6)	M		6.0 (1)

Notes: (1) Recommended Value 5.5±0.5N·m

ELECTRICAL CHARACTERISTICS

Item		Symbol	Unit	Min.	Typ.	Max.	Test Conditions
Drain Source Cut-Off Current		I_{DSS}	mA	-	-	0.05	V_{DS}=1,700V, V_{GS}=0V, T_{vj}=25ºC
				-	-	1	V_{DS}=1,700V, V_{GS}=0V, T_{vj}=175ºC
Gate Source Leakage Current		I_{GSS}	nA	-	-	+100	V_{GS}=+20V, V_{DS}=0V, T_{vj}=25ºC
				-100			V_{GS}=-15V, V_{DS}=0V, T_{vj}=25ºC
Drain Source on-state Voltage		$V_{DS(on)}$	V	-	3.1	-	I_D=900A, V_{GS}=15V, T_{vj}=25ºC
				TBD	3.9	TBD	I_D=900A, V_{GS}=15V, T_{vj}=175ºC
Gate Source Threshold Voltage		$V_{GS(th)}$	V	TBD	3.0	TBD	V_{DS}=10V, I_D=900mA, T_{vj}=25ºC
Input Capacitance		C_{iss}	nF	-	115	-	V_{DS}=10V, V_{GS}=0V, f=100kHz, T_{vj}=25ºC
Internal Gate Resistance		$R_{g(int)}$	Ω	-	2.5	-	V_{DS}=10V, V_{GS}=0V, f=100kHz, T_{vj}=25ºC
Switching Times	Rise Time	t_r	µs	-	TBD	-	V_{DD}=900V, I_D=900A Ls=40nH R_G(on/off)= 1.8/2.7Ω (2) V_{GS}=+15/-10V, T_{vj}=175ºC
	Turn On Delay Time	$td_{(on)}$		-	TBD	-	
	Fall Time	t_f		-	TBD	-	
	Turn Off Delay Time	$td_{(off)}$		-	TBD	-	
Source Drain Voltage		V_{SD}	V	-	2.0	-	I_S=900A, V_{GS}=+15V, T_{vj}=25ºC
				TBD	3.4	TBD	I_S=900A, V_{GS}=+15V, T_{vj}=175ºC
				-	9.4	-	I_S=900A, V_{GS}=-10V, T_{vj}=25ºC
				TBD	7.3	TBD	I_S=900A, V_{GS}=-10V, T_{vj}=175ºC
Reverse Recovery Time		t_{rr}	µs	-	TBD	-	V_{DD}=900V, I_S=900A, Ls =40nH T_{vj}=175ºC ,R_G(on/off)=1.8/2.7Ω
Turn-on Loss per Pulse		E_{on}	J/P	-	0.21	-	V_{DD}=900V, I_D=900A, Ls =40nH R_G(on/off)=1.8/2.7Ω (2) V_{GS}=+15/-10V, T_{vj}=175ºC
Turn-off Loss per Pulse		E_{off}	J/P	-	0.15	-	
Reverse Recovery Loss per Pulse		E_{rr}	J/P	-	0.01	-	
Stray Inductance Module		L_{SCE}	nH	-	10	-	Between D1(main) and S2(main)
NTC-Thermistor	Resistance	R_{25}	kΩ	-	5	-	Tc=25 ºC
	Deviation	△R/R	%	-5	-	5	Tc=25 ºC
Thermal Impedance	MOSFET	Rth(j-c)	K/W	-	-	0.048	Junction to case
Contact Thermal Impedance		Rth(c-f)	K/W	-	0.02	-	Case to fin (per 1 arm)

Notes: (2) R_G value is a test condition value for evaluation, not recommended value.
Please, determine the suitable R_G value by measuring switching behavior and checking results with the respective SOA.

* Please contact our representatives at order.
* For improvement, specifications are subject to change without notice.
* For actual application, please confirm this spec sheet is the newest revision.
* ELECTRICAL CHARACTERISTIC items shown in above table are according to IEC 60747–2 and IEC 60747–9.

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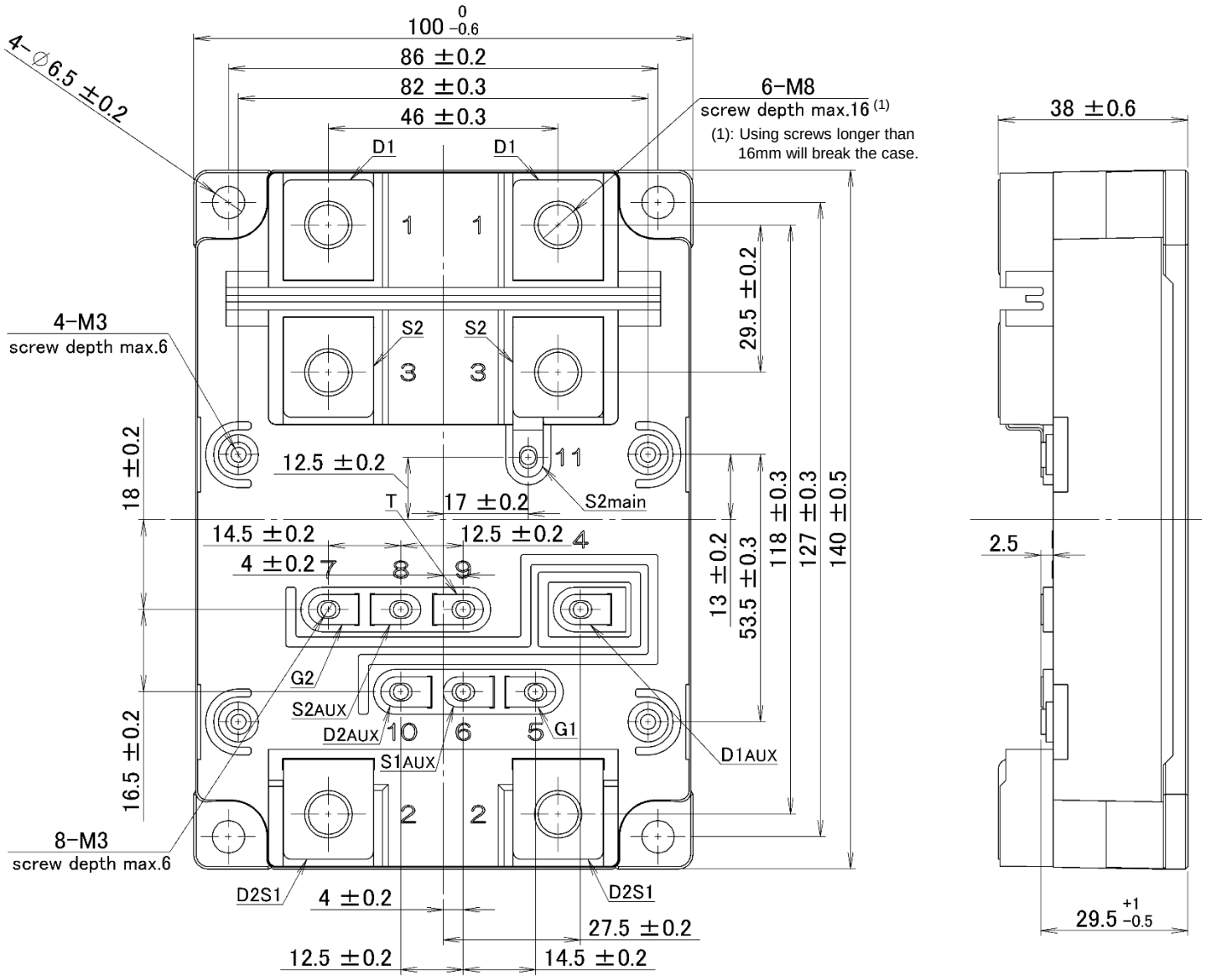
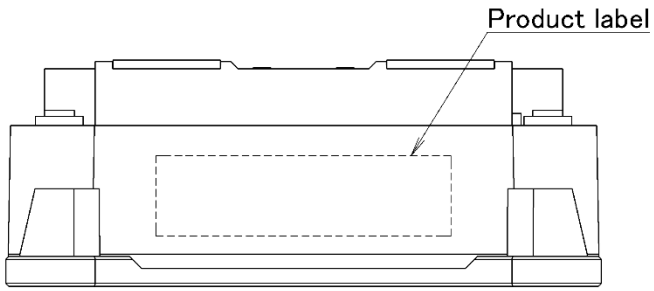
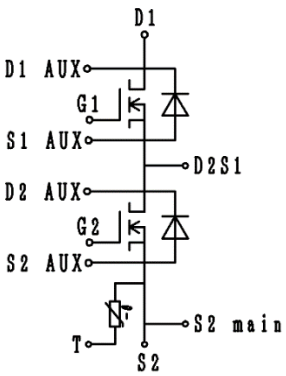
Target Specification

OUTLINE DRAWING(unit in mm)





1 : D1
2 : D2S1
3 : S2
4 : D1AUX
5 : G1
6 : S1AUX
7 : G2
8 : S2AUX
9 : T
10 : D2AUX
11 : S2main



Weight: 770(g)

Terminal Number

Circuit Diagram

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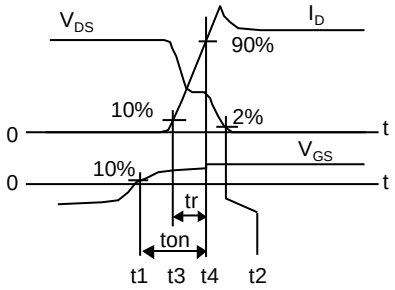
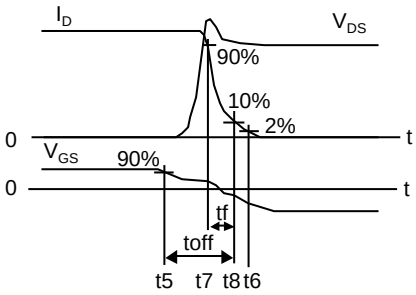
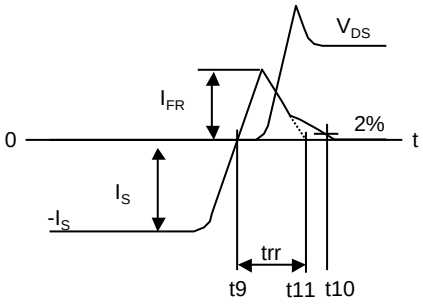
Target Specification

Definition of switching loss







$$Eon = \int_{t1}^{t2} I_D \cdot V_{DS}\, dt$$

$$Eoff = \int_{t5}^{t6} I_D \cdot V_{DS}\, dt$$

$$Err = \int_{t9}^{t10} I_{FR} \cdot V_{DS}\, dt$$

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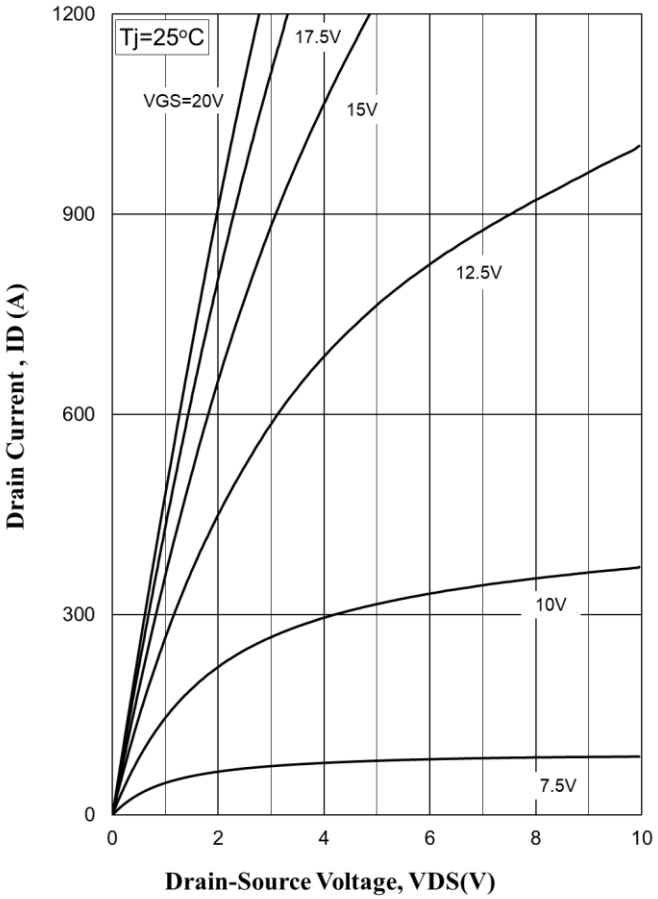
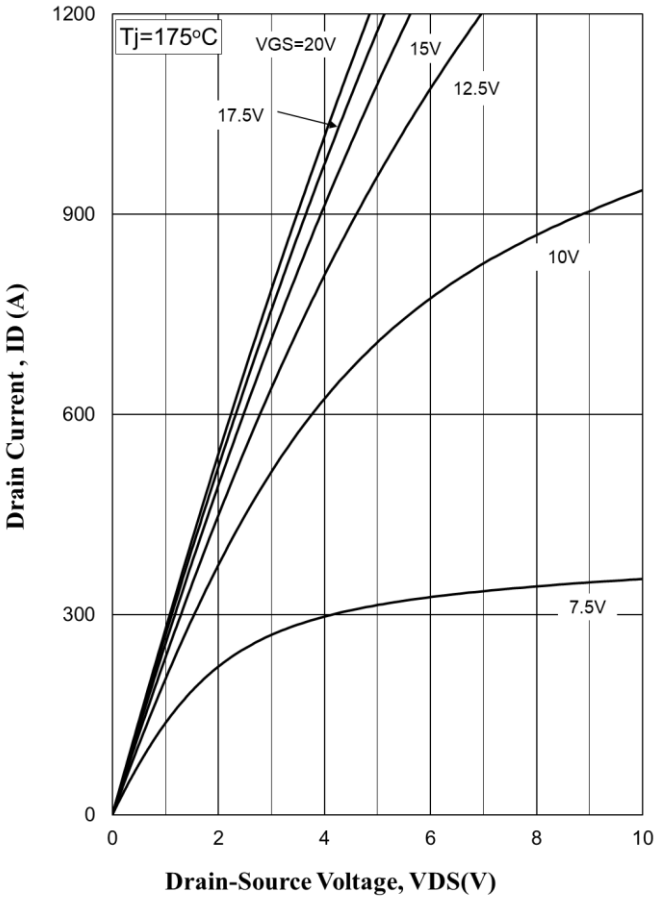
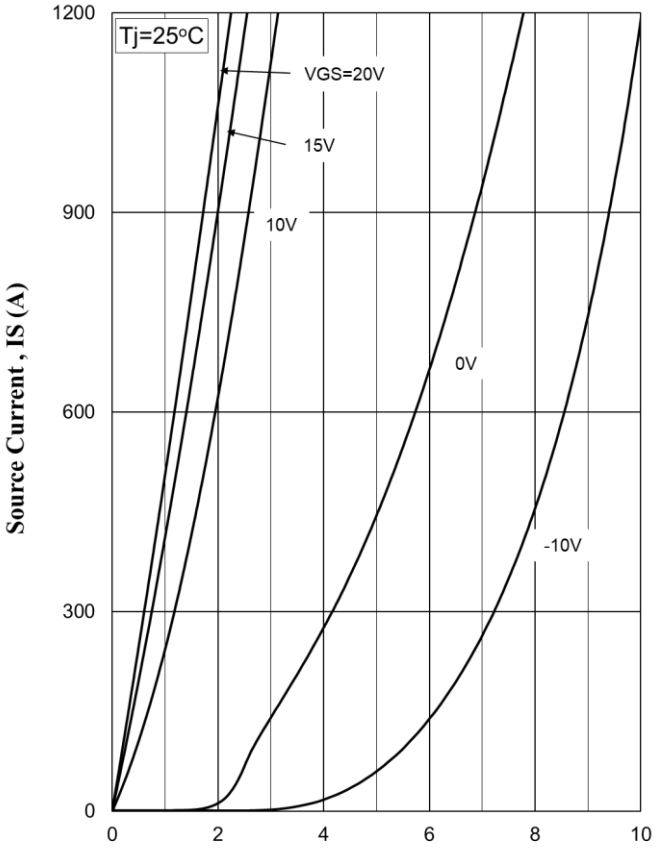
Target Specification



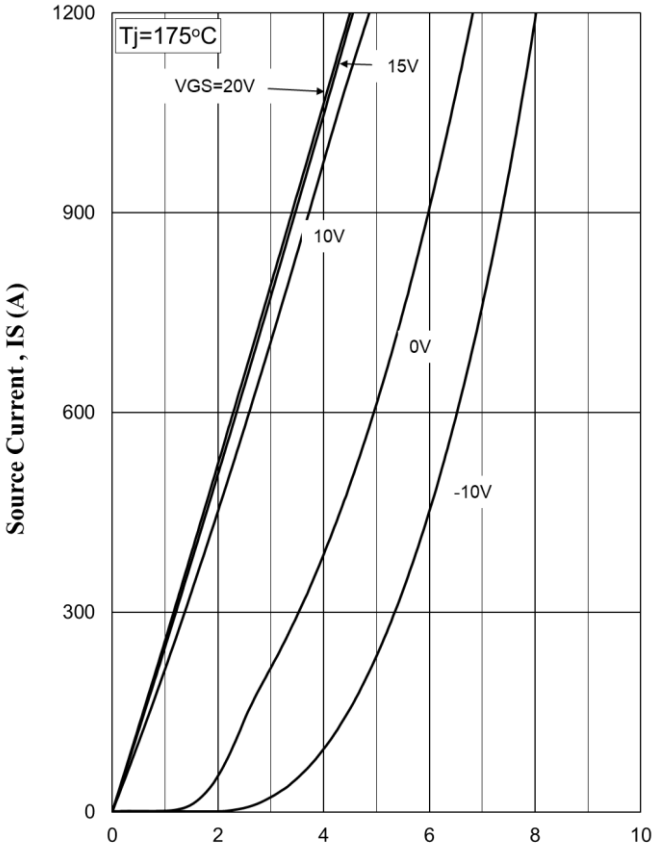
Drain Current vs. Drain - Source Voltage



Drain Current vs. Drain - Source Voltage



Source Current vs. Source - Drain Voltage



Source Current vs. Source - Drain Voltage

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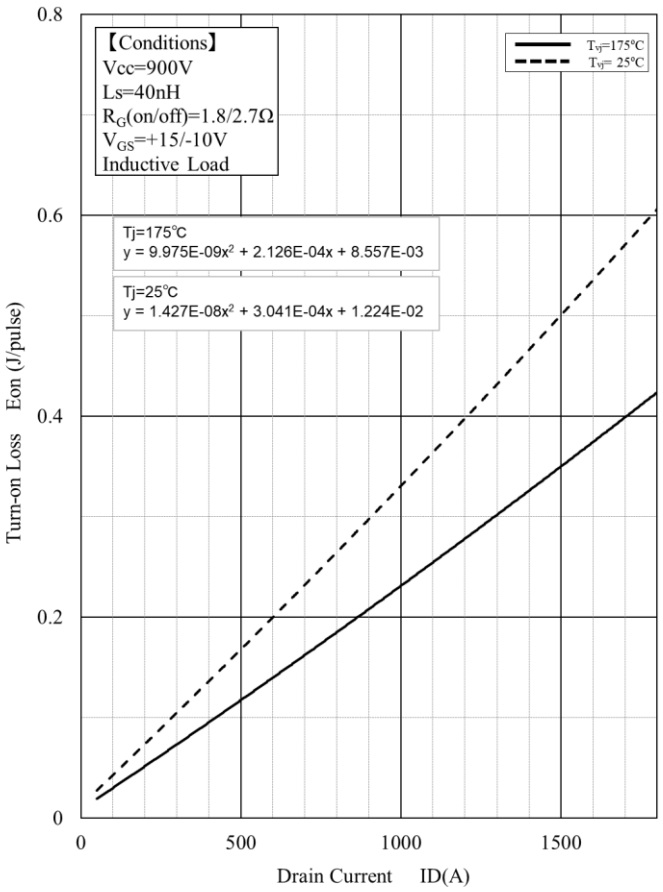
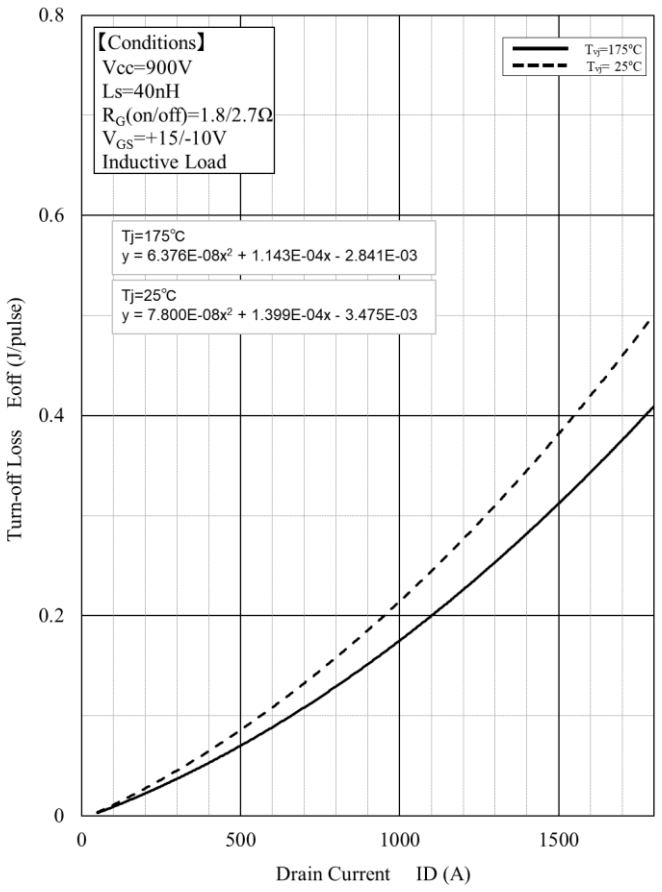
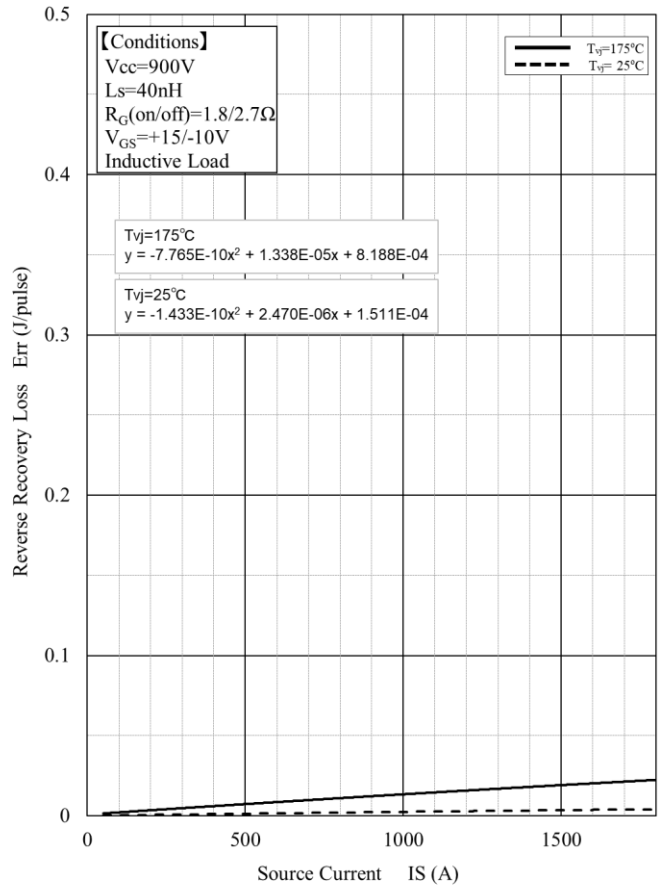
Target Specification



Turn-on Loss vs. Drain Current



Turn-off Loss vs. Drain Current



Reverse Recovery Loss vs. Source Current

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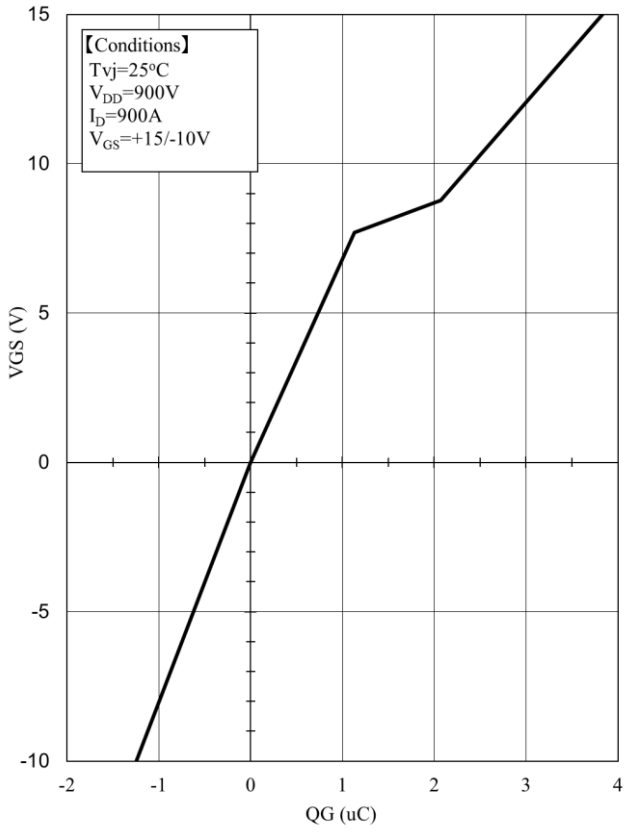
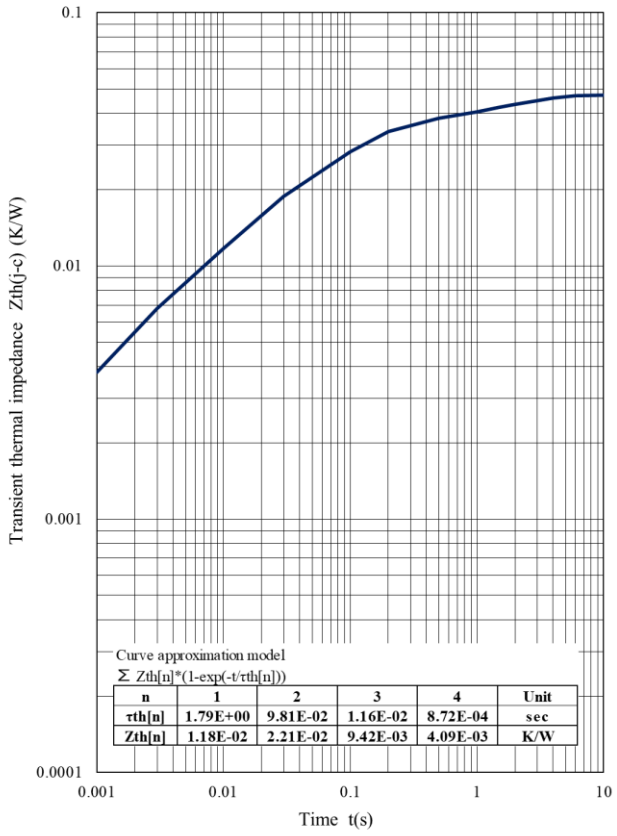
Target Specification



QG-VGS curve



n	1	2	3	4	Unit
τth[n]	1.79E+00	9.81E-02	1.16E-02	8.72E-04	sec
Zth[n]	1.18E-02	2.21E-02	9.42E-03	4.09E-03	K/W

Transient Thermal Impedance Curve (Maximum Value)

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Target Specification

HITACHI POWER SEMICONDUCTORS

Notices

1. Since mishandling of semiconductor devices may cause malfunctions, please be sure to read "Precautions for Safe Use and Notices" in the individual brochure before use.
2. When designing an electronic circuit using semiconductor devices, please do not exceed the absolute maximum rating specified for the device under any external fluctuations. And for pulse applications, please also do not exceed the "Safe Operating Area (SOA)".
3. Semiconductor devices may sometimes break down by accidental or unexpected surge voltage, so please be careful about the safety design such as redundant design and malfunction prevention design which don't cause the damage expand even if they break down.
4. In cases where extremely high reliability is required (such as use in nuclear power control, aerospace and aviation, traffic equipment, life-support-related medical equipment, fuel control equipment and various kinds of safety equipment), safety should be ensured by using semiconductor devices that feature assured safety or by means of users' fail-safe precautions or other arrangement. Or consult with Hitachi's sales department staff. (When semiconductor devices fail, as a result the semiconductor devices or wiring, wiring pattern may smoke, ignite, or the semiconductor devices themselves may burst.)
5. A semi-processed article is done now using solder which contains lead inside the semiconductor devices. There is possibility of the regulation substance depend on the applied models, so please check before using.
6. This specification is a material for component selection, which describes specifications of power semiconductor devices (hereinafter referred to as products), characteristic charts, and external dimension drawings.
7. The information given herein, including the specifications and dimensions, is subject to change without prior notice to improve product characteristics. Before ordering, purchasers are advised to contact with Hitachi power semiconductor sales department for the latest version of this data sheets.
8. For handling other than described in this manual, follow the handling instructions (IGBT-HI-00002).
9. In this module, the maximum depth of the screw holes on the main terminals is 16mm. Using screws longer than 16mm will break the case.

■ For inquiries relating to the products, please contact nearest representatives that is located "Inquiry" portion on the top page of a home page.

Hitachi power semiconductor home page address
http://www.hitachi-power-semiconductor-device.co.jp/
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Target Specification

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Usage

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