

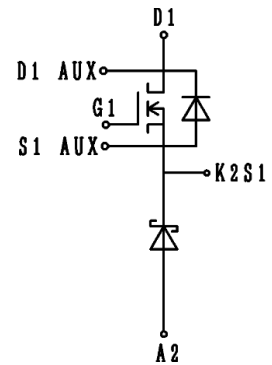
MSL800FS33PLT

Target Specification

3300V SiC MOSFET and Schottky Barrier Diode

FEATURES

- * Ultra low switching loss with SiC MOSFET
- * Ultra low recovery loss with SiC diode.
- * High current density package
- * Low stray inductance & low Rth(j-c)
- * Scalable large current easily handled by paralleling



ABSOLUTE MAXIMUM RATINGS (T_c=25°C)

Item	Symbol	Unit	MSL800FS33PLT
Drain Source Voltage	V _{DSS}	V	3,300
Gate Source Voltage	V _{GSS}	V	+20/-15
MOSFET Drain Current	DC	I _D	800
	1ms	I _{DM}	1,600
MOSFET Source Current	DC	I _S	800
	1ms	I _{SM}	1,600
Chopper Diode Forward Current	DC	I _F	800
	1ms	I _{FM}	1,600
Junction Temperature	T _{vj op}	°C	-50 ~ +150
Storage Temperature	T _{stg}	°C	-55 ~ +150
Isolation Voltage	V _{ISO}	V _{RMS}	6,000(AC 1 minute)
Screw Torque	Terminals (M3/M8)	M	0.8 / 15
	Mounting (M6)	M	6.0 (1)

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

1) MOSFET ELECTRICAL CHARACTERISTICS

Item	Symbol	Unit	Min.	Typ.	Max.	Test Conditions
Drain Source Cut-Off Current	I _{DSS}	mA	-	-	0.05	V _{DS} =3,300V, V _{GS} =0V, T _{vj} =25°C
			-	-	1	V _{DS} =3,300V, V _{GS} =0V, T _{vj} =150°C
Gate Source Leakage Current	I _{GSS}	nA	-	-	100	V _{GS} =20V, V _{DS} =0V, T _{vj} =25°C
			-100	-	-	V _{GS} =-15V, V _{DS} =0V, T _{vj} =25°C
Drain Source on-state Voltage	V _{DS(ON)}	V	-	2.3	-	I _D =800A, V _{GS} =15V, T _{vj} =25°C
			TBD	3.6	TBD	I _D =800A, V _{GS} =15V, T _{vj} =150°C
Gate Source Threshold Voltage	V _{GS(Th)}	V	TBD	3.0	TBD	V _{DS} =10V, I _D =800mA, T _{vj} =25°C
Input Capacitance	C _{iss}	nF	-	230	-	V _{DS} =10V, V _{GS} =0V, f=100kHz, T _{vj} =25°C
Internal Gate Resistance	R _{g(int)}	Ω	-	2.2	-	
Source Drain Voltage	V _{SD}	V	-	1.7	-	I _S =800A, V _{GS} =15V, T _{vj} =25°C
			TBD	3.3	TBD	I _S =800A, V _{GS} =15V, T _{vj} =150°C
			-	8.2	-	I _S =800A, V _{GS} =-10V, T _{vj} =25°C
			TBD	6.7	TBD	I _S =800A, V _{GS} =-10V, T _{vj} =150°C
Switching Times	Rise Time	t _r	-	0.5	-	V _{DD} =1,800V, I _D =800A L _S =105nH, R _{G(ON/OFF)} =1/1.5Ω (2) V _{GS} =+15V/-10V, T _{vj} =150°C
	Turn On Delay Time	t _{d(on)}	-	1.0	-	
	Fall Time	t _f	-	0.2	-	
	Turn Off Delay Time	t _{d(off)}	-	1.5	-	
Turn-on Loss per Pulse	E _{on}	J/P	-	0.58	-	
Turn-off Loss per Pulse	E _{off}	J/P	-	0.37	-	
Reverse Recovery Time	t _{rr}	μs	-	0.3	-	V _{DD} =1,800V, I _S =800A, L _S =150nH,
Reverse Recovery Loss per Pulse	E _{rr}	J/P	-	0.06	-	T _{vj} =150°C, V _{GS} =-10V (3)
Stray Inductance Module	L _{SCE}	nH	-	10	-	Between K1(main) and S2(main)
Thermal Impedance	MOSFET	R _{th(j-c)}	K/W	-	0.025	Junction to case
Contact Thermal Impedance		R _{th(c-f)}	K/W	-	0.02	Case to fin(at MOS part)

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2) Chopper DIODE

Item	Symbol	Unit	Min.	Typ.	Max.	Test Conditions
Repetitive Reverse Current	I _{RRM}	mA	-	-	0.05	V _R =3,300V, T _{vj} =25°C
			-	-	54	V _R =3,300V, T _{vj} =150°C
Peak Forward Voltage Drop (Between main terminals)	V _{FM}	V	-	2.8	-	I _F =800A, T _{vj} =25°C Measured at main terminal
			TBD	4.9	TBD	I _F =800A, T _{vj} =150°C Measured at main terminal
Reverse Recovery Time	t _{rr}	μs		0.15		V _{DD} =1,800V, I _F =800A, L _S =105nH, T _{vj} =150°C, Counter arm;
Reverse Recovery Loss per Pulse	Err	J/P		0.002		V _{GS} =+15/-10V, R _{G(ON/OFF)} =1Ω/1.5Ω
Thermal Impedance	R _{th(j-c)}	K/W			0.025	Junction to case
Contact Thermal Impedance	R _{th(c-f)}	K/W	-	0.02	-	Case to fin (at Chopper Diode part)

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.

(3) Counter arm; MBN1500E33E2 V_{GE}=+/-15V

* Please contact our representatives at order. * For improvement, specifications are subject to change without notice.

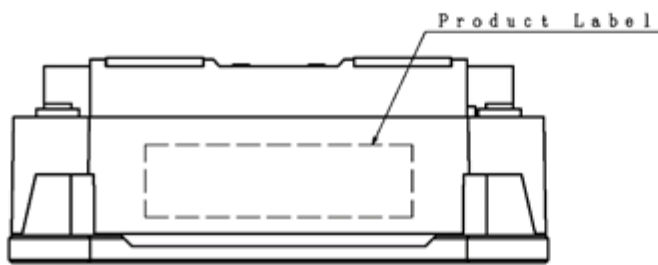
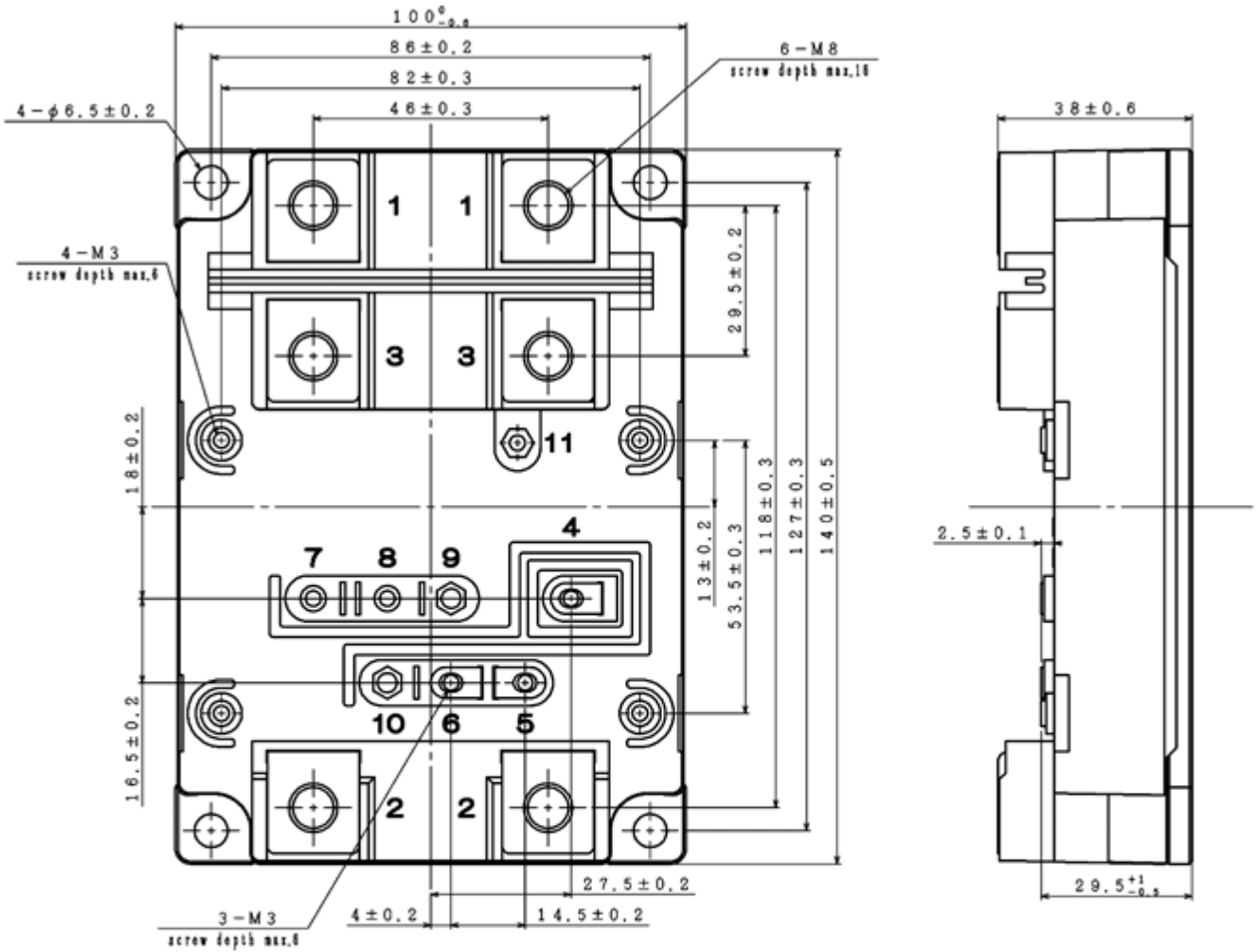
* For actual application, please confirm this spec sheet is the newest revision.

* ELECTRICAL CHARACTERISTIC items shown in above table are according to IEC 60747-2 and IEC 60747-9.

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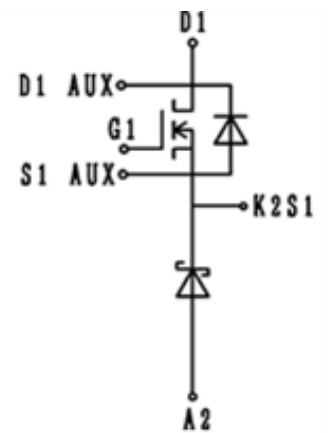
Target Specification

OUTLINE DRAWING (unit in mm)



Weight: 770(g)

- 1 : D1
- 2 : K2S1
- 3 : A2
- 4 : D1 AUX
- 5 : G1
- 6 : S1 AUX
- 7 : -
- 8 : -
- 9 : -
- 10 : -
- 11 : -

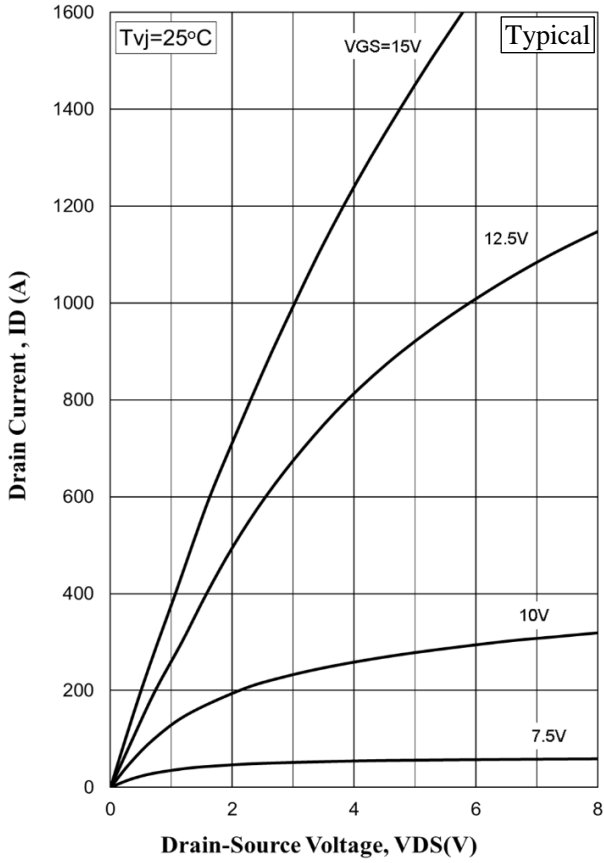


Terminal Number

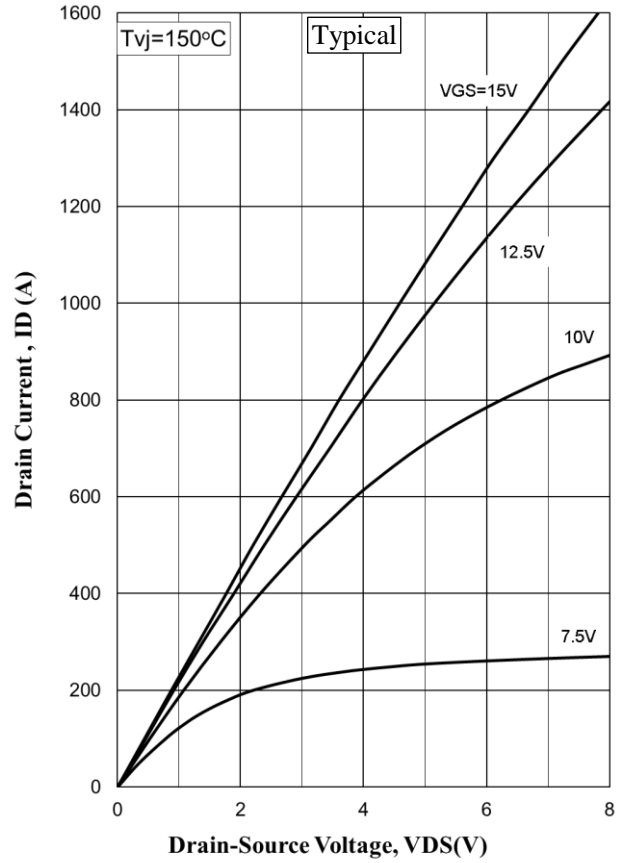
Circuit Diagram

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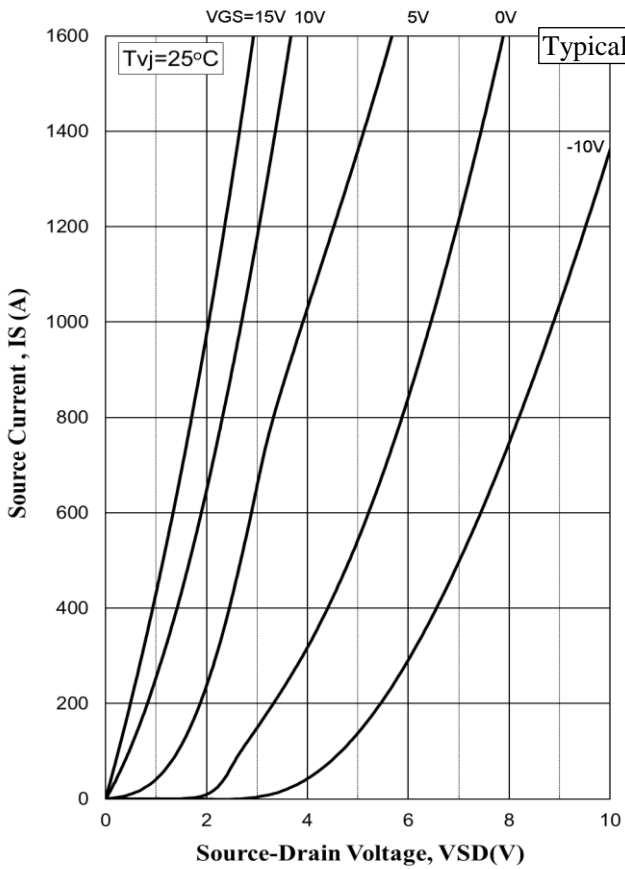
Target Specification



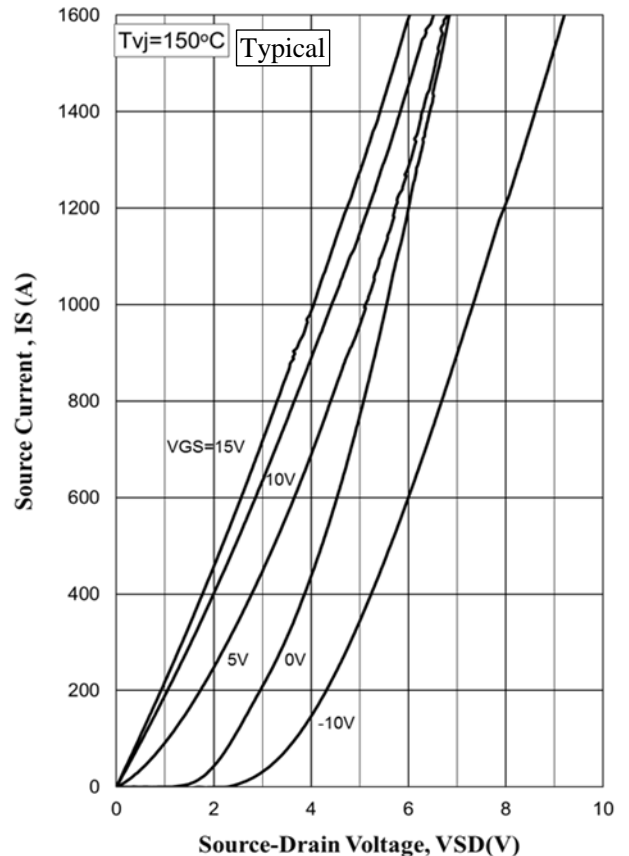
Drain Current vs. Drain - Source Voltage



Drain Current vs. Drain - Source Voltage



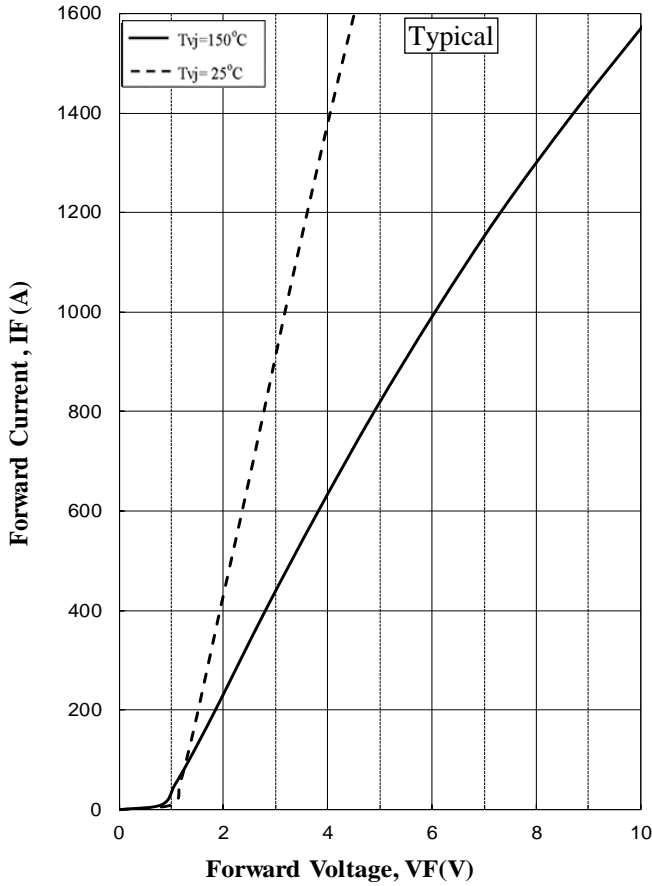
Source Current vs. Source - Drain Voltage



Source Current vs. Source - Drain Voltage

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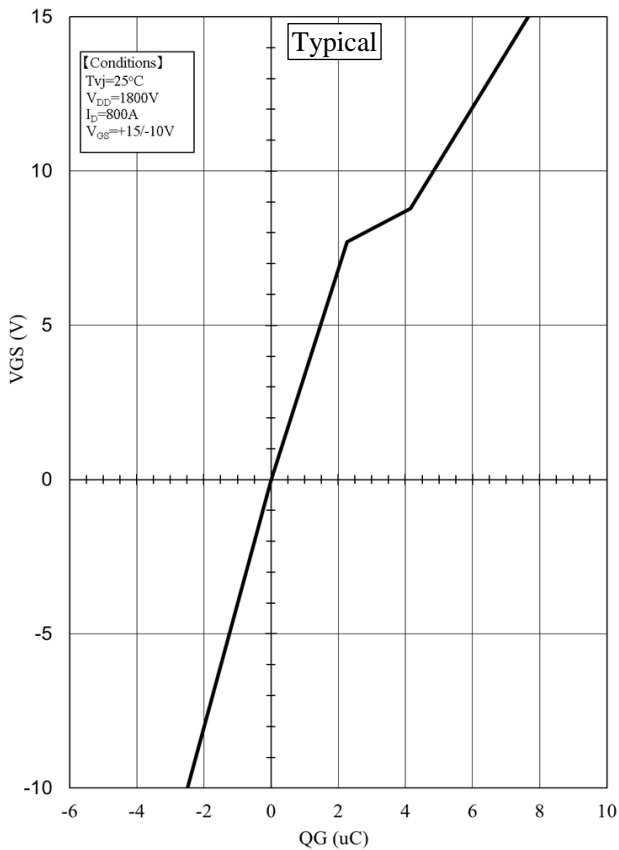


Forward Voltage of Chopper diode

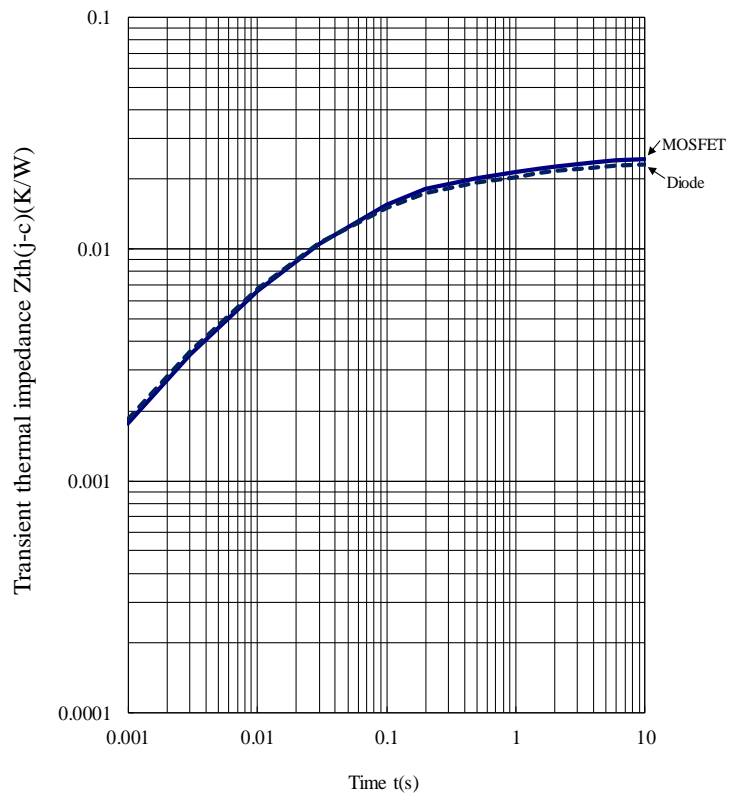
Curve approximation model

$$\sum Z_{th}[n] * (1 - \exp(-t/\tau_{th}[n]))$$

n	1	2	3	4	Unit
$\tau_{th}[n]$	1.79E+00	9.81E-02	1.16E-02	8.72E-04	sec
$Z_{th}[n, MOSFET]$	5.52E-03	1.10E-02	6.41E-03	1.77E-03	K/W
$Z_{th}[n, Diode]$	5.07E-03	9.84E-03	6.73E-03	1.88E-03	K/W



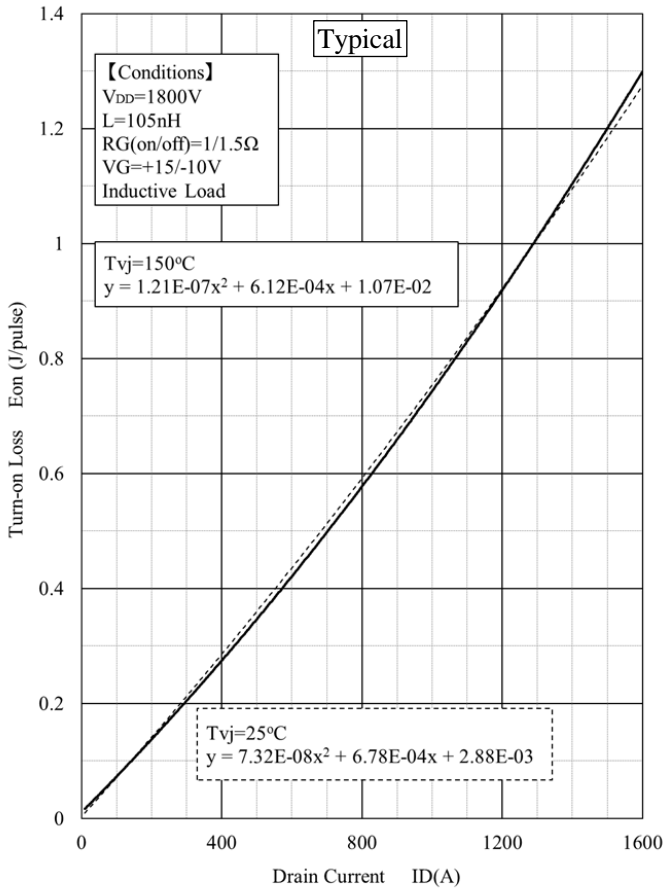
QG-VGS curve



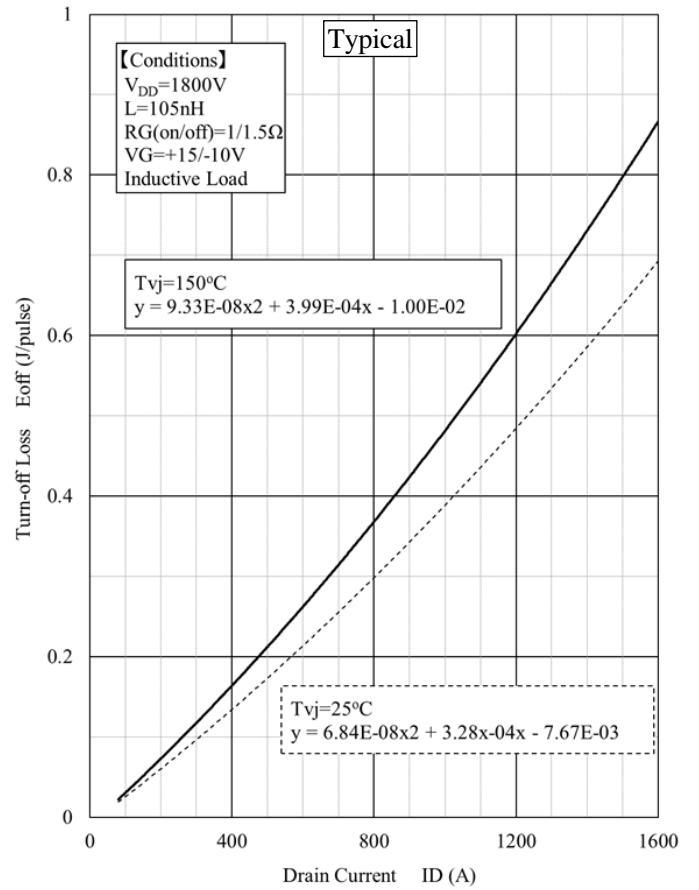
Transient Thermal Impedance Curve (Maximum Value)

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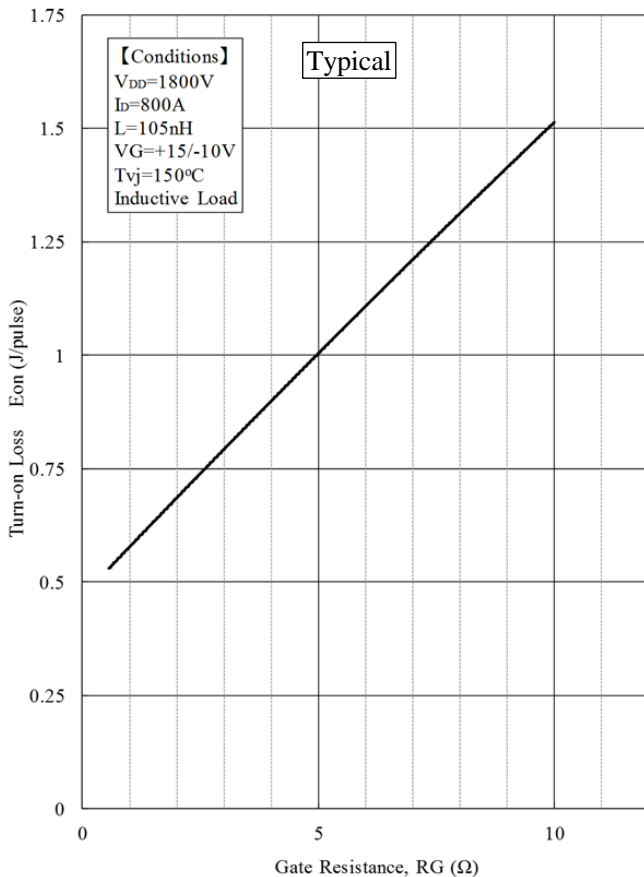
Target Specification



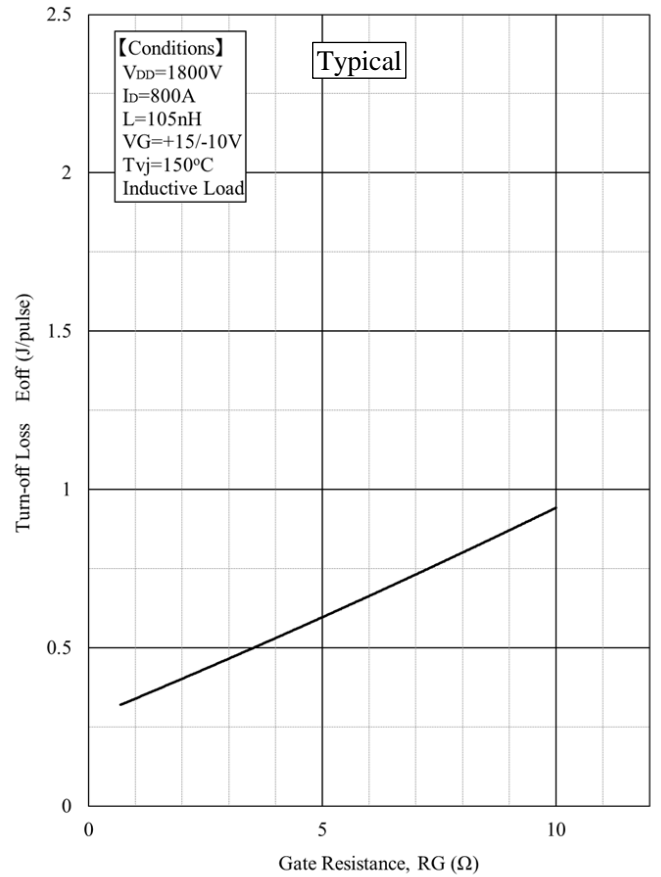
Turn-on Loss vs. Drain Current



Turn-off Loss vs. Drain Current



Turn-on Loss vs. Gate Resistance



Turn-off Loss vs. Gate Resistance

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Target Specification

HITACHI POWER SEMICONDUCTORS

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