

MSM800GS33ALT

SiC MOSFET 3300V

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
- * Sintered copper bonding technology
- * SBD-less SiC module

ABSOLUTE MAXIMUM RATINGS (T_C=25°C)

Item	Symbol	Unit	MSM800GS33ALT
Drain Source Voltage	V _{DSS}	V	3,300
Gate Source Voltage	V _{GSS}	V	+20/-15
Drain Current	DC	I _D	800
	1ms	I _{DM}	1,600
Source Current	DC	I _S	800
	1ms	I _{SM}	1,600
Junction Temperature	T _{vi op}	°C	-40 ~ +175
Storage Temperature	T _{stg}	°C	-40 ~ +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

ELECTRICAL CHARACTERISTICS

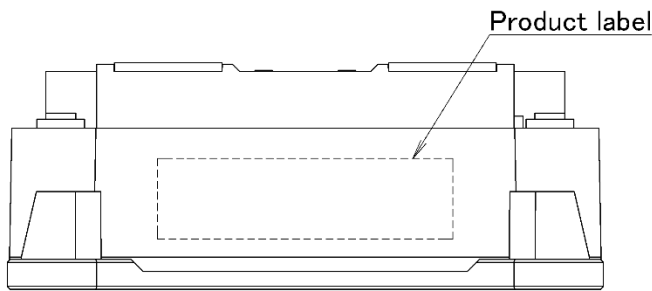
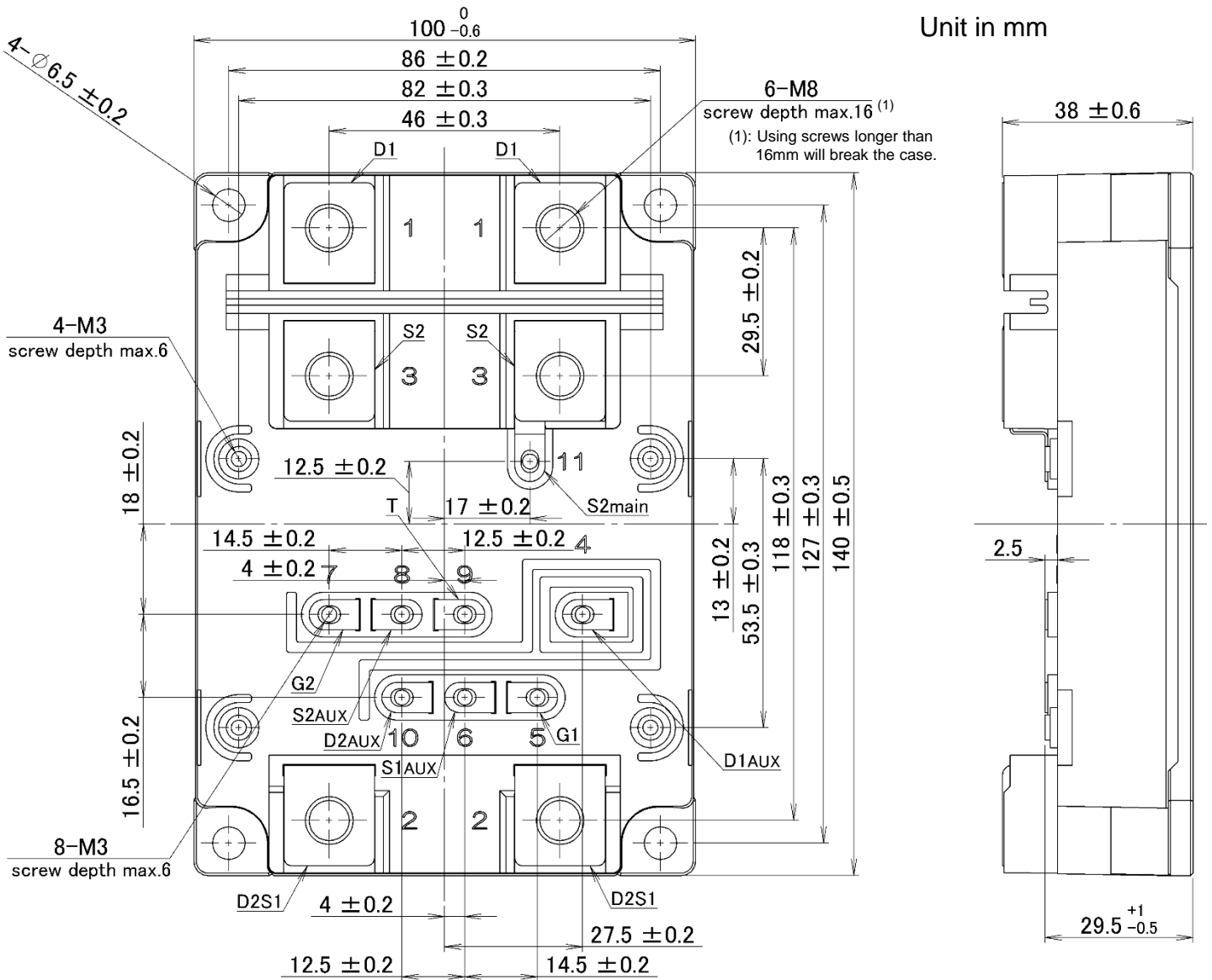
Item	Symbol	Unit	Min.	Typ.	Max.	Test Conditions	
Drain Source Cut-Off Current	I _{DSS}	mA	-	-	0.05	V _{DS} =3,300V, V _{GS} =0V, T _{vi} =25°C	
			-	-	1	V _{DS} =3,300V, V _{GS} =0V, T _{vi} =175°C	
Gate Source Leakage Current	I _{GSS}	nA	-	-	+100	V _{GS} =20V, V _{DS} =0V, T _{vi} =25°C	
			-100	-	-	V _{GS} =-15V, V _{DS} =0V, T _{vi} =25°C	
Drain Source on-state Voltage	V _{DS(on)}	V	-	2.3	-	I _D =800A, V _{GS} =15V, T _{vi} =25°C	
			-	4.2	5.5	I _D =800A, V _{GS} =15V, T _{vi} =175°C	
Gate Source Threshold Voltage	V _{GS(th)}	V	2.2	3.0	3.8	V _{DS} =10V, I _D =800mA, T _{vi} =25°C	
Input Capacitance	C _{iss}	nF	-	230	-	V _{DS} =10V, V _{GS} =0V, f=100kHz, T _{vi} =25°C	
Internal Gate Resistance	R _{G(int)}	Ω	-	2.15	-		
Turn On Delay Time	t _{d(on)}	μs	-	1.5	-	V _{DD} =1,800V, I _D =800A	
Rise Time	t _r		-	0.5	-	L _S =40nH, R _{G(ON/OFF)} =1/1.5Ω (2)	
Turn Off Delay Time	t _{d(off)}		-	1.7	-	V _{GS} =+15/-10V, T _{vi} =175°C	
Fall Time	t _f		-	0.25	-		
Source Drain Voltage	V _{SD}	V	-	1.7	-	I _S =800A, V _{GS} =15V, T _{vi} =25°C	
			-	3.8	5	I _S =800A, V _{GS} =15V, T _{vi} =175°C	
			-	8.2	-	I _S =800A, V _{GS} =-10V, T _{vi} =25°C	
			-	6.4	-	I _S =800A, V _{GS} =-10V, T _{vi} =175°C	
Reverse Recovery Time	t _{rr}	μs	-	0.8	-	V _{DD} =1,800V, I _S =800A, L _S =40nH, R _{G(ON/OFF)} =1/1.5Ω, T _{vi} =175°C	
Turn On Loss	E _{on}	J/P	-	0.95	-	V _{DD} =1,800V, I _D =800A,	
Turn Off Loss	E _{off}	J/P	-	0.39	-	L _S =40nH, R _{G(ON/OFF)} =1/1.5Ω (2)	
Reverse Recovery Loss	E _{rr}	J/P	-	0.07	-	V _{GS} =+15V/-10V, T _{vi} =175°C	
Stray inductance module	L _{SCE}	nH	-	10	-	Between D1(main) and S2(main)	
NTC-Thermistor	Resistance	R ₂₅	kΩ	-	5	-	T _C =25°C
	Deviation	ΔR/R	%	-5	-	5	T _C =25°C
	B-constant	B _(25/50)	K	-	3375	-	Between 25°C and 50°C
Thermal Impedance MOS	R _{th(j-c)}	K/W	-	-	0.024	Junction to case	
Contact Thermal Impedance	R _{th(c-f)}	K/W	-	0.02	-	Case to fin(par 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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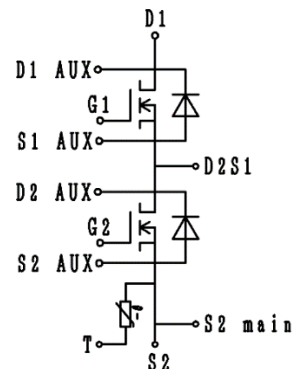
OUTLINE DRAWING



Weight: 770(g)

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

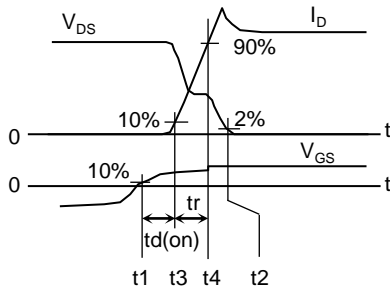
Terminal Number



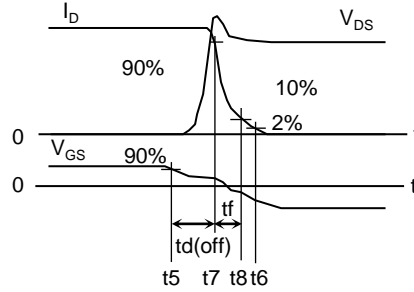
Circuit Diagram

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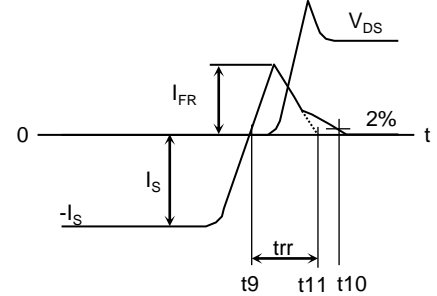
Definition of switching loss



$$E_{on} = \int_{t1}^{t2} I_D \cdot V_{DS} dt$$

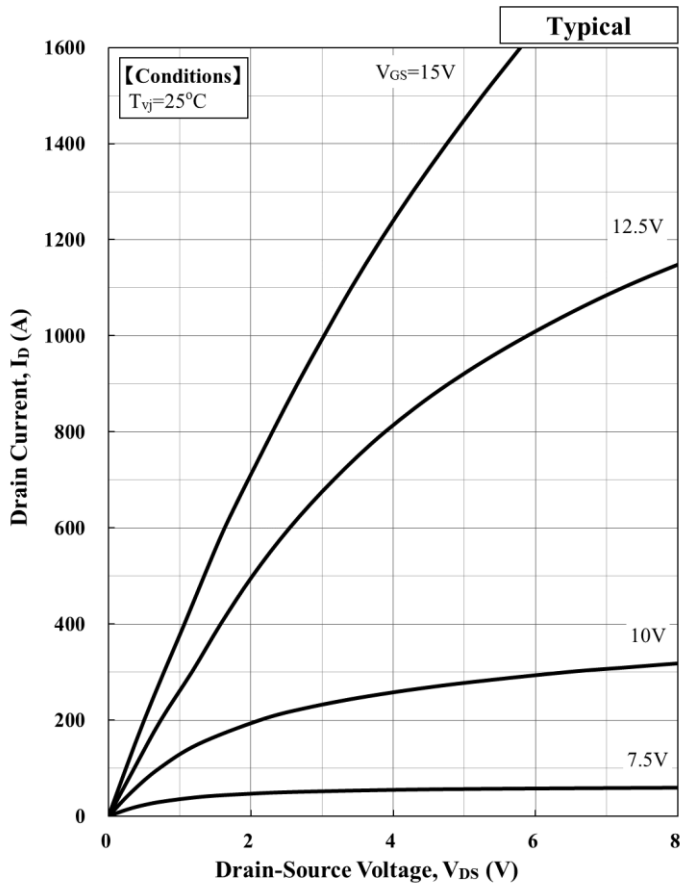


$$E_{off} = \int_{t5}^{t6} I_D \cdot V_{DS} dt$$

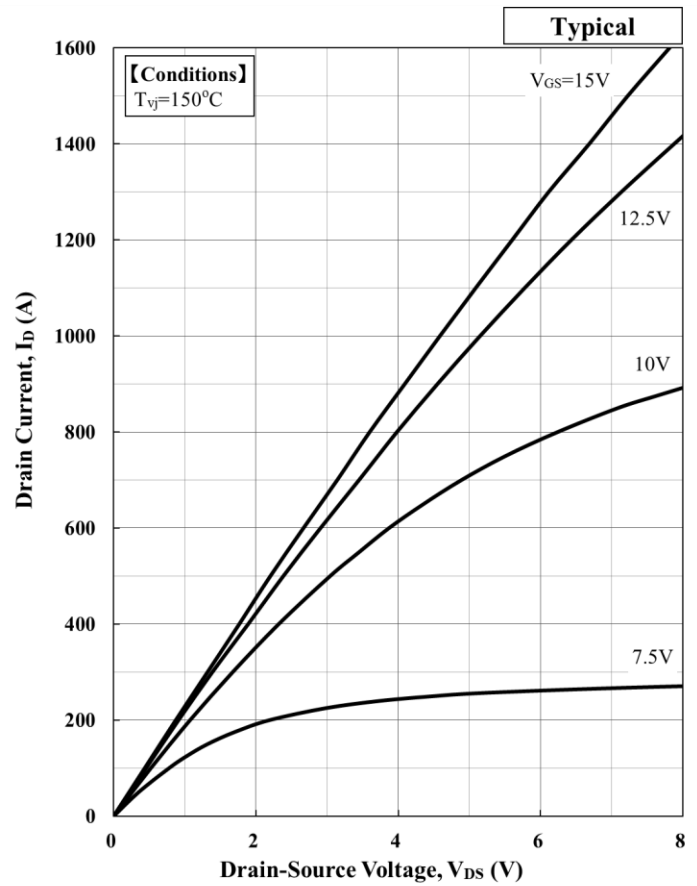


$$E_{rr} = \int_{t9}^{t10} I_{FR} \cdot V_{DS} dt$$

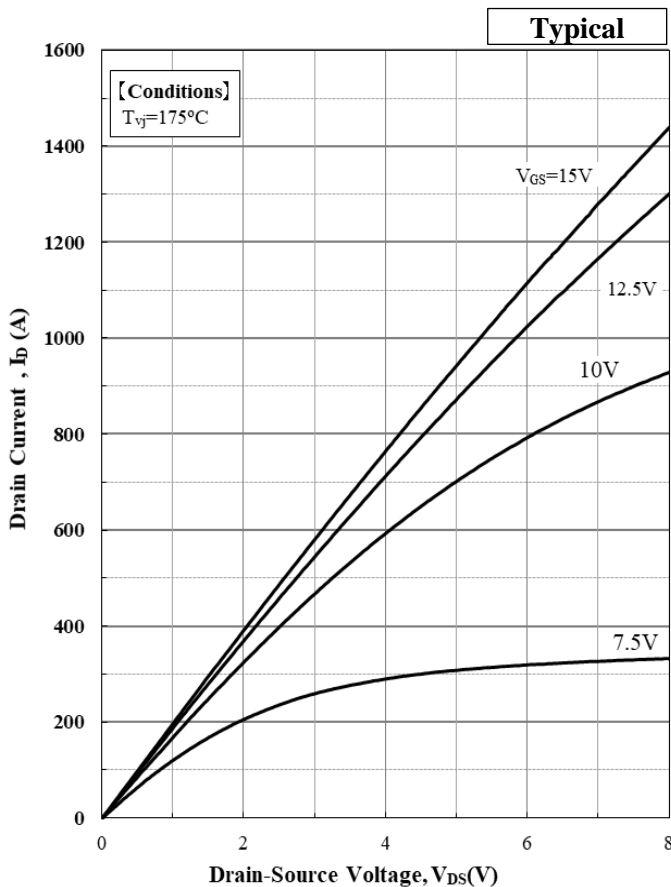
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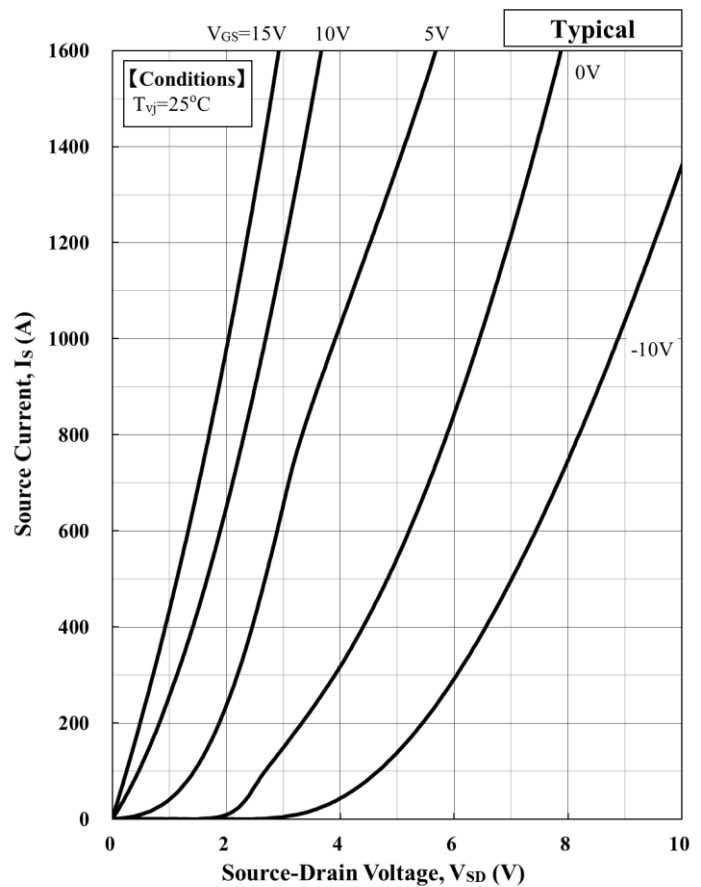
Drain Current vs. Drain - Source Voltage



Drain Current vs. Drain - Source Voltage

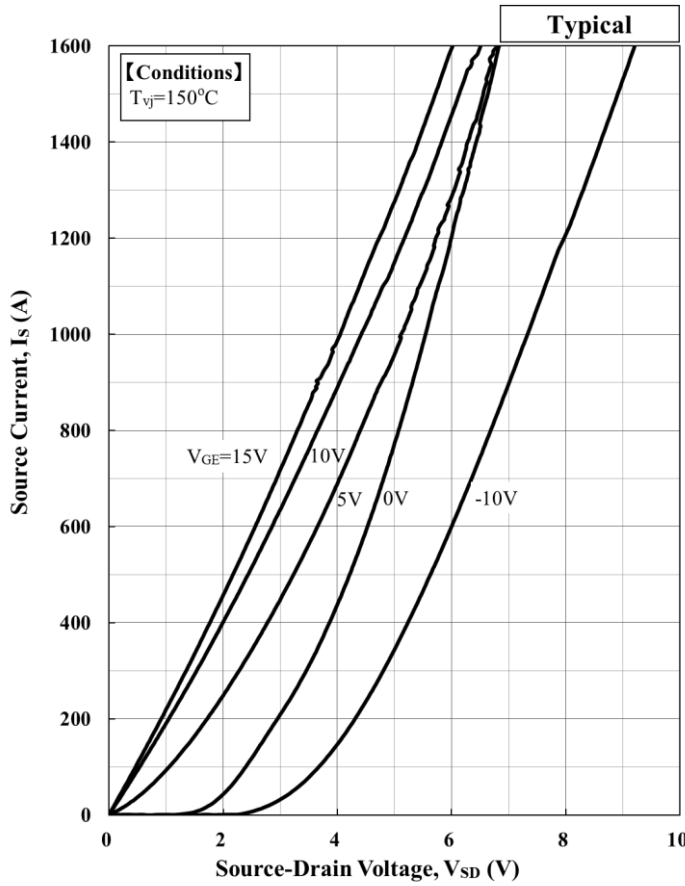


Drain Current vs. Drain - Source Voltage

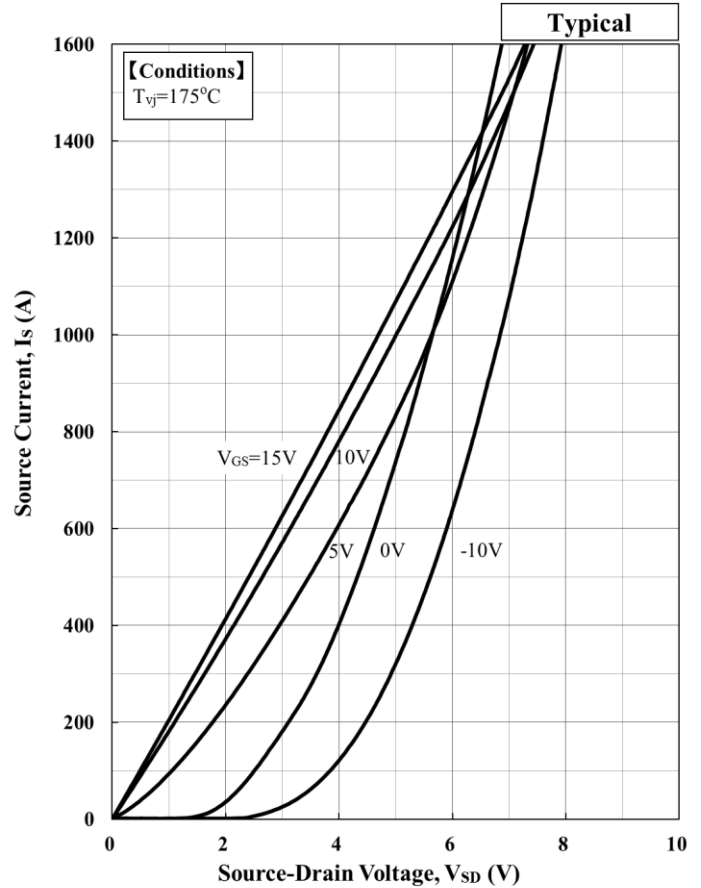


Source Current vs. Source - Drain Voltage

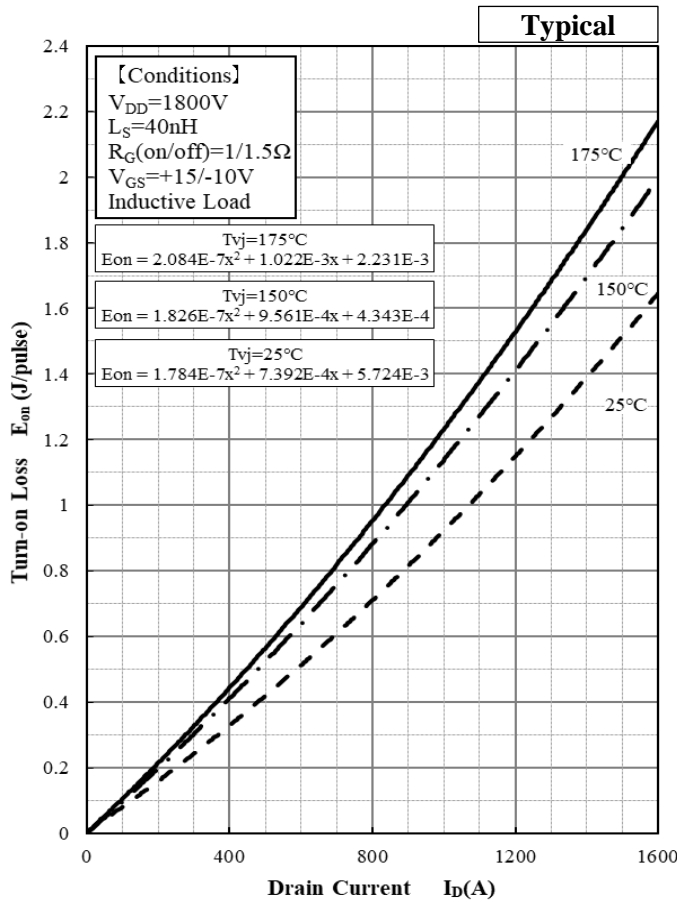
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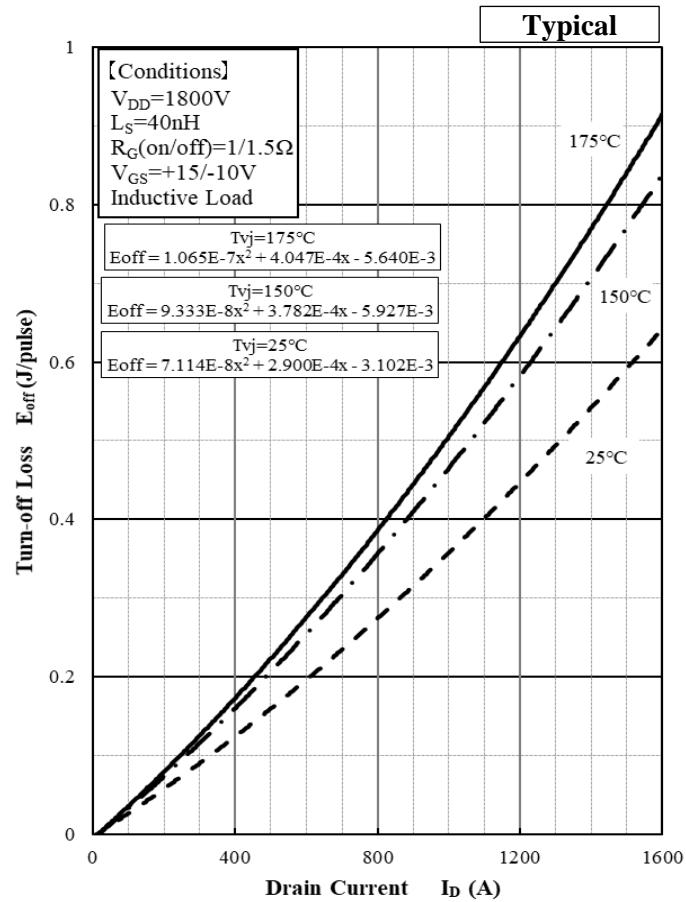
Source Current vs. Source - Drain Voltage



Source Current vs. Source - Drain Voltage

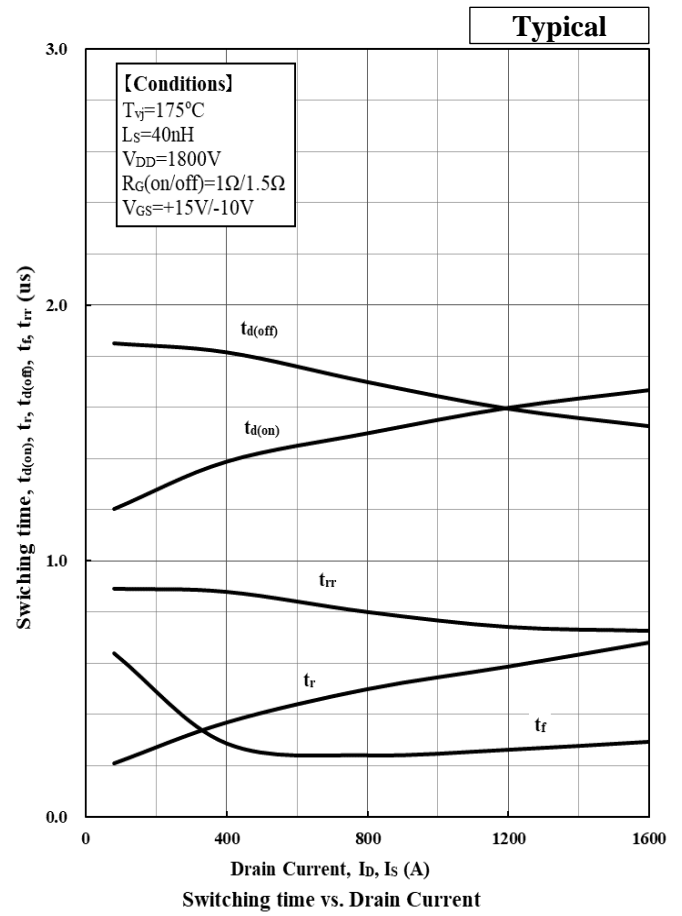
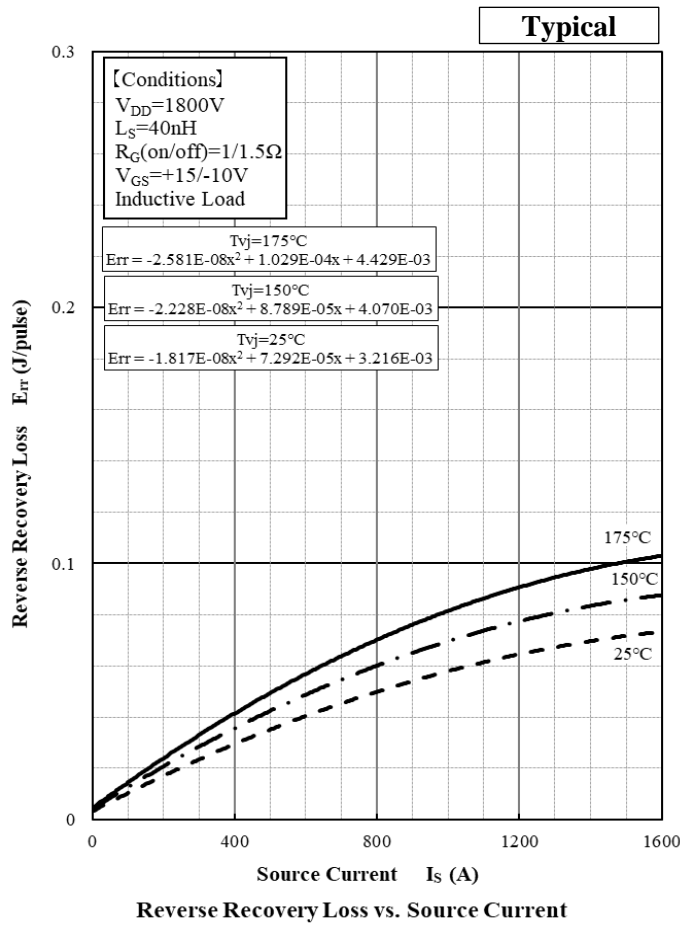


Turn-on Loss vs. Drain Current

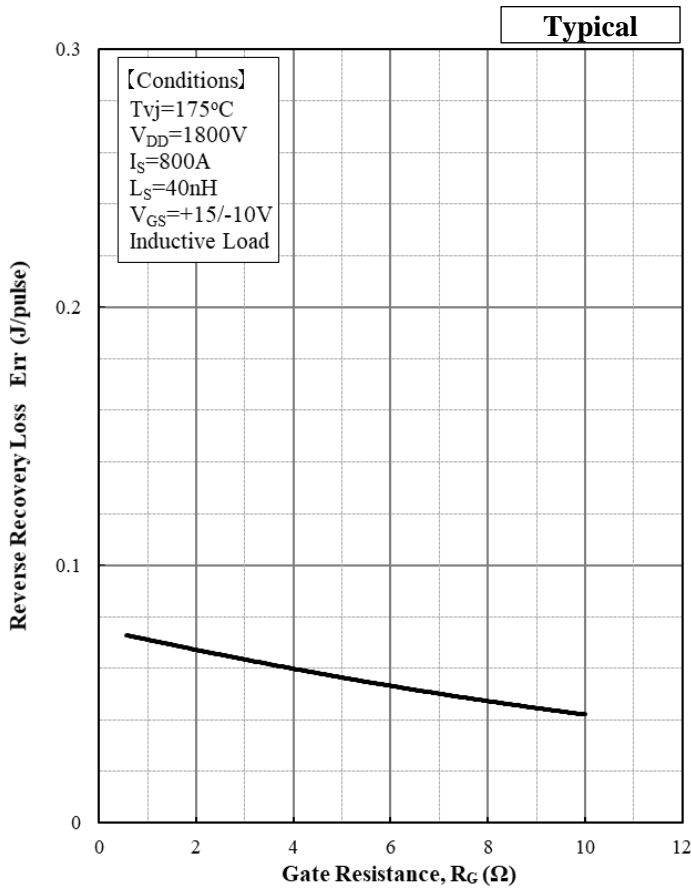
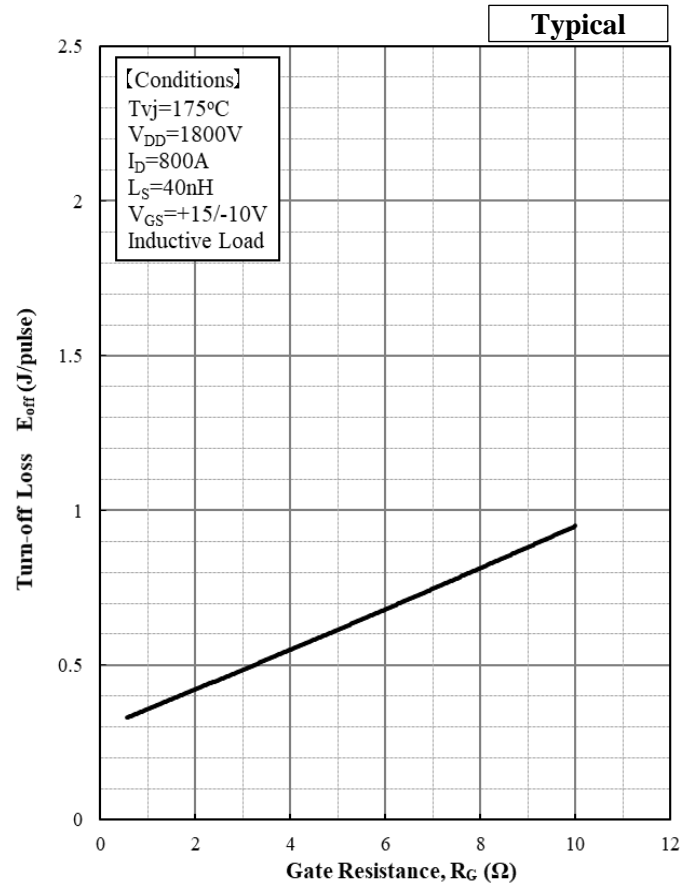
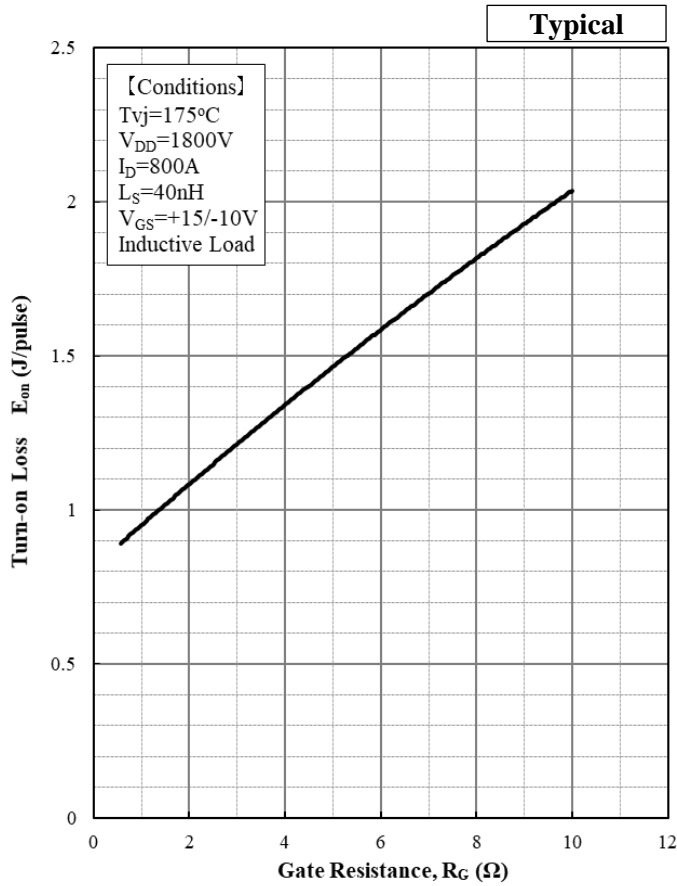


Turn-off Loss vs. Drain Current

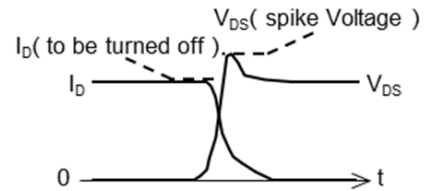
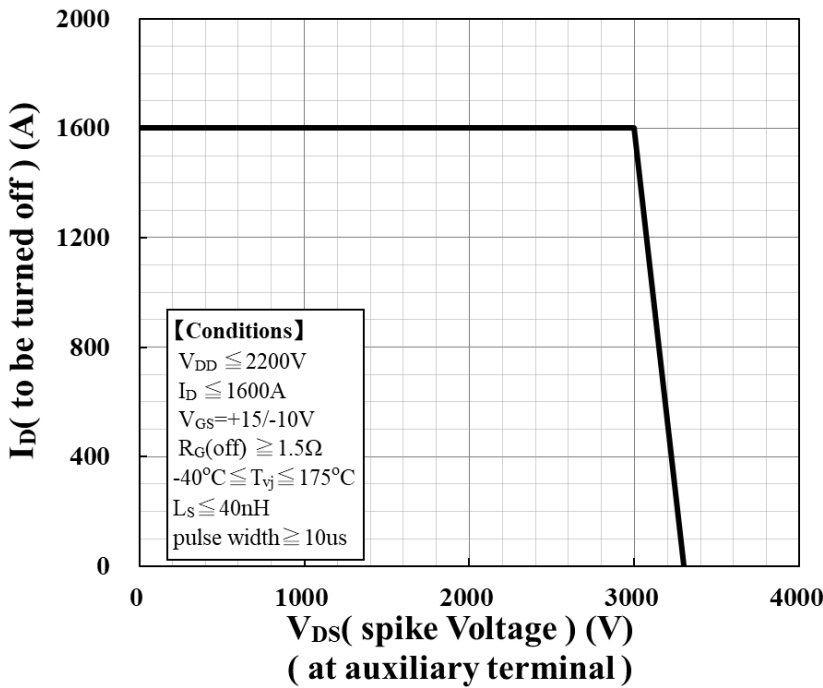
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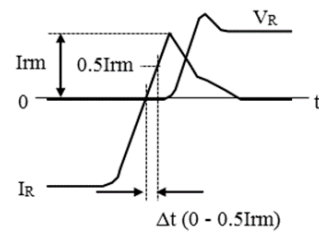
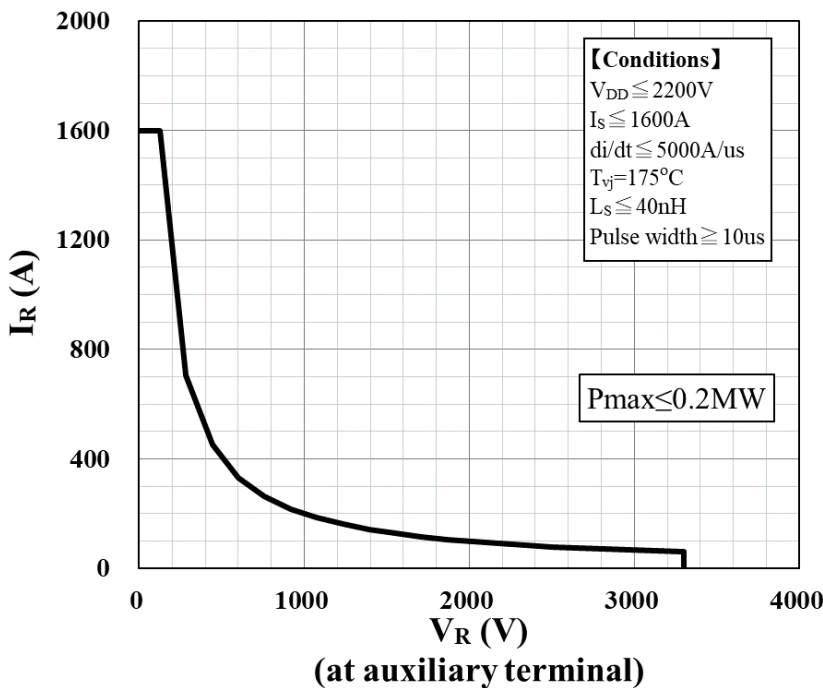


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Definition of RBSOA waveform

Reverse Bias Safe Operation Area (RBSOA)

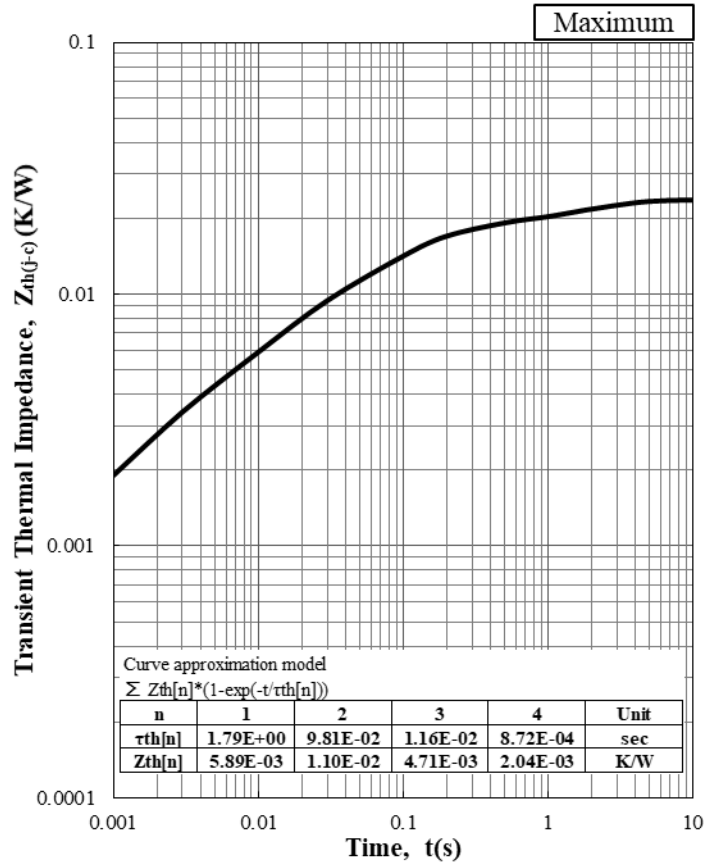
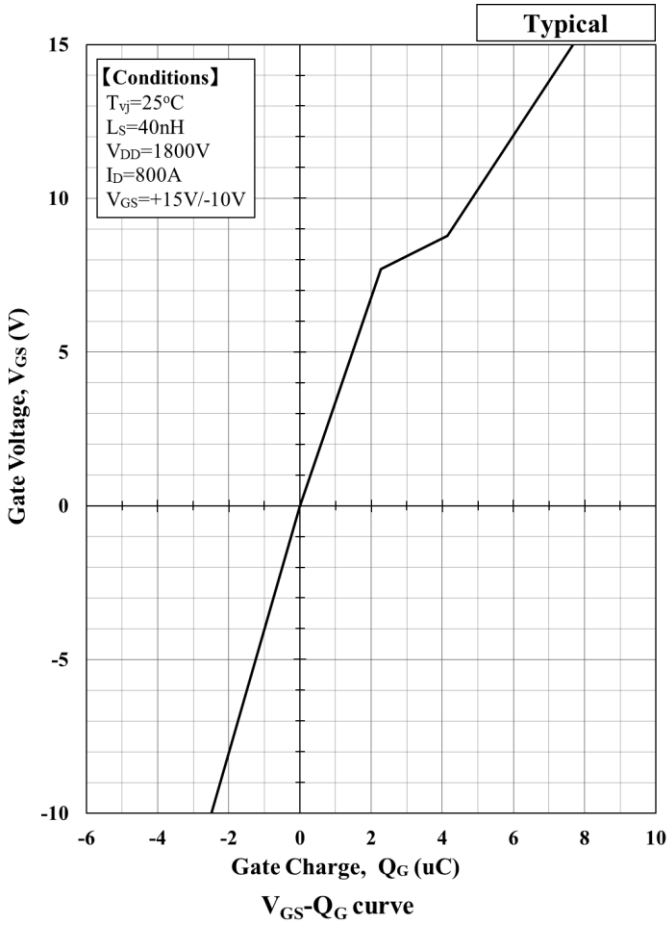


$$di/dt = \frac{0.5I_{m}}{\Delta t}$$

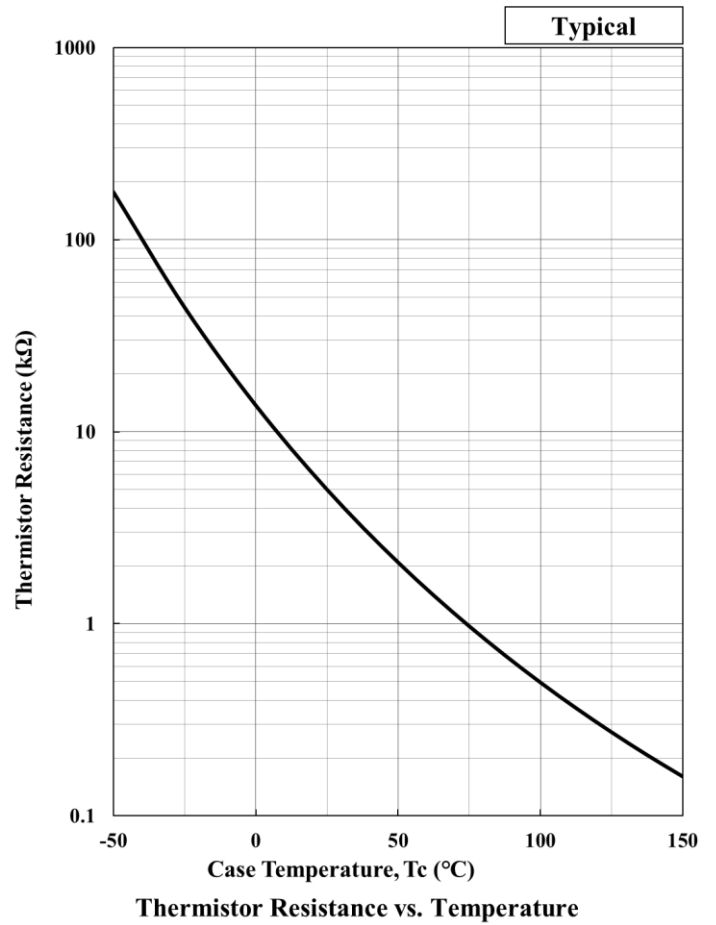
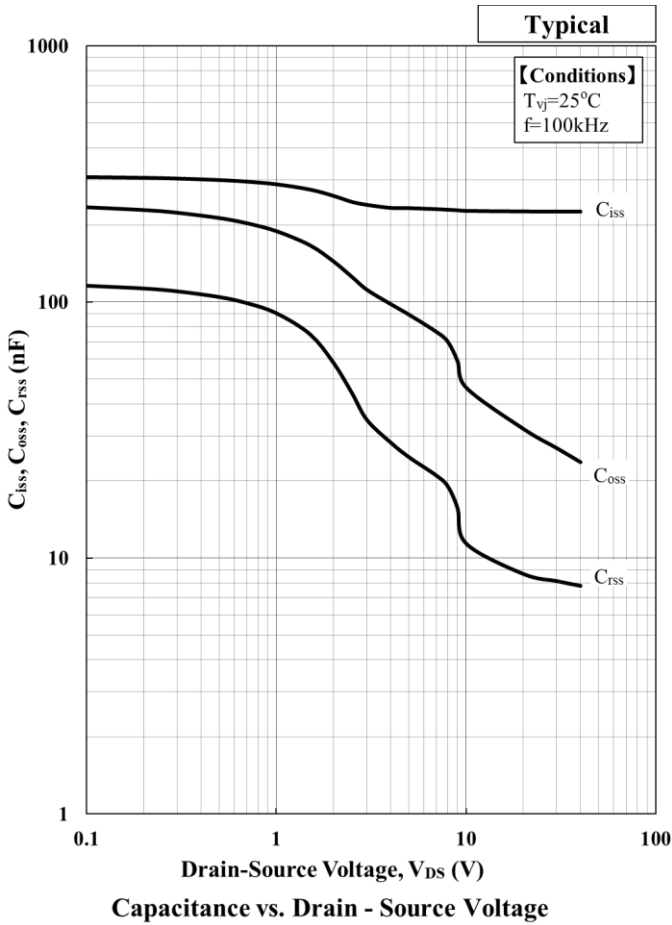
Definition of Recovery di/dt

Reverse Recovery Safe Operation Area (RRSOA)

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Transient Thermal Impedance Curve



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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.

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- For inquiries relating to the products, please contact nearest representatives that is located "Inquiry" portion on the top page of a home page.
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<http://www.hitachi-power-semiconductor-device.co.jp/>

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