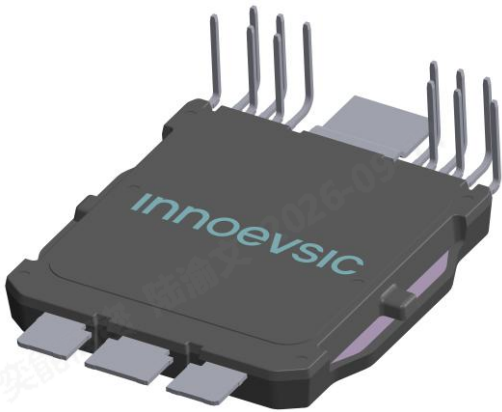


1200V, 1.7mΩ SiC MOSFET Module

Features

- Electrical features
 - $V_{DSS} = 1200V$
 - $I_{DN} = 600A$ / $I_{DRM}^* = 1200A$
 - Standard housing
 - Isolated base plate
 - High power density
 - Low $R_{DS(on)}$
 - Low Switching Losses
 - $T_{vj\ op} = 175^{\circ}C$
- Mechanical features
 - 4.2kV DC 1 sec Insulation
 - High Creepage and Clearance Distances
 - Direct Cooled PinFin Base Plate
 - High Performance Si₃N₄ Ceramic
 - Low Inductance Design
 - Integrated NTC temperature sensor
 - RoHS compliant

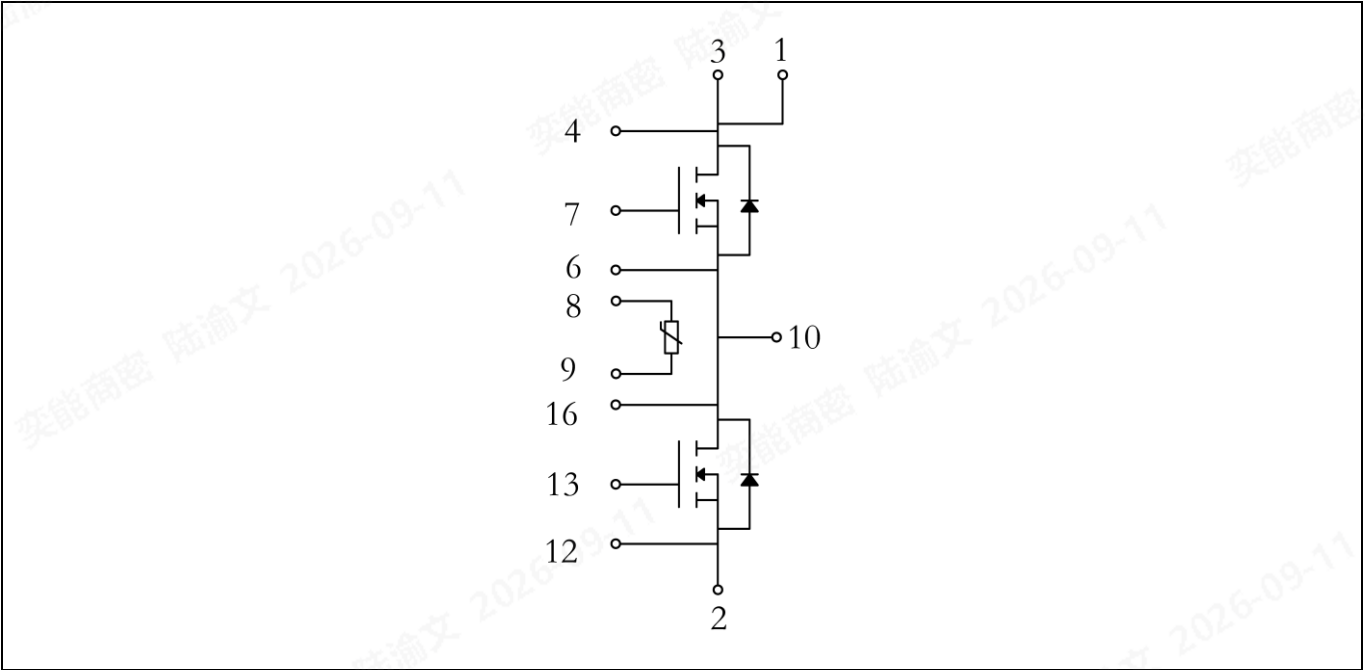
V_{DS}	1200V
$R_{DS(on)}$	1.7mΩ



Typical applications

- Automotive Applications
- Hybrid Electrical Vehicles (H)EV
- Motor Drives

Circuit diagram



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Contents

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1 Package

Table 1 Insulation coordination

Parameter	Symbol	Note or test condition	Value	Unit
Isolation Test Voltage	V_{ISOL}	DC, $t = 1\text{ sec}$	4.2	kV
Material of Module Baseplate			Cu	
Internal Isolation		Basic insulation (class 1, IEC 61140)	Si_3N_4	

Table 2 Characteristic values

Parameter	Symbol	Note or test condition	Value			Unit
			Min.	Typ.	Max.	
Stray Inductance Module	L_s			5		nH
Module Lead Resistance, terminals - chip	$R_{DD'+SS'}$	$T_C = 25^\circ\text{C}$, per Switch		TBD		m Ω
Storage Temperature	T_{stg}		-40		175	$^\circ\text{C}$
Weight	G			160		g

2 MOSFET, T1/T2

Table 3 Maximum rated values

Parameter	Symbol	Note or test condition		Value	Unit
Drain-source Voltage	V_{DSS}	$T_{vj} = 25^\circ\text{C}$		1200	V
Implemented Drain Current	I_{DN}			600	A
Continuous DC Drain Current	I_{DDC}	$T_{vj} = 175^\circ\text{C}$, $V_{GS} = 18\text{V}$	$T_f = 65^\circ\text{C}$	600	A
Repetitive Peak Drain Current	I_{DRM}	Verified by design, t_p limited by T_{vjmax}		1200	A
Gate-source Voltage, Max. Static Voltage	V_{GS}			-10/22	V

Table 4 Recommended values

Parameter	Symbol	Note or test condition	Value	Unit
On-state Gate Voltage	$V_{GS(on)}$		18	V
Off-state Gate Voltage	$V_{GS(off)}$		-3	V

Table 5 Characteristic values

Parameter	Symbol	Note or test condition		Value			Unit
				Min.	Typ.	Max.	
Drain-source On-resistance	$R_{DS(on)}$	$I_D = 600A$	$V_{GS} = 18V,$ $T_{vj} = 25^{\circ}C$		1.63		mΩ
			$V_{GS} = 18V,$ $T_{vj} = 125^{\circ}C$		2.67		
			$V_{GS} = 18V,$ $T_{vj} = 175^{\circ}C$		3.56		
Gate Threshold Voltage	$V_{GS(th)}$	$I_D = 209mA, V_{DS} = V_{GS},$ $T_{vj} = 25^{\circ}C, (tested after 1ms$ pulse at $V_{GS} = +10V)$			3.3		V
Total Gate Charge	Q_G	$V_{DD} = 800V, V_{GS} = -4/15V,$ $T_{vj} = 25^{\circ}C$			1.4		μC
Internal Gate Resistor	R_{Gint}	$T_{vj} = 25^{\circ}C$			2.3		Ω
Input Capacitance	C_{iss}	$f = 100kHz,$ $V_{DS} = 800V,$ $V_{GS} = 0V$	$T_{vj} = 25^{\circ}C$		37.9		nF
Output Capacitance	C_{oss}	$f = 100kHz,$ $V_{DS} = 800V,$ $V_{GS} = 0V$	$T_{vj} = 25^{\circ}C$		1.43		nF
Reverse Transfer Capacitance	C_{rss}	$f = 100kHz,$ $V_{DS} = 800V,$ $V_{GS} = 0V$	$T_{vj} = 25^{\circ}C$		0.050		nF
Coss Stored Energy	E_{oss}	$V_{DS} = 800V,$ $V_{GS} = -3/18V$	$T_{vj} = 25^{\circ}C$		1050		μJ
Drain-source Leakage Current	I_{DSS}	$V_{DS} = 1200V,$ $V_{GS} = 0V$	$T_{vj} = 25^{\circ}C$			320	μA
Gate-source Leakage Current	I_{GSS}	$V_{DS} = 0V,$ $T_{vj} = 25^{\circ}C$	$V_{GS} = 19V$			1	uA
Turn-on Delay Time (Inductive Load)	t_{don}	$I_D = 600A,$ $V_{DD} = 900V,$ $V_{GS} = -3/18V,$ $R_{Gon} = 2.4\Omega$	$T_{vj} = 25^{\circ}C$		125		ns
			$T_{vj} = 125^{\circ}C$		114		
			$T_{vj} = 175^{\circ}C$		112		
Rise Time (Inductive Load)	t_r	$I_D = 600A,$ $V_{DD} = 900V,$ $V_{GS} = -3/18V,$ $R_{Gon} = 2.4\Omega$	$T_{vj} = 25^{\circ}C$		60		ns
			$T_{vj} = 125^{\circ}C$		54		
			$T_{vj} = 175^{\circ}C$		54		
Turn-off Delay Time (Inductive Load)	t_{doff}	$I_D = 600A,$ $V_{DD} = 900V,$ $V_{GS} = -3/18V,$ $R_{Goff} = 1\Omega$	$T_{vj} = 25^{\circ}C$		222		ns
			$T_{vj} = 125^{\circ}C$		264		
			$T_{vj} = 175^{\circ}C$		273		

3 Body diode (MOSFET, T1/T2)

Parameter	Symbol	Note or test condition	Value			Unit
			Min.	Typ.	Max.	
Fall Time (Inductive Load)	t_f	$I_D = 600A$, $V_{DD} = 900V$, $V_{GS} = -3/18V$, $R_{Goff} = 1\Omega$	$T_{vj} = 25^\circ C$	41		ns
			$T_{vj} = 125^\circ C$	41		
			$T_{vj} = 175^\circ C$	45		
Turn-on Energy Loss per Pulse	E_{on}	$I_D = 600A$, $V_{DD} = 900V$, $V_{GS} = -3/18V$, $R_{Gon} = 2.4\Omega$	$T_{vj} = 25^\circ C$	29.0		mJ
			$T_{vj} = 125^\circ C$	29.5		
			$T_{vj} = 175^\circ C$	31.3		
Turn-off Energy Loss per Pulse	E_{off}	$I_D = 600A$, $V_{DD} = 900V$, $V_{GS} = -3/18V$, $R_{Goff} = 1\Omega$	$T_{vj} = 25^\circ C$	22.0		mJ
			$T_{vj} = 125^\circ C$	23.5		
			$T_{vj} = 175^\circ C$	23.6		
Thermal Resistance, Junction to Cooling Fluid	R_{thJF}	per MOSFET		0.0794		K/W
Temperature Under Switching Conditions	$T_{vj op}$		-40		175	$^\circ C$

3 Body diode (MOSFET, T1/T2)

Table 6 Maximum rated values

Parameter	Symbol	Note or test condition	Value	Unit
DC Body Diode Forward Current	I_{SD}	$V_{GS} = -3V$, $T_{vj} = 175^\circ C$	300	A

Table 7 Characteristic values

Parameter	Symbol	Note or test condition	Value			Unit
			Min.	Typ.	Max.	
Forward Voltage	V_{SD}	$I_{SD} = 600A$, $V_{GS} = -3V$	$T_{vj} = 25^\circ C$	4.80		V
			$T_{vj} = 125^\circ C$	4.55		
			$T_{vj} = 175^\circ C$	4.40		
Peak Reverse Recovery Current	I_{rrm}	$I_{SD} = 600A$, $V_{DD} = 900V$, $V_{GS} = -3V$	$T_{vj} = 25^\circ C$	90		A
			$T_{vj} = 125^\circ C$	150		
			$T_{vj} = 175^\circ C$	202		
Recovered Charge	Q_{rr}	$I_{SD} = 600A$, $V_{DD} = 900V$, $V_{GS} = -3V$	$T_{vj} = 25^\circ C$	0.67		μC
			$T_{vj} = 125^\circ C$	3.09		
			$T_{vj} = 175^\circ C$	5.30		
Reverse Recovery Energy	E_{rec}	$I_{SD} = 600A$, $V_{DD} = 900V$, $V_{GS} = -3V$	$T_{vj} = 25^\circ C$	0.63		mJ
			$T_{vj} = 125^\circ C$	1.16		
			$T_{vj} = 175^\circ C$	2.14		

4 NTC-Thermistor

Table 8 Characteristic values

Parameter	Symbol	Note or test condition	Value			Unit
			Min.	Typ.	Max.	
Rated Resistance	R_{25}	$T_{NTC} = 25^{\circ}\text{C}$		10		k Ω
Deviation of R_{25}	$\Delta R/R$	$T_{NTC} = 25^{\circ}\text{C}$, $R_{25} = 5\text{k}\Omega$	-3		3	%
Power Dissipation	P_{25}	$T_{NTC} = 25^{\circ}\text{C}$			50	mW
B-value	$B_{25/50}$	$R_2 = R_{25} \exp[B_{25/50}(1/T_2 - 1/(298,15\text{K}))]$		3382		K
B-value	$B_{25/85}$	$R_2 = R_{25} \exp[B_{25/85}(1/T_2 - 1/(298,15\text{K}))]$		3435		K
B-value	$B_{25/100}$	$R_2 = R_{25} \exp[B_{25/100}(1/T_2 - 1/(298,15\text{K}))]$		3454		K

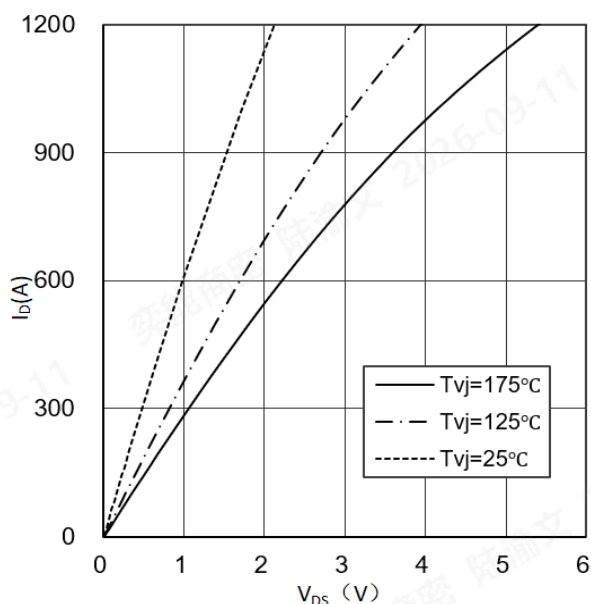
5 Characteristic diagrams

5 Characteristic diagrams

Output characteristic (typical), MOSFET, T1/T2

$I_D = f(V_{DS})$

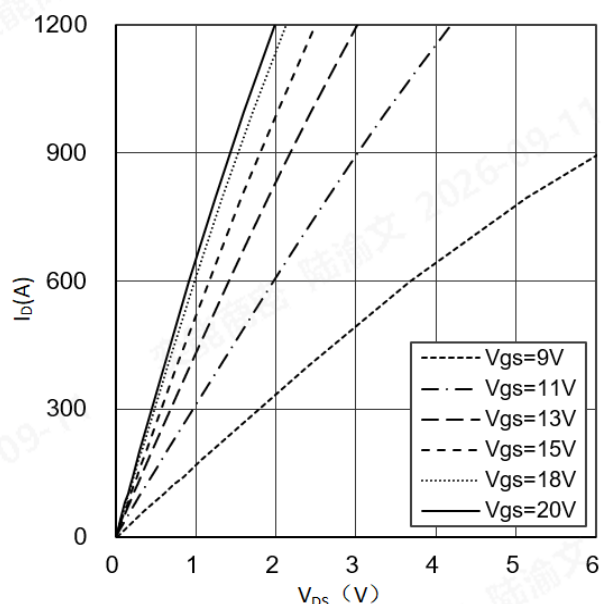
$V_{GS} = 18V$



Output characteristic (typical), MOSFET, T1/T2

$I_D = f(V_{DS})$

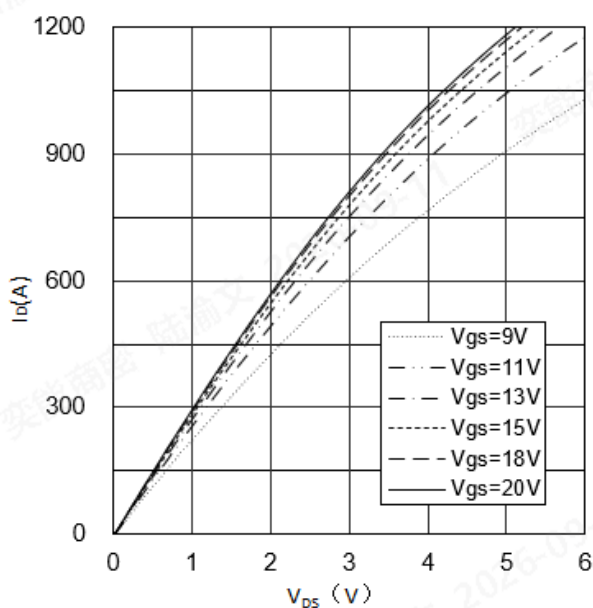
$T_{vj} = 25^\circ C$



Output characteristic (typical), MOSFET, T1/T2

$I_D = f(V_{DS})$

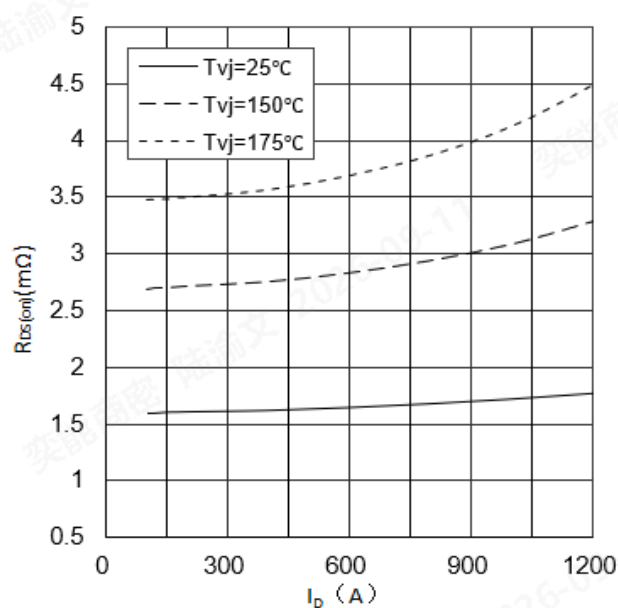
$T_{vj} = 175^\circ C$



Output characteristic (typical), MOSFET, T1/T2

$R_{DS(on)} = f(I_D)$

$V_{GS} = 18V$

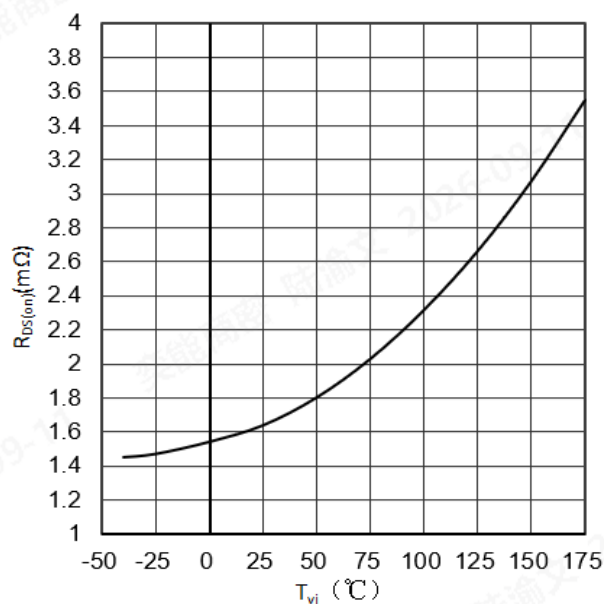


5 Characteristic diagrams

Drain-source on resistance as a function of junction temperature(typical)

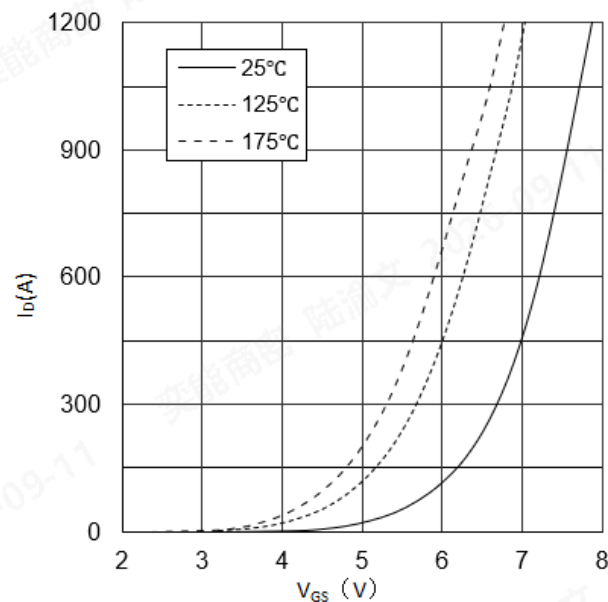
$$R_{DS(on)} = f(T_{vj})$$

$$I_D = 600A, V_{GS} = 18V$$

**Transfer characteristic(typical)**

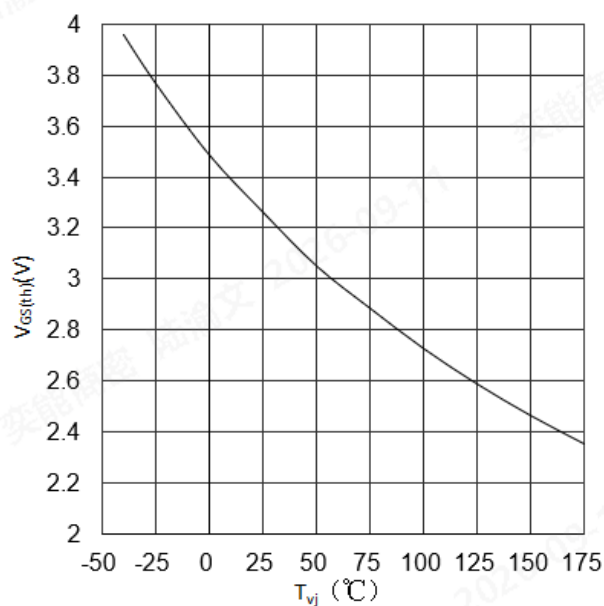
$$I_D = f(V_{GS})$$

$$V_{DS} = 20V$$

**Gate-source threshold voltage as a function of junction temperature(typical)**

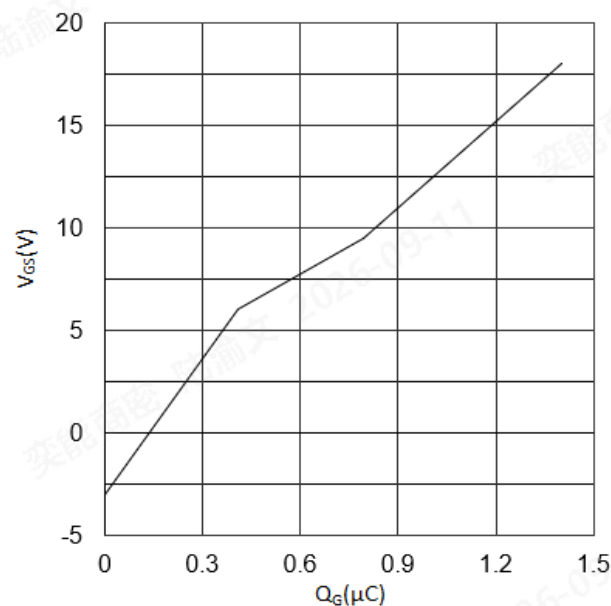
$$V_{GS(th)} = f(T_{vj})$$

$$V_{GS} = V_{DS}, I_D = 198mA$$

**Gate charge (typical)**

$$V_{GS} = f(Q_G)$$

$$I_D = 600A, V_{DS} = 900V$$

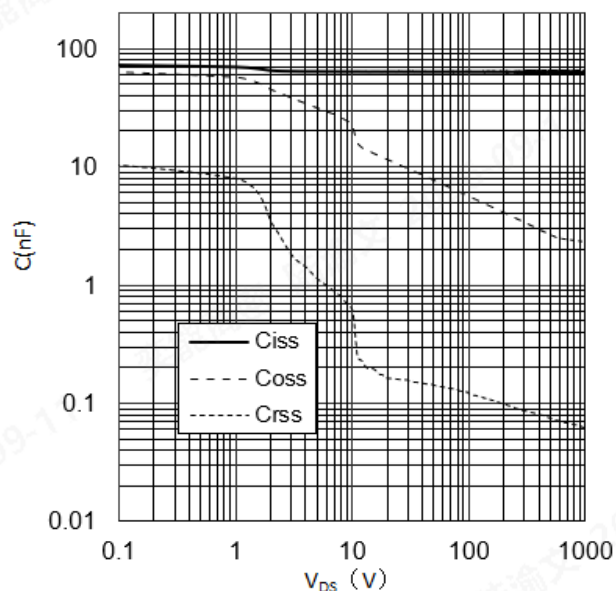


5 Characteristic diagrams

Typical capacitance as a function of Drain-Source voltage

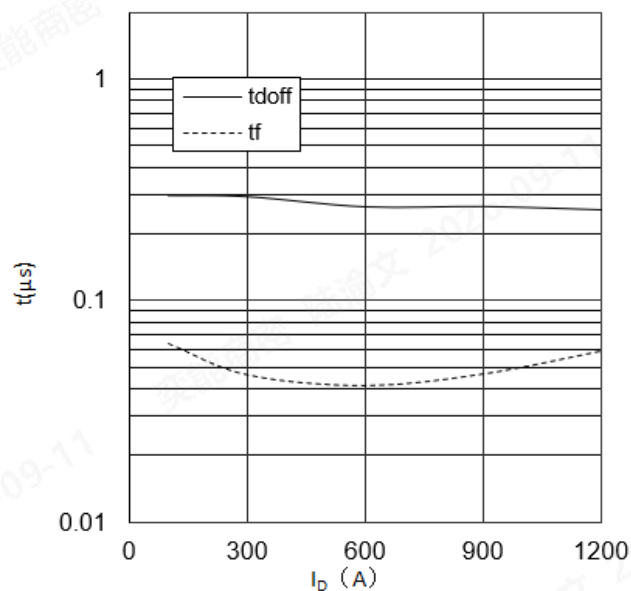
$C = f(V_{DS})$

$f = 100\text{kHz}, V_{GS} = 0\text{V}$

**Switching times (typical)**

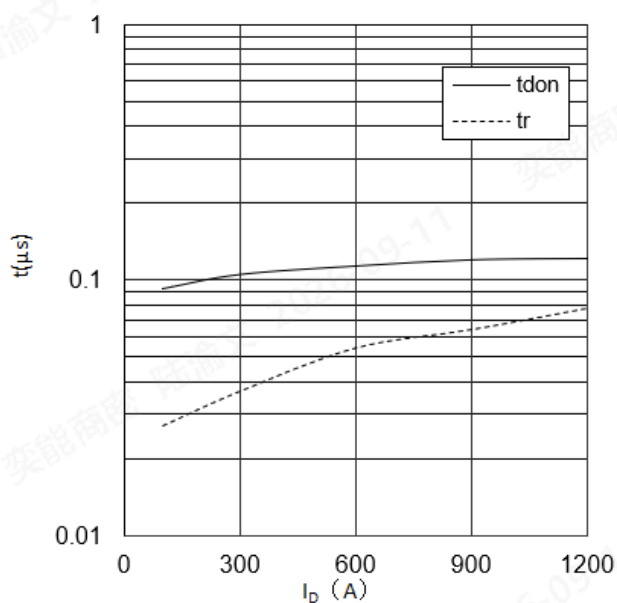
$t = f(I_D)$

$R_{goff} = 1.5\Omega, V_{GS} = -3/+18\text{V}, V_{DS} = 900\text{V}, T_{vj} = 175^\circ\text{C}$

**Switching times (typical)**

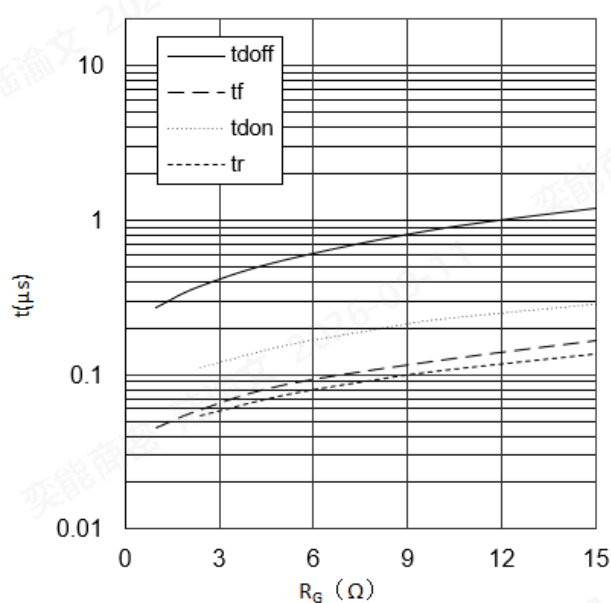
$t = f(I_D)$

$R_{gon} = 2.4\Omega, V_{GS} = -3/+18\text{V}, V_{DS} = 900\text{V}, T_{vj} = 175^\circ\text{C}$

**Switching times (typical)**

$t = f(R_G)$

$V_{GS} = -3/+18\text{V}, I_D = 600\text{A}, V_{DS} = 900\text{V}, T_{vj} = 175^\circ\text{C}$

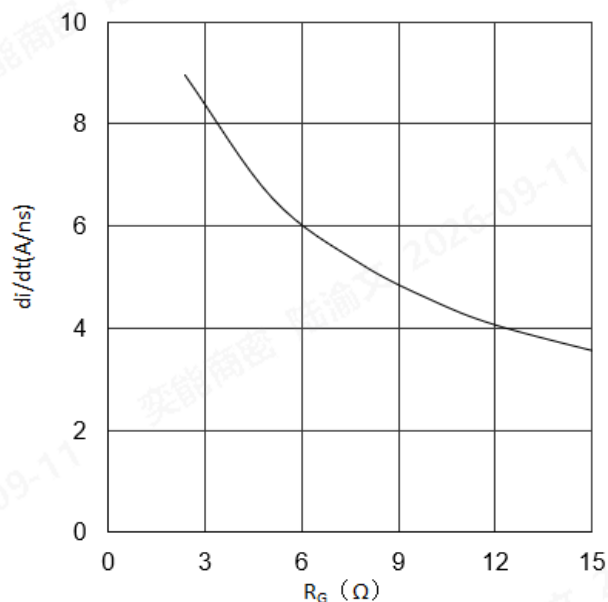


5 Characteristic diagrams

Current slope (typical)

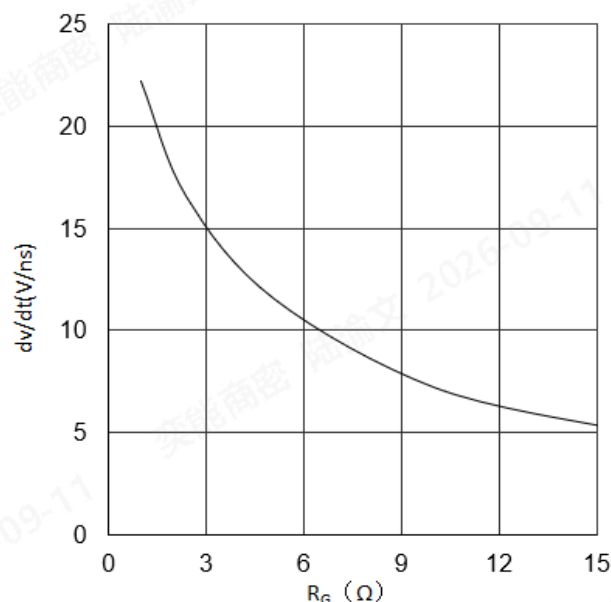
$$di/dt = f(R_G)$$

$$V_{GS} = -3/+18V, I_D = 600A, V_{DS} = 900V, T_{vj} = 175^\circ C$$

**Voltage slope (typical)**

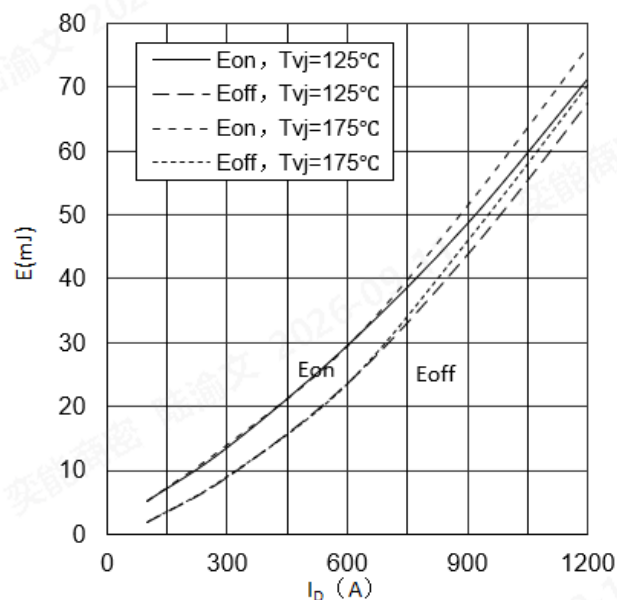
$$dv/dt = f(R_G)$$

$$V_{GS} = -3/+18V, I_D = 600A, V_{DS} = 900V, T_{vj} = 175^\circ C$$

**Switching losses (typical)**

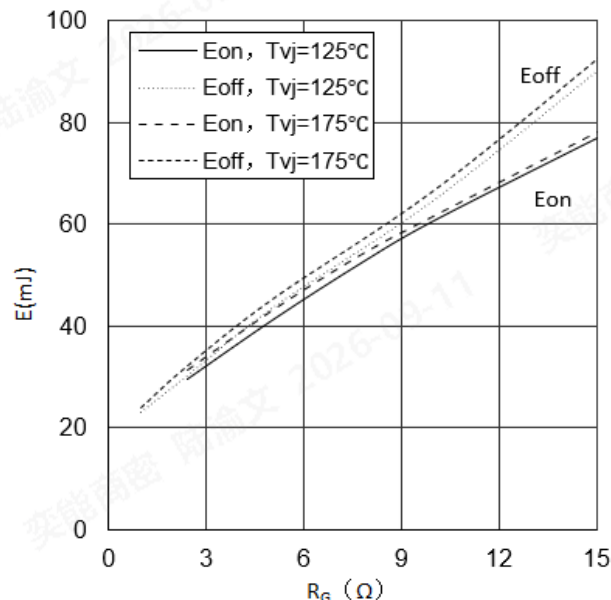
$$E = f(I_D)$$

$$V_{GS} = -3/+18V, R_{Gon} = 2.4\Omega, R_{Goff} = 1\Omega, V_{DS} = 900V$$

**Switching losses (typical)**

$$E = f(R_G)$$

$$V_{GS} = -3/+18V, I_D = 600A, V_{DS} = 900V$$

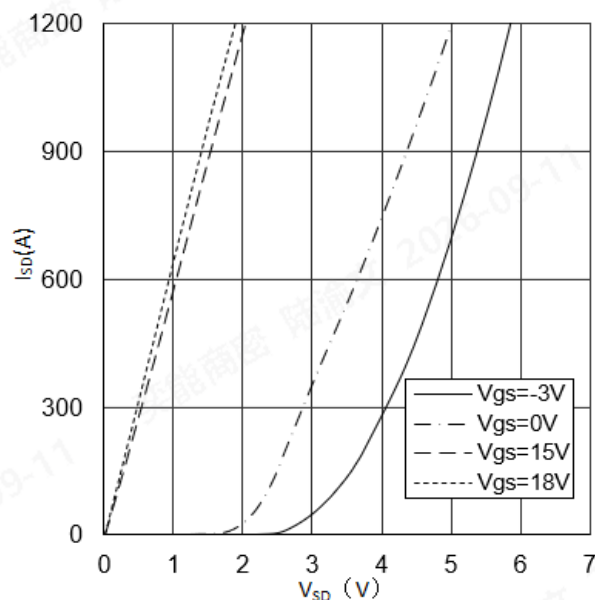


5 Characteristic diagrams

Forward characteristic of Diode (typical)

$$I_{SD} = f(V_{SD})$$

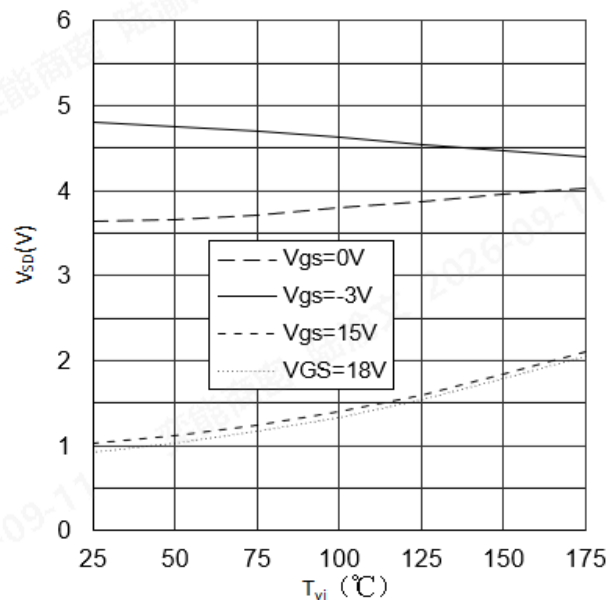
$$T_{vj} = 25^{\circ}\text{C}$$



Forward characteristic of Diode (typical)

$$V_{SD} = f(T_{vj})$$

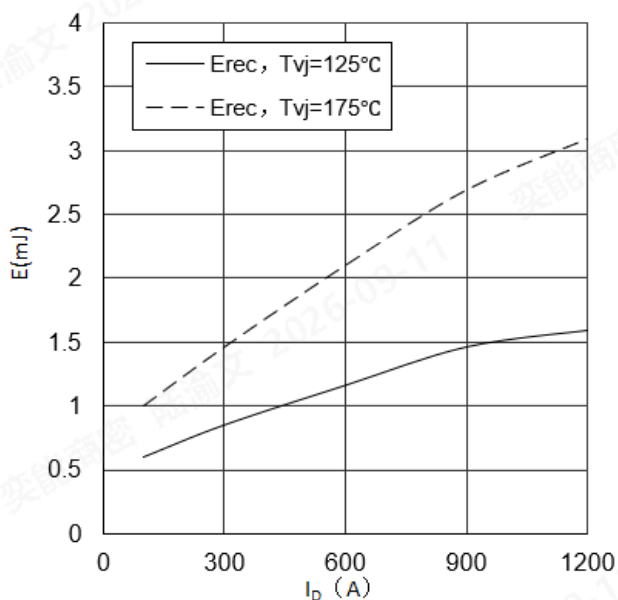
$$I_{SD} = 600\text{A}$$



Switching losses body diode (typical)

$$E_{rec} = f(I_{SD})$$

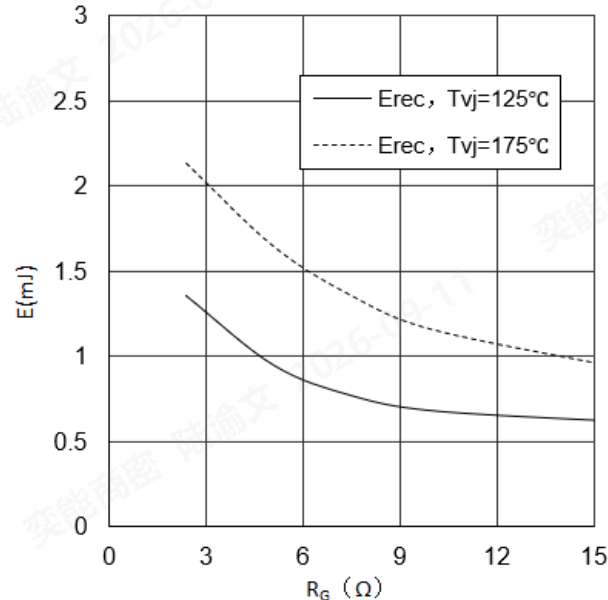
$$V_{GS} = -3/+18\text{V}, R_{Gon} = 2.4\Omega, V_{DS} = 900\text{V}$$



Switching losses body diode (typical)

$$E_{rec} = f(R_G)$$

$$V_{GS} = -3/+18\text{V}, I_D = 600\text{A}, V_{DS} = 900\text{V}$$

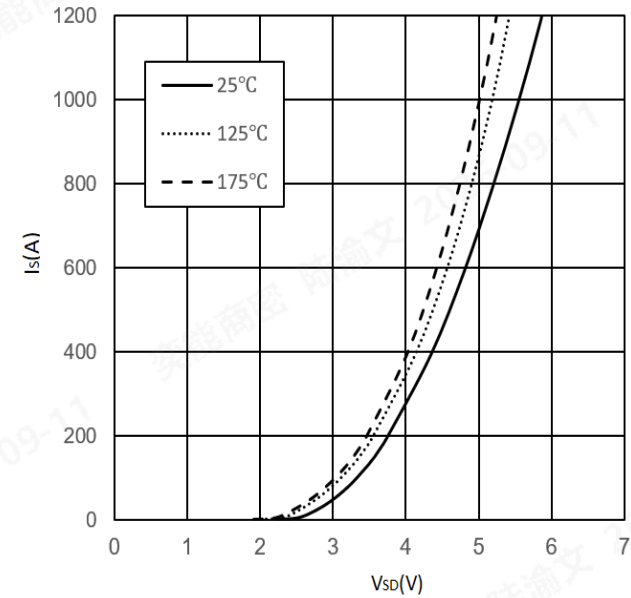


5 Characteristic diagrams

Forward characteristic body diode (typical), MOSFET

$I_{FS} = f(V_{SD})$

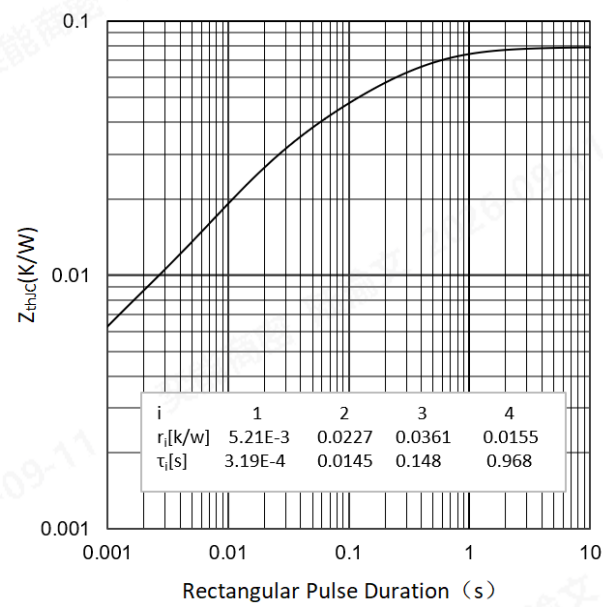
$V_{GS} = -3V$



Transient thermal impedance as a function of pulse width

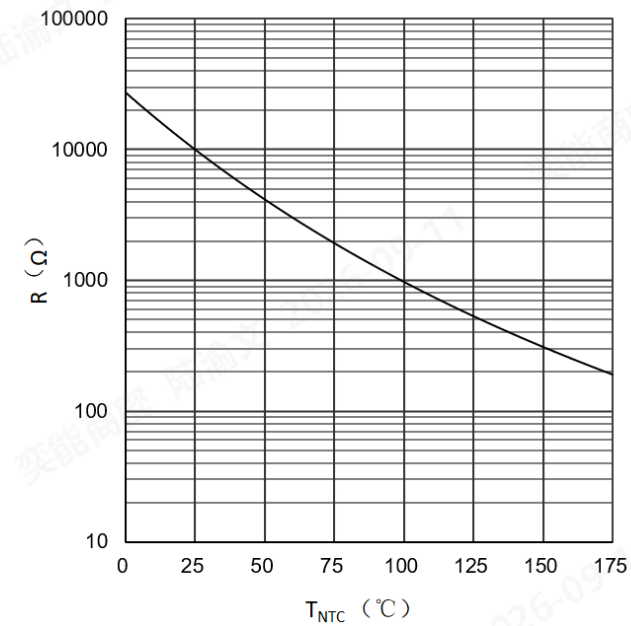
$Z_{th(j-f)} = f(t_p)$

$D = t_p/T$

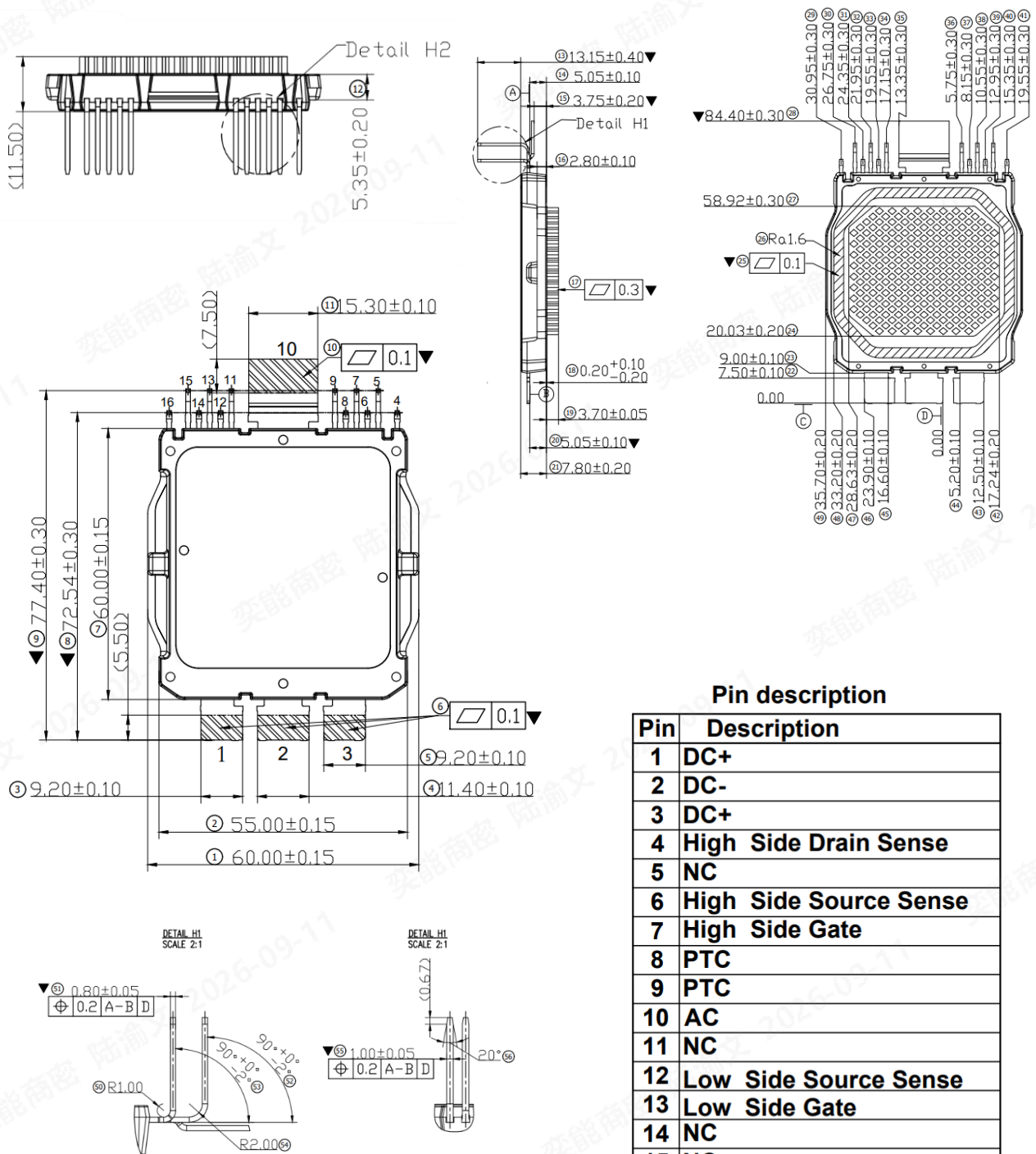


NTC-Thermistor-temperature characteristic (typical)

$R = f(T)$



6 Package Outlines



Revision History

Document revision	Date of release	Description of changes
1.1	2026-06-23	Change the NTC diagram
1.0	2026-06-05	Preliminary version

IMPORTANT NOTICE:

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Due to technical requirements, components of the product may contain dangerous substances. For information on the types in question, please contact the sales staff responsible for you.

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