

V_{DSS}	1700V
$R_{DS(on)}$ (Typ.)	1.15Ω
I_D	3.9A
P_D	39W

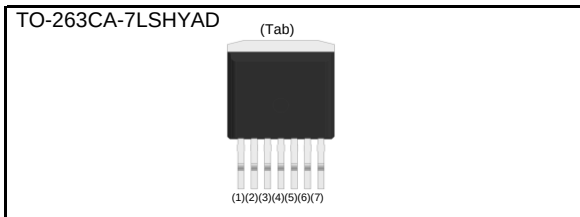
●Features

- 1) Low on-resistance
- 2) Fast switching speed
- 3) Wide creepage distance = 6.1 mm
- 4) Simple to drive
- 5) Pb-free lead plating ; RoHS compliant

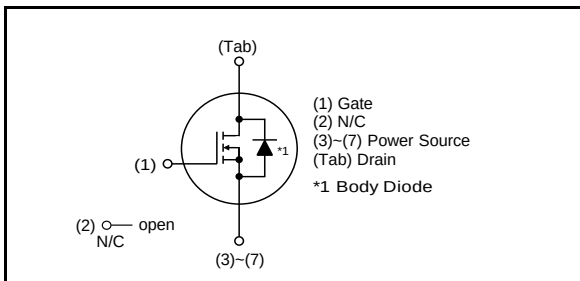
●Application

- Auxiliary power supplies
- Switch mode power supplies

●Outline



●Inner circuit



●Packaging specifications

Type	Packing	Embossed tape
	Reel size (mm)	330
	Tape width (mm)	24
	Basic ordering unit (pcs)	800
	Taping code	TL1
	Marking	SCT2H12NWB

●Absolute maximum ratings ($T_{vj} = 25^{\circ}\text{C}$ unless otherwise specified)

Parameter			Symbol	Value	Unit
Drain - Source voltage			V_{DSS}	1700	V
Continuous drain and source current	$V_{GS} = V_{GS_{on}}$	$T_c = 25^{\circ}\text{C}$	I_D, I_S^{*1}	3.9	A
		$T_c = 100^{\circ}\text{C}$		2.8	A
Pulsed drain current	$V_{GS} = V_{GS_{on}}$	$T_c = 25^{\circ}\text{C}$	$I_{D,pulse}^{*1}$	5.6	A
Body diode pulsed forward current		$T_c = 25^{\circ}\text{C}$ $V_{GS} = 0\text{ V}$	$I_{S,pulse}^{*1}$	5.6	A
Gate - Source voltage (DC)			V_{GSS_DC}	-6 to 22	V
Gate - Source surge voltage ($t_{surge} < 300\text{ns}$)			$V_{GSS_surge}^{*2}$	-10 to 26	V
Power dissipation ($T_c = 25^{\circ}\text{C}$)			P_D	39	W
Virtual Junction temperature			T_{vj}	175	$^{\circ}\text{C}$
Range of storage temperature			T_{stg}	-55 to +175	$^{\circ}\text{C}$

●Electrical characteristics ($T_{vj} = 25^{\circ}\text{C}$ unless otherwise specified)

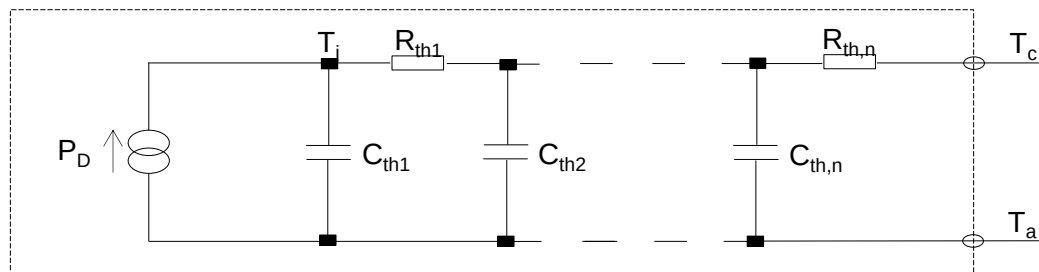
Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Drain - Source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{V}, I_D = 1\text{mA}$	1700	-	-	V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 1700\text{V}, V_{GS} = 0\text{V}$ $T_{vj} = 25^{\circ}\text{C}$	-	0.1	10	μA
		$T_{vj} = 150^{\circ}\text{C}$	-	0.2	-	
Gate - Source leakage current	I_{GSS+}	$V_{GS} = +22\text{V}, V_{DS} = 0\text{V}$	-	-	100	nA
Gate - Source leakage current	I_{GSS-}	$V_{GS} = -6\text{V}, V_{DS} = 0\text{V}$	-	-	-100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 0.41\text{mA}$	1.6	2.8	4.0	V

●Thermal resistance

Parameter	Symbol	Values			Unit
		Min.	Typ.	Max.	
Thermal resistance, junction - case	R_{thJC}	-	2.94	3.83	K/W

●Typical Transient Thermal Characteristics

Symbol	Value	Unit	Symbol	Value	Unit
R_{th1}	5.9×10^{-1}	K/W	C_{th1}	1.4×10^{-3}	Ws/K
R_{th2}	1.3×10^0		C_{th2}	8.8×10^{-2}	
R_{th3}	1.1×10^0		C_{th3}	3.5×10^{-3}	



●Electrical characteristics ($T_{vj} = 25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Static drain - source on - state resistance	$R_{DS(on)}^{*3}$	$V_{GS} = 18\text{V}, I_D = 1.1\text{A}$ $T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$	- -	1.15 1.71	1.50 -	Ω
Gate input resistance	R_G	$f = 1\text{MHz}$, open drain	-	49	-	Ω
Transconductance	g_{fs}^{*3}	$V_{DS} = 10\text{V}, I_D = 1.1\text{A}$	-	0.4	-	S
Input capacitance	C_{iss}	$V_{GS} = 0\text{V}$	-	197	-	pF
Output capacitance	C_{oss}	$V_{DS} = 800\text{V}$	-	8	-	
Reverse transfer capacitance	C_{rss}	$f = 1\text{MHz}$	-	2	-	
Effective output capacitance, energy related	$C_{o(er)}$	$V_{GS} = 0\text{V}$ $V_{DS} = 0\text{V to } 800\text{V}$	-	11	-	pF
Total gate charge	Q_g^{*3}	$V_{DD} = 800\text{V}$	-	24	-	nC
Gate - Source charge	Q_{gs}^{*3}	$I_D = 2\text{A}$	-	8	-	
Gate - Drain charge	Q_{gd}^{*3}	$V_{GS} = 18\text{V}$	-	5	-	
Gate plateau voltage	$V_{(plateau)}$	$V_{DD} = 800\text{V}, I_D = 2\text{A}$	-	7.4	-	V
Turn - on delay time	$t_{d(on)}^{*3}$	$V_{DD} = 800\text{V}, I_D = 2\text{A}$ $V_{GS} = 18\text{V}/0\text{V}$ $R_G = 0\Omega, L = 250\mu\text{H}$ * E_{on} includes diode	-	12	-	ns
Rise time	t_r^{*3}		-	25	-	
Turn - off delay time	$t_{d(off)}^{*3}$		-	24	-	
Fall time	t_f^{*3}		-	32	-	
Turn - on switching loss	E_{on}^{*3}		-	81	-	μJ
Turn - off switching loss	E_{off}^{*3}	reverse recovery	-	2	-	

●Body diode electrical characteristics (Source-Drain) ($T_{vj} = 25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Forward voltage	V_{SD}^{*3}	$V_{GS} = 0\text{V}, I_S = 1.1\text{A}$	-	4.3	-	V
Reverse recovery time	t_{rr}^{*3}	$I_F = 1.1\text{A}, V_R = 800\text{V}$ $di/dt = 650\text{A}/\mu\text{s}$	-	39	-	ns
Reverse recovery charge	Q_{rr}^{*3}		-	34	-	nC
Peak reverse recovery current	I_{rrm}^{*3}		-	1.8	-	A

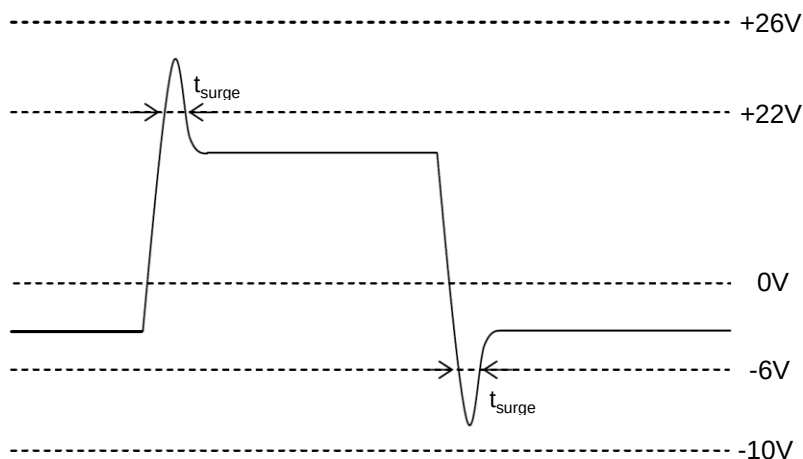
●Electrostatic Discharge^{*4}

Test	Reference Standard	Conditions	Classification Levels
Human Body Model (HBM)	ANSI/ESDA/JEDEC JS-001-2023	$C=100\text{pF}, R=1.5\text{k}\Omega$	1A^* ($< 500\text{V}$)
Charged Device Model (CDM)	ANSI/ESDA/JEDEC JS-002-2022	-	C3^* ($\geq 1\text{kV}$)

* Noted : This is reference data from a random sampling test under conditions confirming to the above standards. ROHM does not guarantee classification Level of Electrostatic Discharge.

*1 Limited by maximum T_{vj} and for Max. R_{thJC} .

*2 Example of acceptable V_{GS} waveform



*3 Pulsed

*4 This Product is electrostatic sensitive product, which may be damaged due to electrostatic discharge. Please take proper caution in your manufacturing process and storage so that voltage exceeding the Products maximum rating will not be applied to Products. Please take special care under dry condition (e.g. Grounding of human body / equipment / solder iron, isolation from charged objects, setting of Ionizer, friction prevention and temperature / humidity control).

●Electrical characteristic curves

Fig.1 Power Dissipation Derating Curve

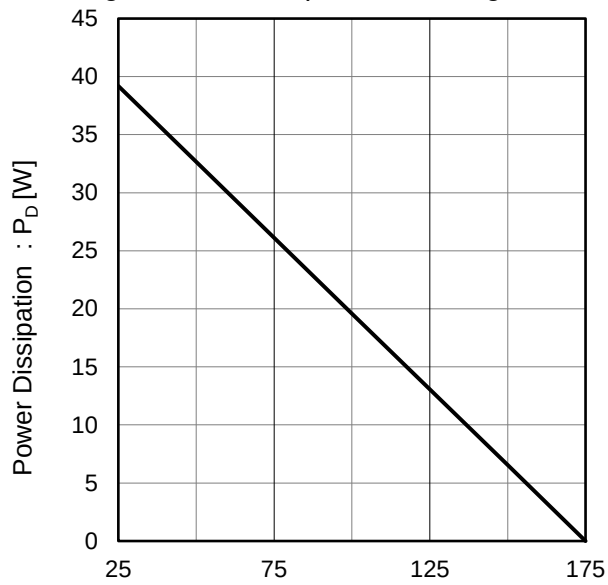


Fig.2 Maximum Safe Operating Area

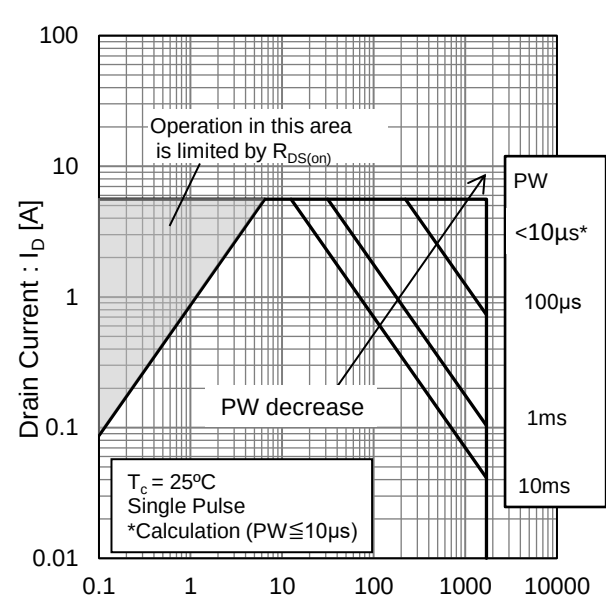
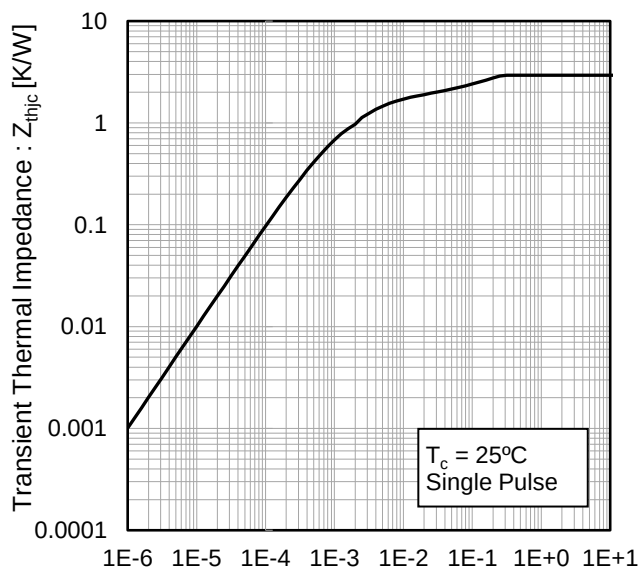
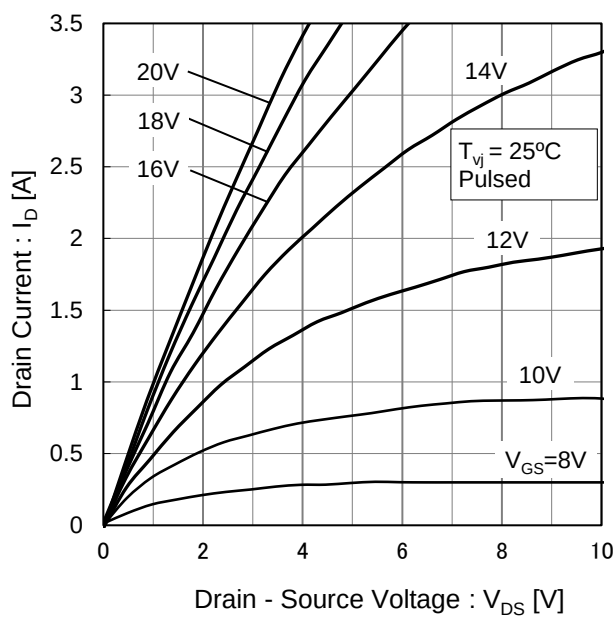
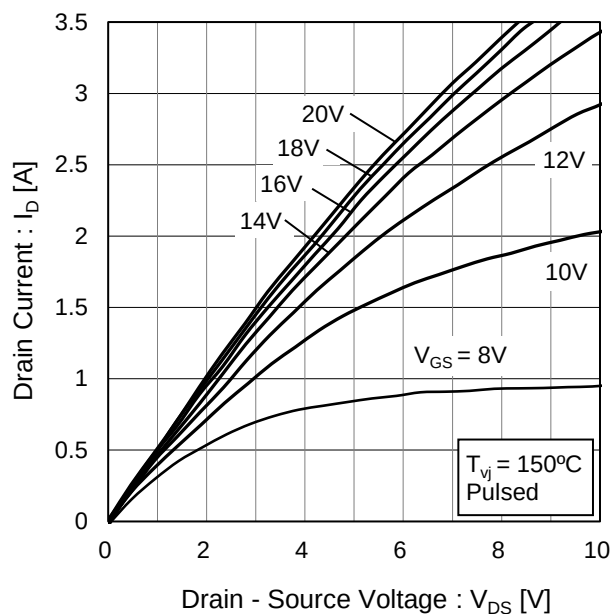


Fig.3 Typical Transient Thermal Impedance vs. Pulse Width



●Electrical characteristic curves

Fig.4 Typical Output Characteristics

Fig.5 $T_{vj} = 150^{\circ}\text{C}$ Typical Output Characteristics

●Electrical characteristic curves

Fig.6 Typical Transfer Characteristics (I)

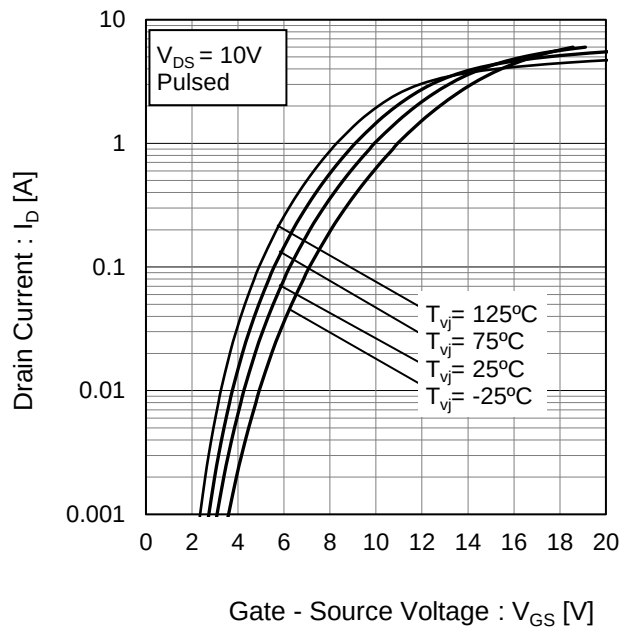


Fig.7 Typical Transfer Characteristics (II)

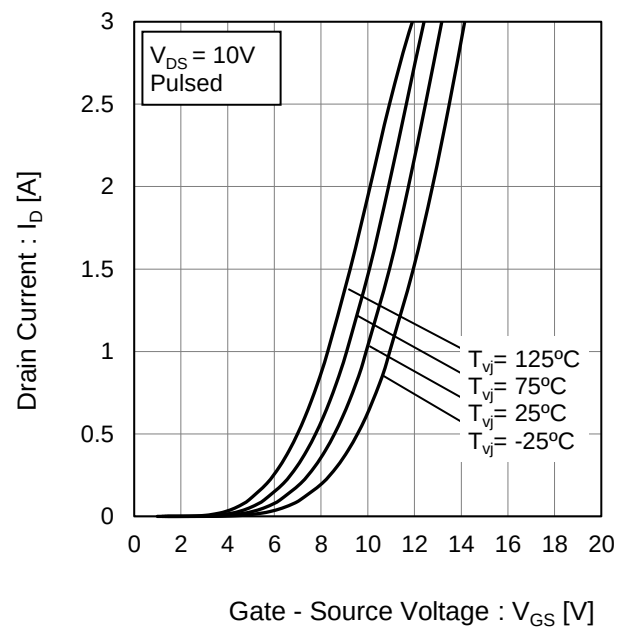


Fig.8 Gate Threshold Voltage vs. Virtual Junction Temperature

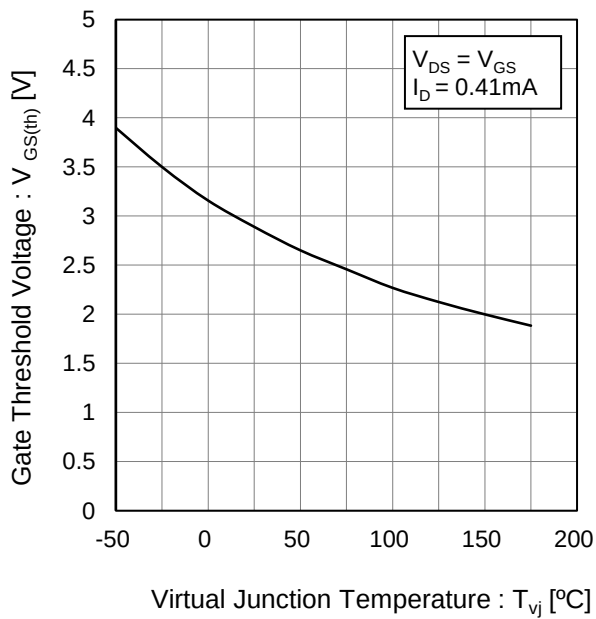
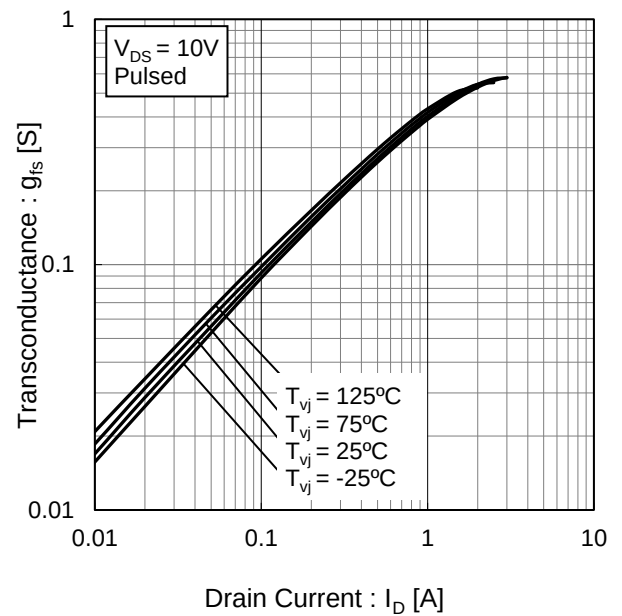


Fig.9 Transconductance vs. Drain Current



●Electrical characteristic curves

Fig.10 Static Drain - Source On - State Resistance vs. Gate - Source Voltage

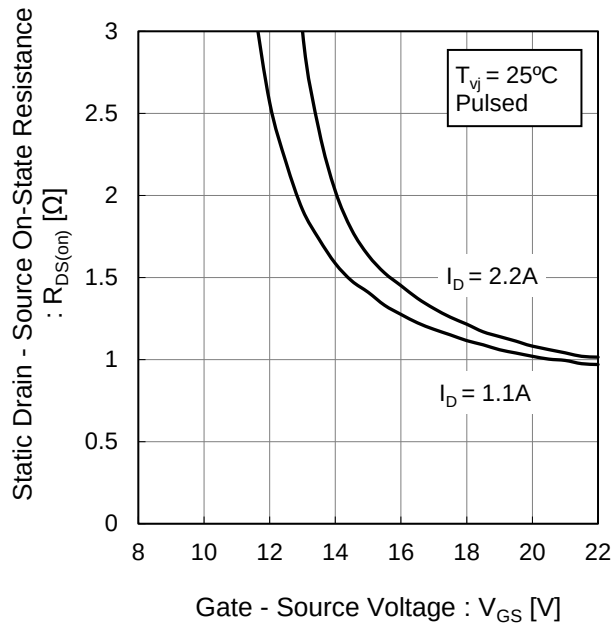


Fig.11 Static Drain - Source On - State Resistance vs. Virtual Junction Temperature

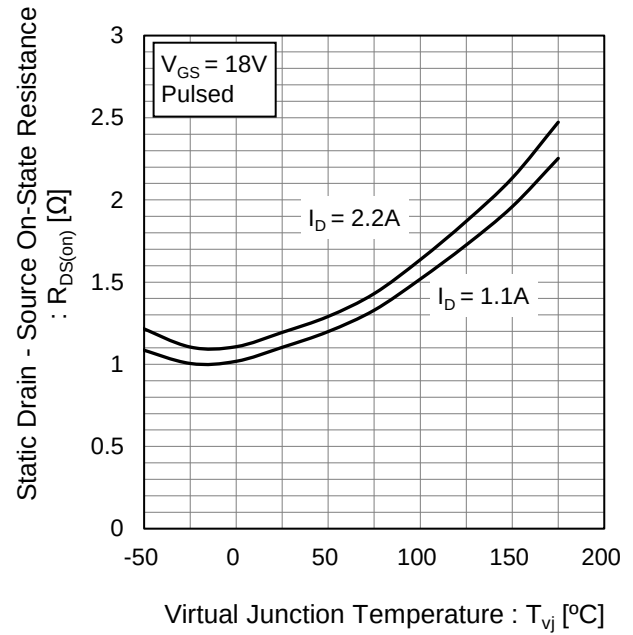
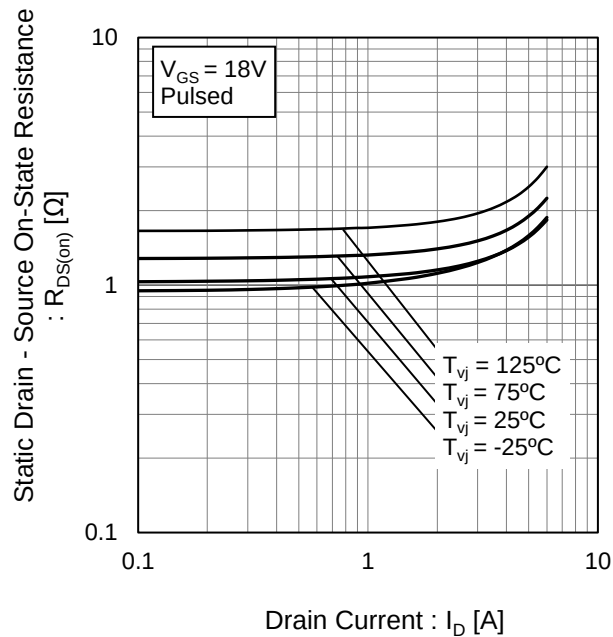


Fig.12 Static Drain - Source On - State Resistance vs. Drain Current



●Electrical characteristic curves

Fig.13 Typical Capacitance
vs. Drain - Source Voltage

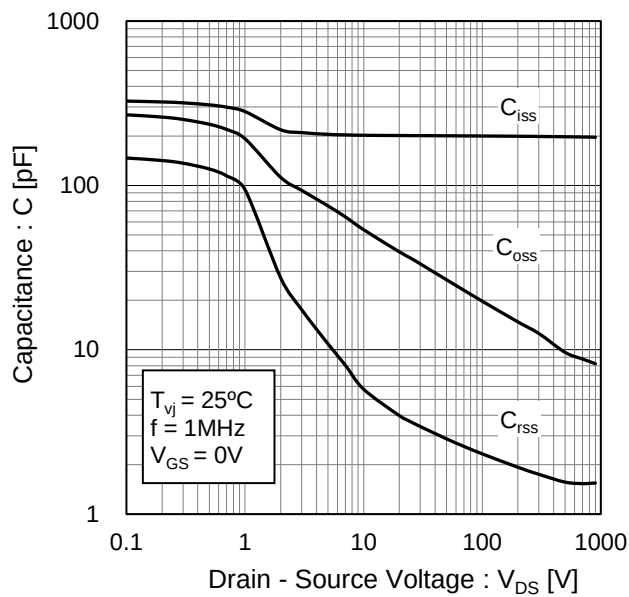


Fig.14 Coss Stored Energy

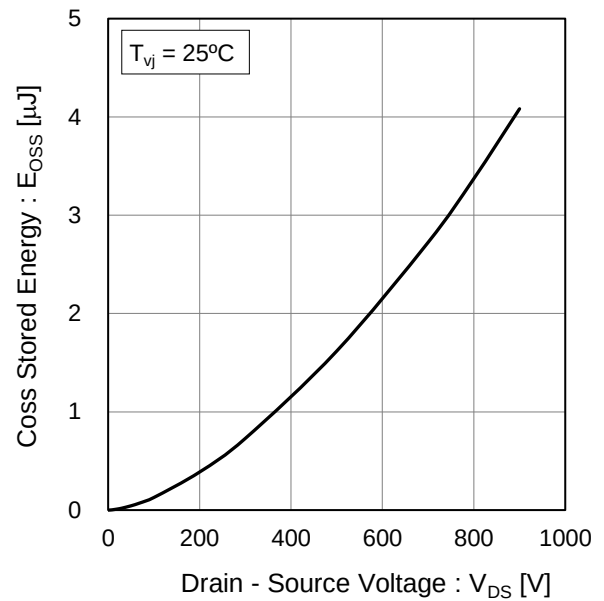


Fig.15 Switching Characteristics

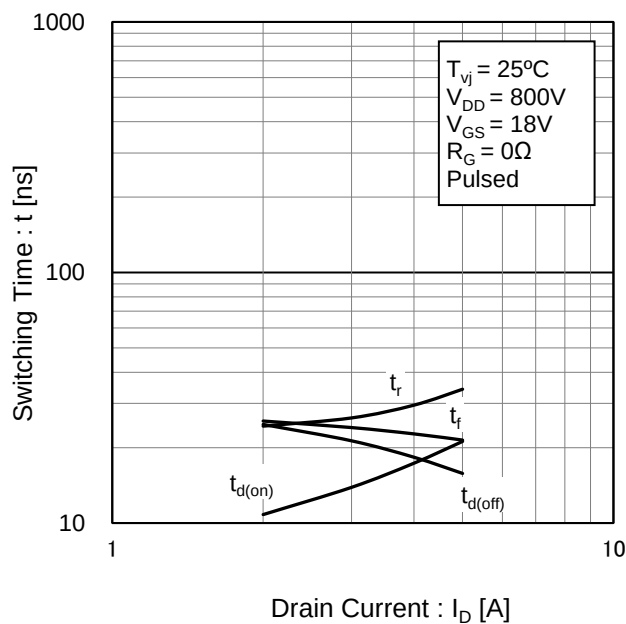
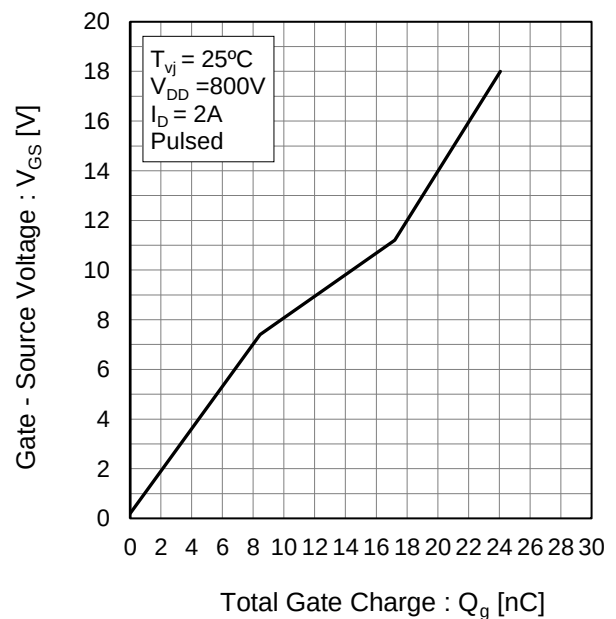


Fig.16 Dynamic Input Characteristics



●Electrical characteristic curves

Fig.17 Typical Switching Loss
vs. Drain - Source Voltage

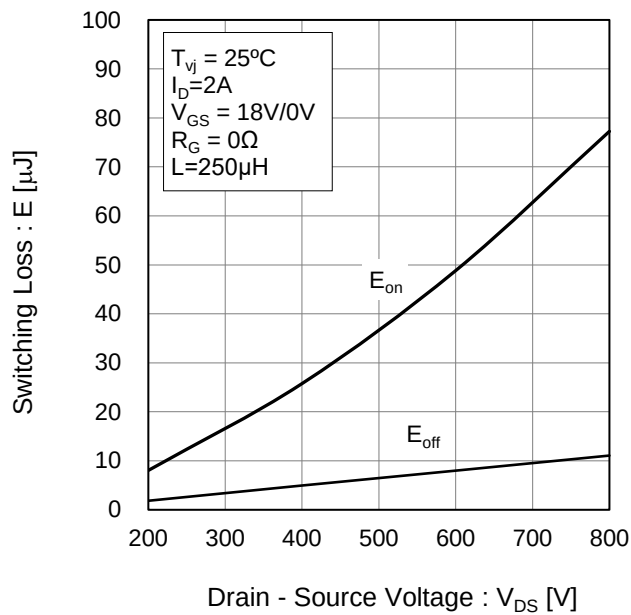


Fig.18 Typical Switching Loss
vs. Drain Current

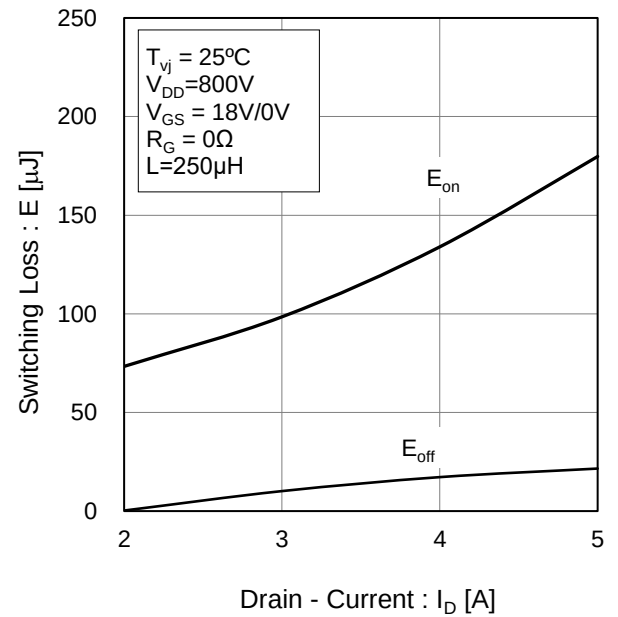
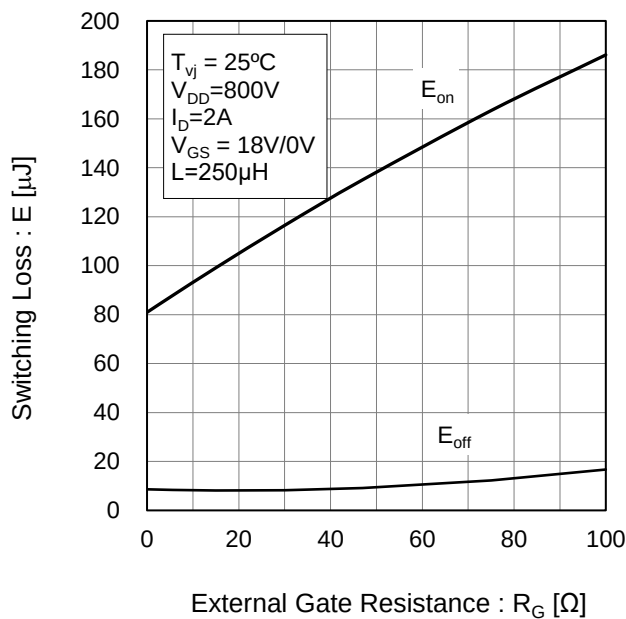


Fig.19 Typical Switching Loss
vs. External Gate Resistance



●Electrical characteristic curves

Fig.20 Inverse Diode Forward Current vs. Source - Drain Voltage

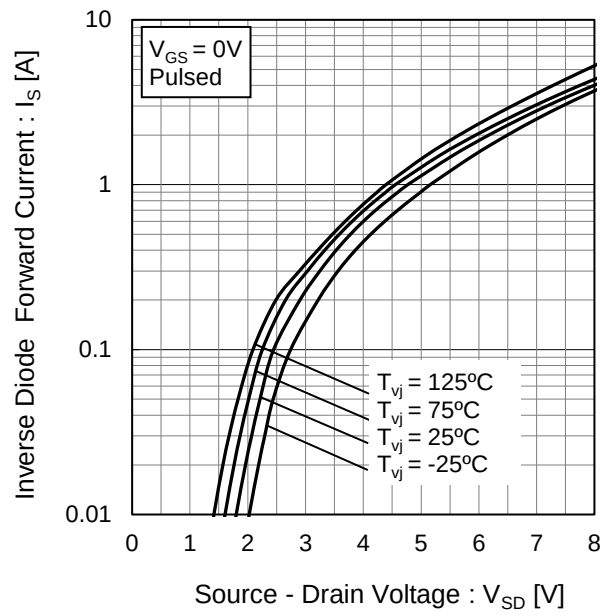
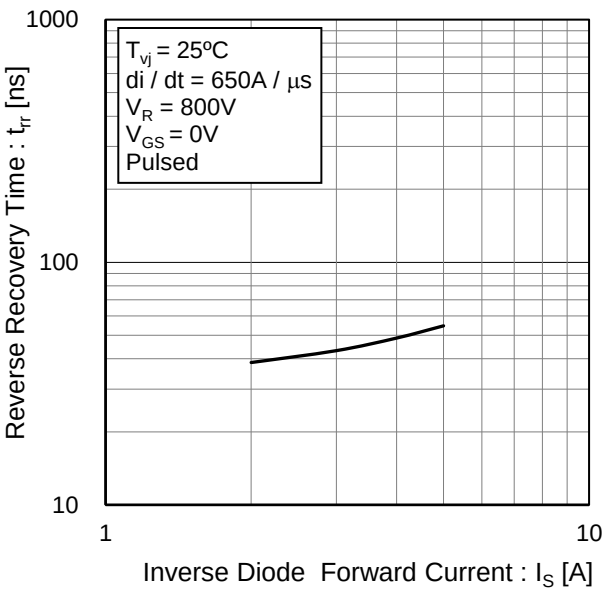


Fig.21 Reverse Recovery Time vs. Inverse Diode Forward Current



● Measurement circuits

Fig.1-1 Gate Charge Measurement Circuit

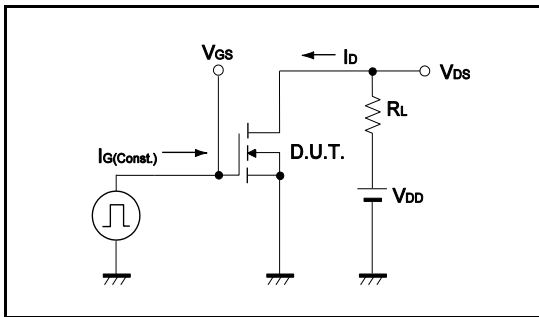


Fig.1-2 Gate Charge Waveform

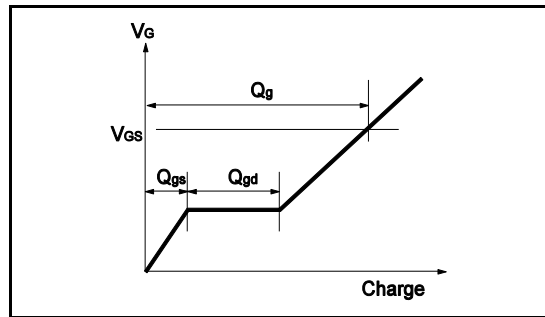


Fig.2-1 Switching Characteristics Measurement Circuit

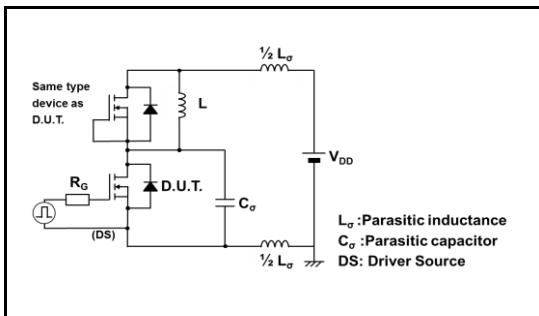


Fig.2-2 Waveforms for Switching Time

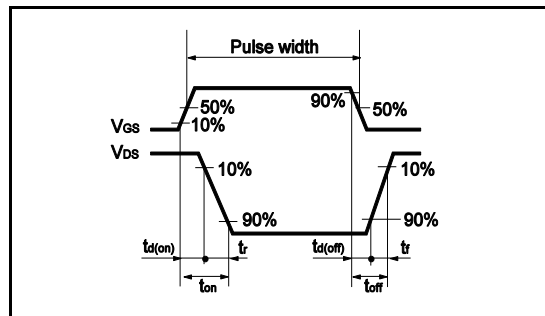


Fig.2-3 Waveforms for Switching Energy Loss

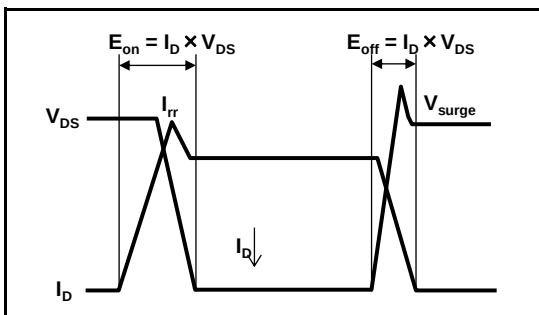


Fig.3-1 Reverse Recovery Time Measurement Circuit

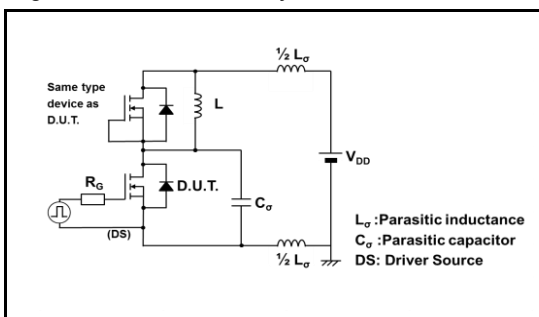
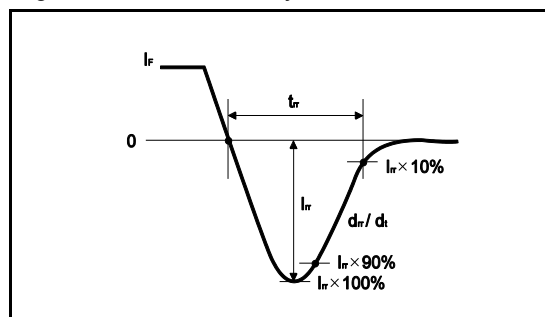
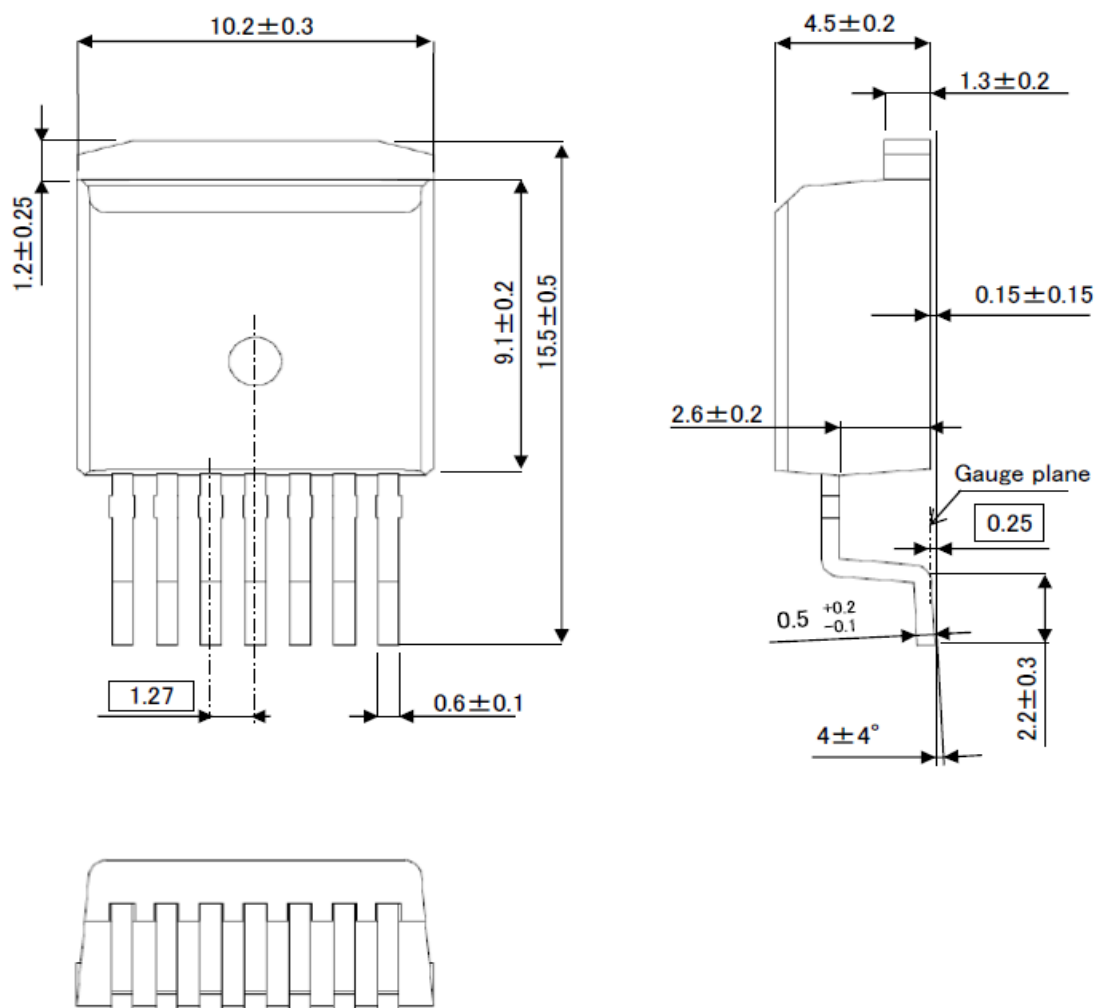


Fig.3-2 Reverse Recovery Waveform



●Package Dimensions

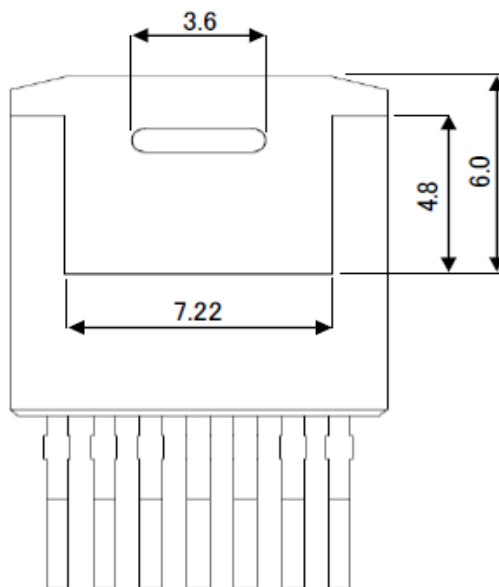
Marking side



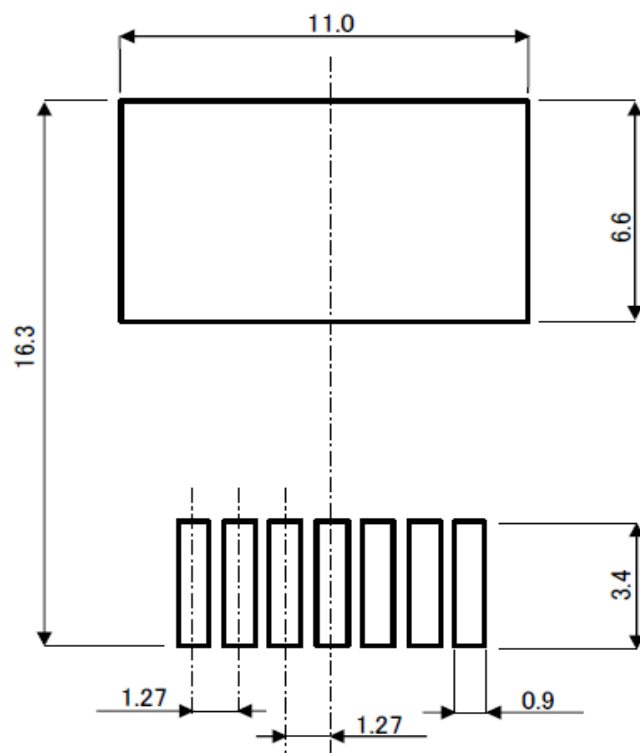
UNIT:mm

●Package Dimensions

Back side

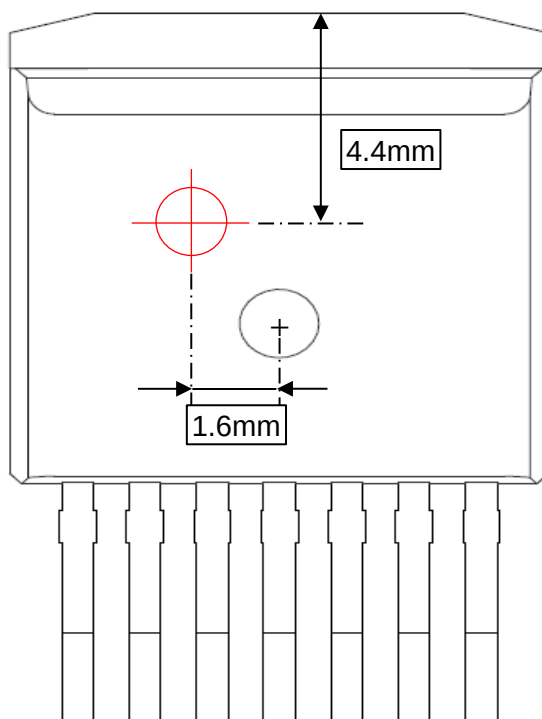
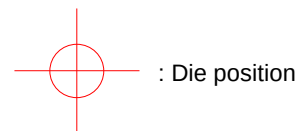


Reference Copper Plate Area Dimension



UNIT:mm

●Die Bonding Layout



- Front view of the packaging.
- Dimensions are design values.
- If the heat sink is to be installed, it should be in contact with the die bonding point.

Unit: mm

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