

Pb Free Plating Product

2SK3878



THINKISEMI 9A,900V N-CHANNEL PLANAR STRIPE POWER MOSFETS

<p>Features</p> <ul style="list-style-type: none"> ※ Low ON Resistance ※ Low Gate Charge ※ Peak Current vs Pulse Width Curve ※ ESD Capability Improved ※ 100% Avalanche Tested <p>Application</p> <ul style="list-style-type: none"> ※ Uninterruptible Power Supply(UPS) ※ LCD Panel Power ※ DC-AC Inverter, Amplifier and SMPS <p>Mechanical Data</p> <ul style="list-style-type: none"> ※ Case: TO-3P non-isolated package ※ Epoxy: UL 94V-0 rate flame retardant ※ Terminals: Solderable per MIL-STD-202 method 208 ※ Polarity: As per configuration ※ Mounting position: Any ※ Weight: 6.0 gram approximately 	<p>TO-3P pkg outline & internal configuration</p> <p>Schematic Diagram</p>
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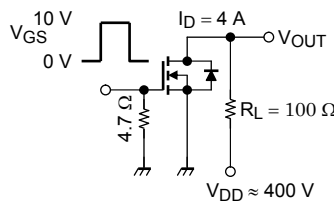
Absolute Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit
Drain-source voltage		V_{DSS}	900	V
Drain-gate voltage ($R_{GS} = 20\text{ k}\Omega$)		V_{DGR}	900	V
Gate-source voltage		V_{GSS}	± 30	V
Drain current	DC (Note 1)	I_D	9	A
	Pulse (Note 1)	I_{DP}	27	
Drain power dissipation ($T_c = 25^\circ\text{C}$)		P_D	150	W
Single pulse avalanche energy (Note 2)		E_{AS}	778	mJ
Avalanche current		I_{AR}	9	A
Repetitive avalanche energy (Note 3)		E_{AR}	15	mJ
Channel temperature		T_{ch}	150	$^\circ\text{C}$
Storage temperature range		T_{stg}	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Characteristic	Symbol	Max	Unit
Thermal resistance, channel to case	$R_{th(ch-c)}$	0.833	$^\circ\text{C/W}$
Thermal resistance, channel to ambient	$R_{th(ch-a)}$	50	$^\circ\text{C/W}$

Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit	
Gate leakage current	I_{GSS}	$V_{GS} = \pm 30\text{ V}, V_{DS} = 0\text{ V}$	—	—	± 10	μA	
Gate-source breakdown voltage	$V_{(BR)GSS}$	$I_G = \pm 10\ \mu\text{A}, V_{DS} = 0\text{ V}$	± 30	—	—	V	
Drain cutoff current	I_{DSS}	$V_{DS} = 720\text{ V}, V_{GS} = 0\text{ V}$	—	—	100	μA	
Drain-source breakdown voltage	$V_{(BR)DSS}$	$I_D = 10\text{ mA}, V_{GS} = 0\text{ V}$	900	—	—	V	
Gate threshold voltage	V_{th}	$V_{DS} = 10\text{ V}, I_D = 1\text{ mA}$	2.0	—	4.0	V	
Drain-source ON resistance	$R_{DS(ON)}$	$V_{GS} = 10\text{ V}, I_D = 4\text{ A}$	—	1.0	1.3	Ω	
Forward transfer admittance	$ Y_{fs} $	$V_{DS} = 15\text{ V}, I_D = 4\text{ A}$	3.5	7.0	—	S	
Input capacitance	C_{iss}	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$	—	2200	—	pF	
Reverse transfer capacitance	C_{rss}		—	45	—		
Output capacitance	C_{oss}		—	190	—		
Switching time	Rise time	t_r		—	25	—	ns
	Turn-on time	t_{on}		—	65	—	
	Fall time	t_f		—	20	—	
	Turn-off time	t_{off}		Duty $\leq 1\%$, $t_w = 10\ \mu\text{s}$	—	120	
Total gate charge (gate-source plus gate-drain)	Q_g	$V_{DD} \approx 400\text{ V}, V_{GS} = 10\text{ V}, I_D = 9\text{ A}$	—	60	—	nC	
Gate-source charge	Q_{gs}		—	34	—		
Gate-drain ("Miller") charge	Q_{gd}		—	26	—		

Source-Drain Ratings and Characteristics (Ta = 25°C)

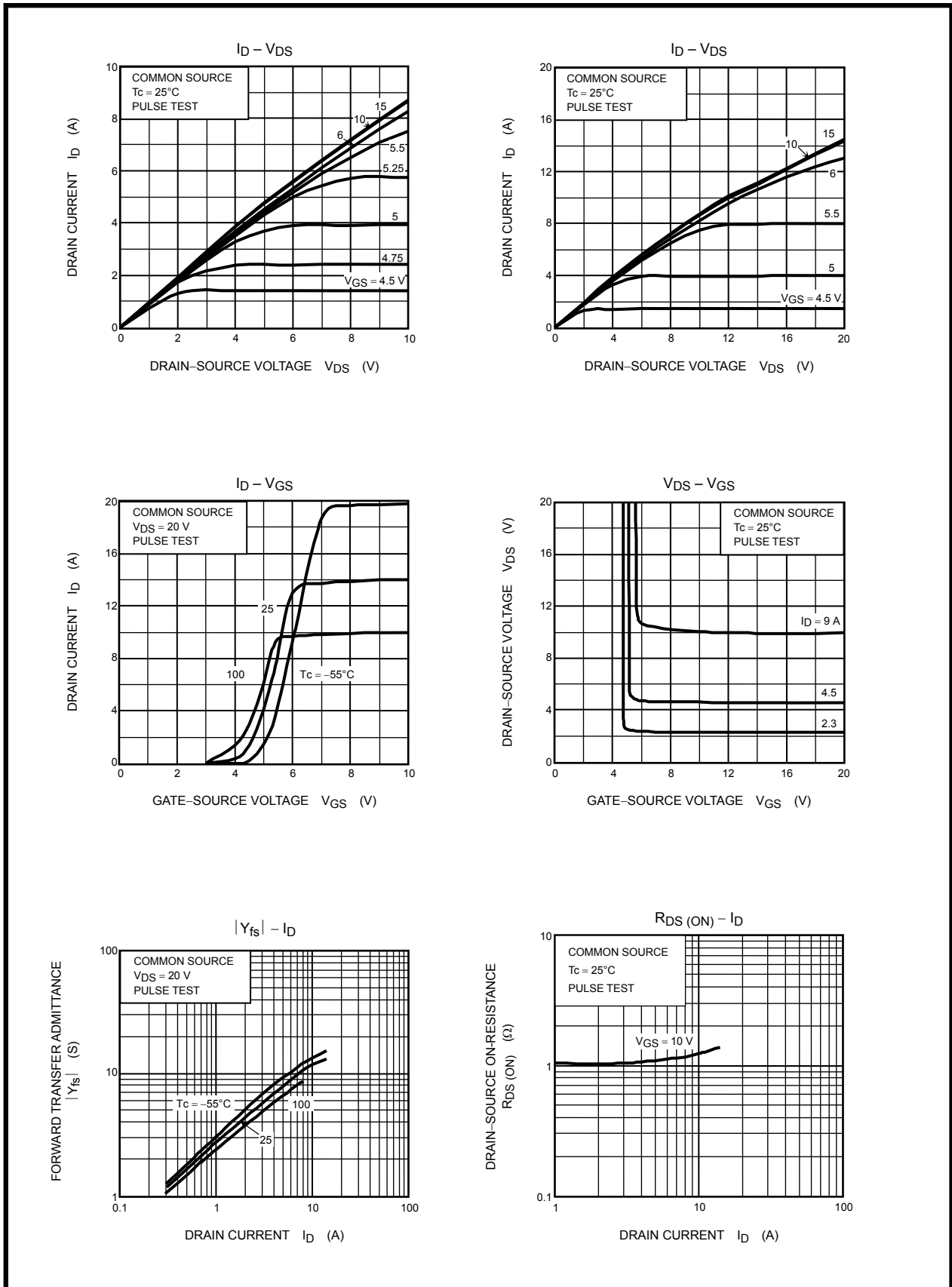
Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Continuous drain reverse current (Note 1)	I_{DR}	—	—	—	9	A
Pulse drain reverse current (Note 1)	I_{DRP}	—	—	—	27	A
Forward voltage (diode)	V_{DSF}	$I_{DR} = 9\text{ A}, V_{GS} = 0\text{ V}$	—	—	-1.7	V
Reverse recovery time	t_{rr}	$I_{DR} = 9\text{ A}, V_{GS} = 0\text{ V},$	—	1.4	—	μs
Reverse recovery charge	Q_{rr}	$dI_{DR}/dt = 100\text{ A}/\mu\text{s}$	—	16	—	μC

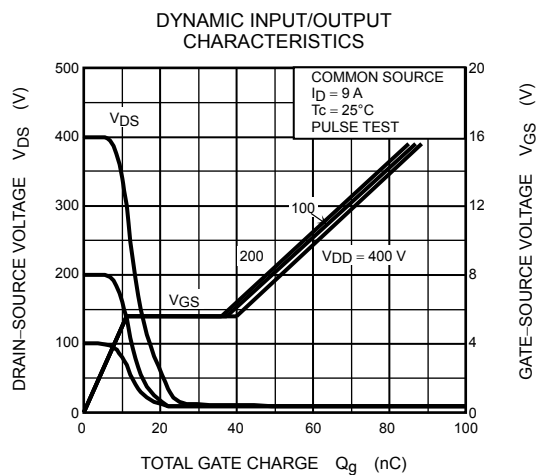
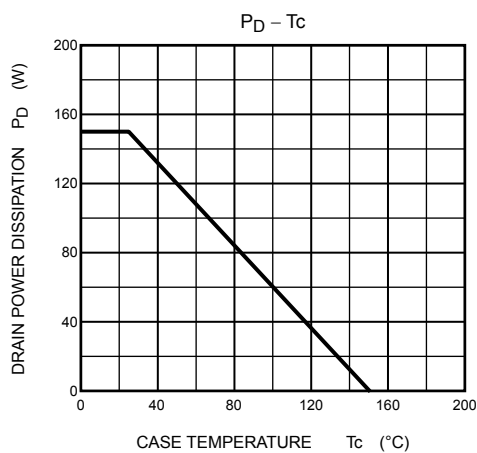
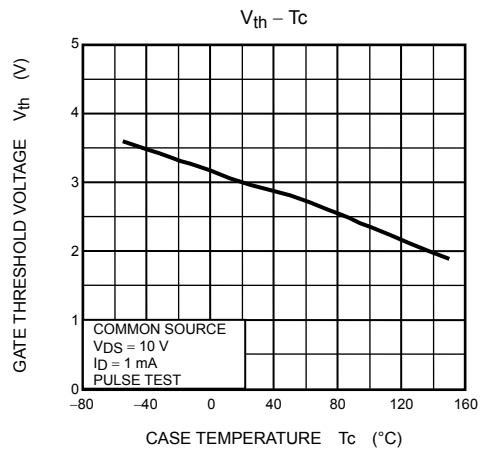
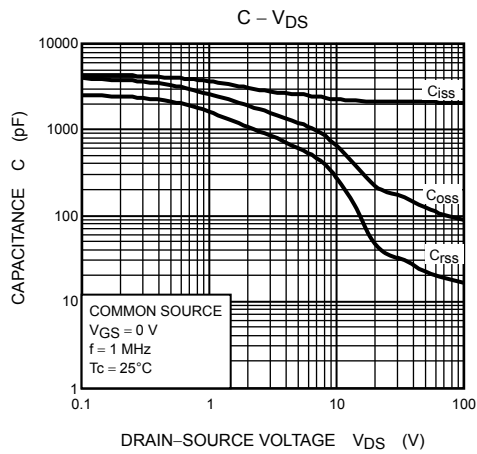
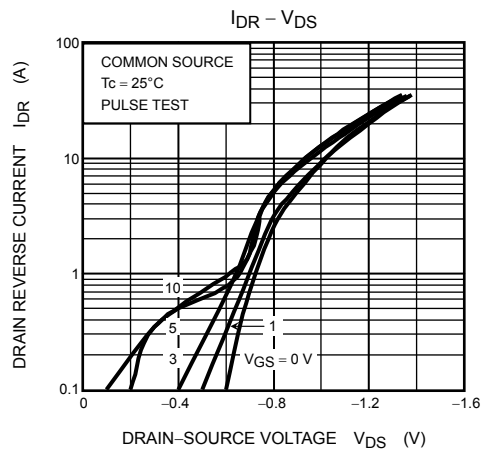
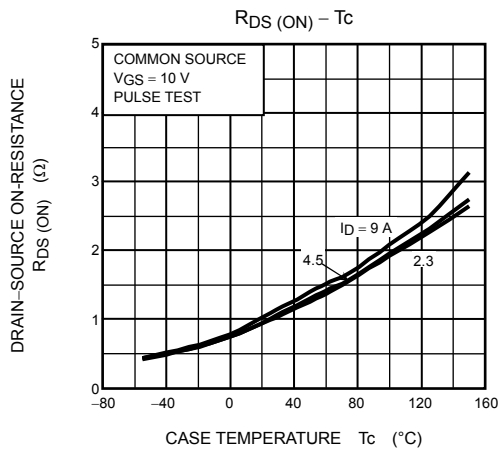
Note 1: Ensure that the channel temperature does not exceed 150°C during use of the device.

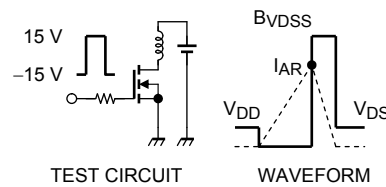
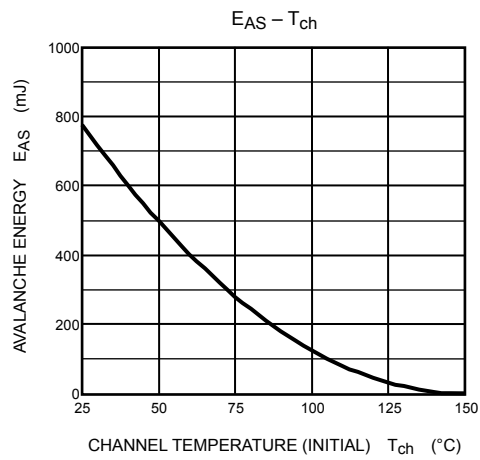
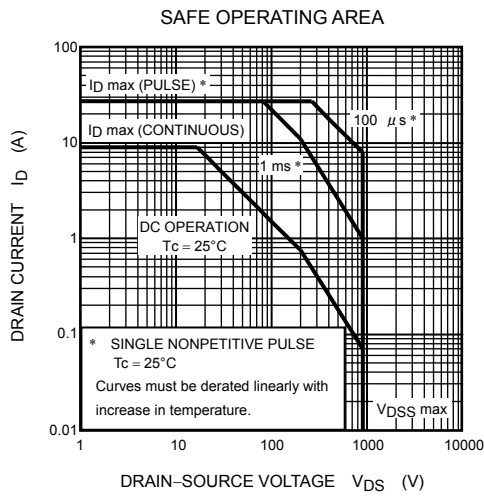
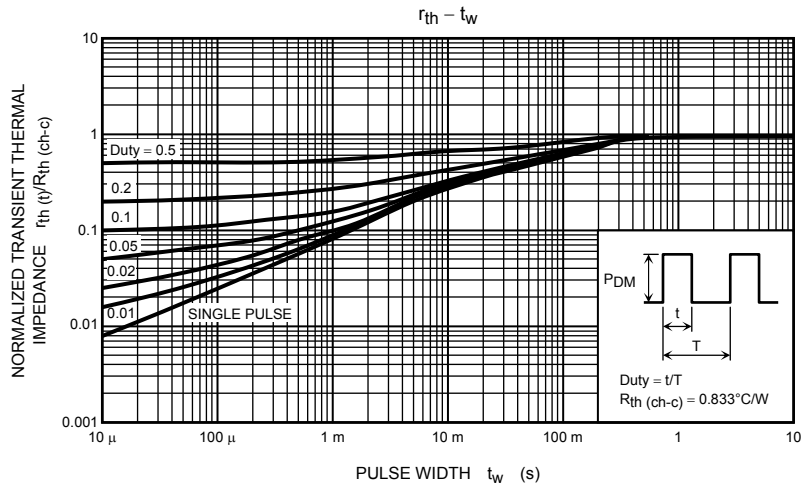
Note 2: $V_{DD} = 90\text{ V}, T_{ch} = 25^\circ\text{C}, L = 17.6\text{ mH}, R_G = 25\ \Omega, I_{AR} = 9\text{ A}$

Note 3: Repetitive rating: pulse width limited by max junction temperature

This transistor is an electrostatic-sensitive device. Handle with care.





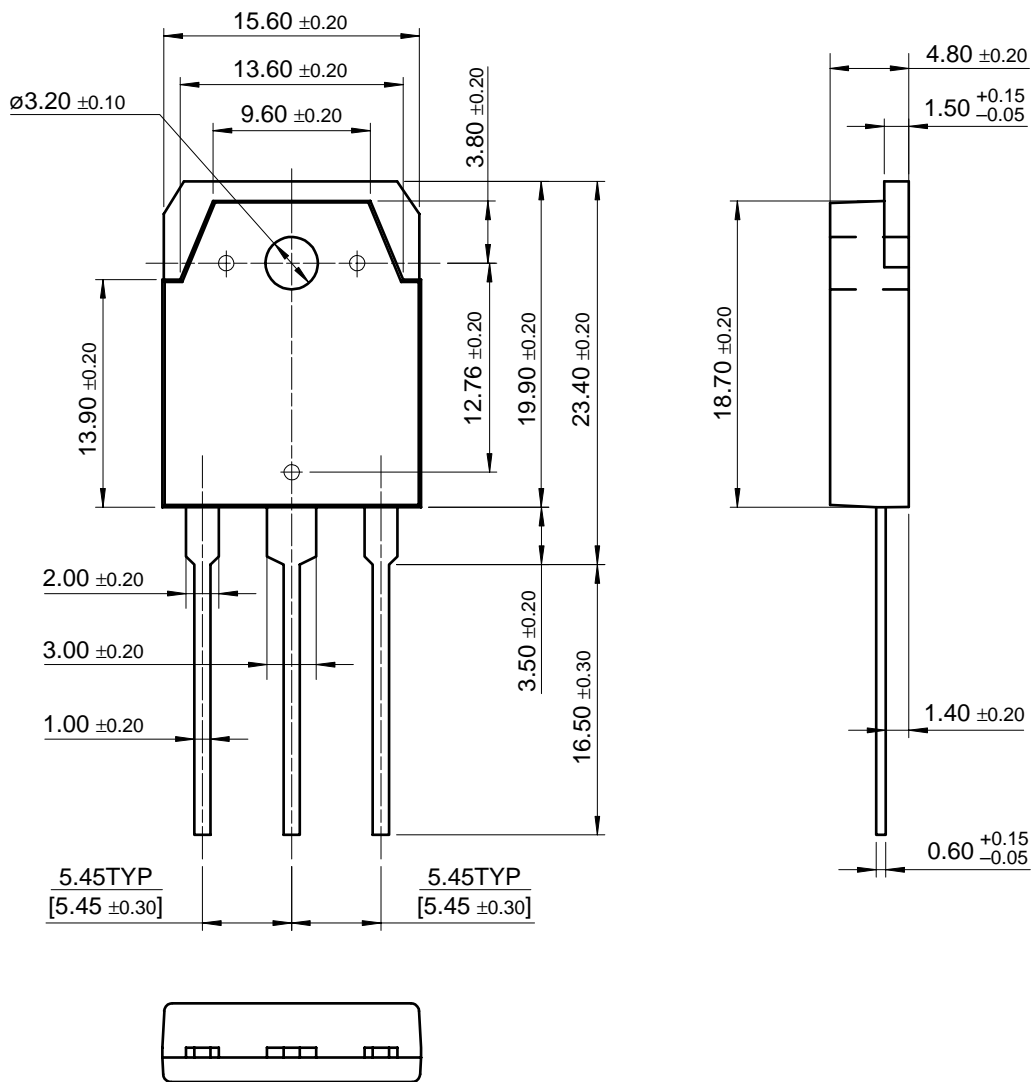


$R_G = 25 \Omega$
 $V_{DD} = 90 \text{ V}, L = 17.6 \text{ mH}$

$$E_{AS} = \frac{1}{2} \cdot L \cdot I_{AR}^2 \cdot \left(\frac{B_{VDSS}}{B_{VDSS} - V_{DD}} \right)$$

THINKI TO-3P Package Dimensions

TO-3PN-SQ/TO-3PB-SQ



Dimensions in Millimeters