Pb Free Plating Product

2SK3878

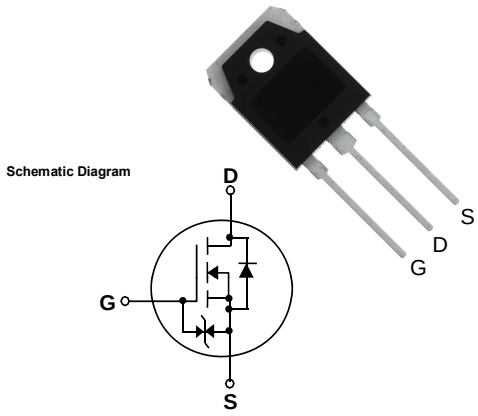
THINKISEMI 9A,900V N-CHANNEL PLANAR STRIPE POWER MOSFETs

Features
※ Low ON Resistance
※ Low Gate Charge
※ Peak Current vs Pulse Width Curve
※ ESD Capability Improved
※ 100% Avalanche Tested

Application
※ Uninterruptible Power Supply(UPS)
※ LCD Panel Power
※ DC-AC Inverter,Amplifier and SMPS

Mechanical Data
※ 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

TO-3P pkg outline & internal configuration



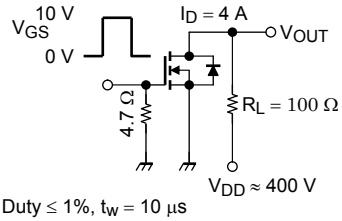
Absolute Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit
Drain-source voltage		V_{DSS}	900	V
Drain-gate voltage (R_{GS} = 20 kΩ)		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 (Tc = 25°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	°C
Storage temperature range		T_{stg}	−55 to 150	°C

Thermal Characteristics

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

Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GSS}	V_{GS} = ±30 V, V_{DS} = 0 V	—	—	±10	μA
Gate-source breakdown voltage		$V_{(BR)\ GSS}$	I_G = ±10 μA, V_{DS} = 0 V	±30	—	—	V
Drain cutoff current		I_{DSS}	V_{DS} = 720 V, V_{GS} = 0 V	—	—	100	μA
Drain-source breakdown voltage		$V_{(BR)\ DSS}$	I_D = 10 mA, V_{GS} = 0 V	900	—	—	V
Gate threshold voltage		V_{th}	V_{DS} = 10 V, I_D = 1 mA	2.0	—	4.0	V
Drain-source ON resistance		$R_{DS\ (ON)}$	V_{GS} = 10 V, I_D = 4 A	—	1.0	1.3	Ω
Forward transfer admittance		$\|Y_{fs}\|$	V_{DS} = 15 V, I_D = 4 A	3.5	7.0	—	S
Input capacitance		C_{iss}	V_{DS} = 25 V, V_{GS} = 0 V, f = 1 MHz	—	2200	—	pF
Reverse transfer capacitance		C_{rss}		—	45	—	
Output capacitance		C_{oss}		—	190	—	
Switching time	Rise time	t_r	 Duty ≤ 1%, t_w = 10 μs	—	25	—	ns
	Turn-on time	t_{on}		—	65	—	
	Fall time	t_f		—	20	—	
	Turn-off time	t_{off}		—	120	—	
Total gate charge (gate-source plus gate-drain)		Q_g	V_{DD} ≈ 400 V, V_{GS} = 10 V, I_D = 9 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 A, V_{GS} = 0 V	—	—	−1.7	V
Reverse recovery time	t_{rr}	I_{DR} = 9 A, V_{GS} = 0 V, dI_{DR}/dt = 100 A/μs	—	1.4	—	μs
Reverse recovery charge	Q_{rr}		—	16	—	μC

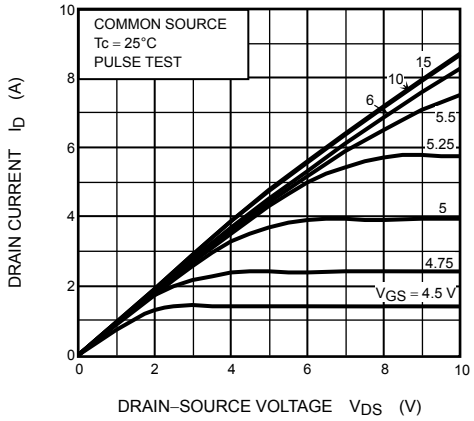
Note 1: Ensure that the channel temperature does not exceed 150°C during use of the device.

Note 2: V_{DD} = 90 V, T_{ch} = 25°C, L = 17.6 mH, R_G = 25 Ω, I_{AR} = 9 A

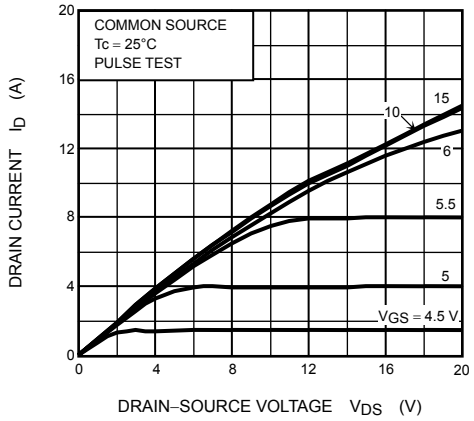
Note 3: Repetitive rating: pulse width limited by max junction temperature

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

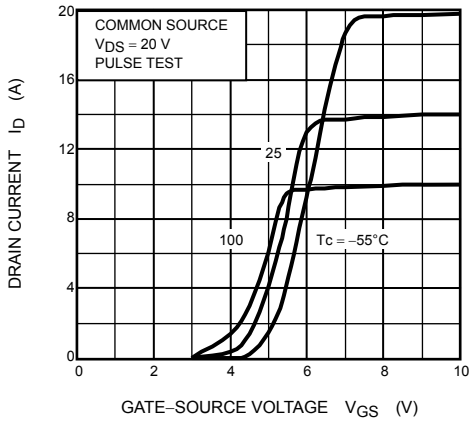
$I_D - V_{DS}$



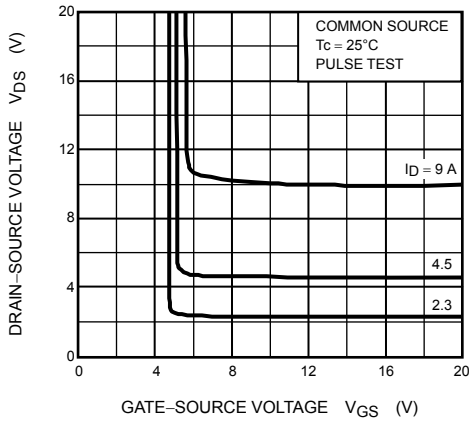
$I_D - V_{DS}$



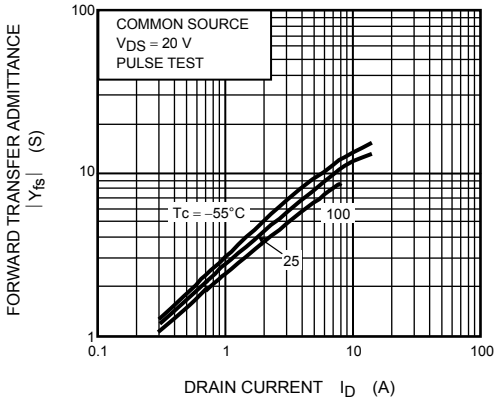
$I_D - V_{GS}$



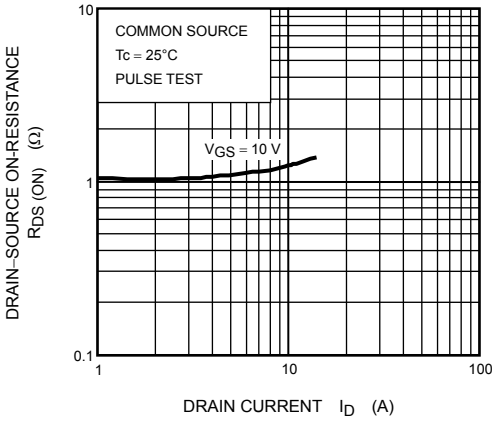
$V_{DS} - V_{GS}$



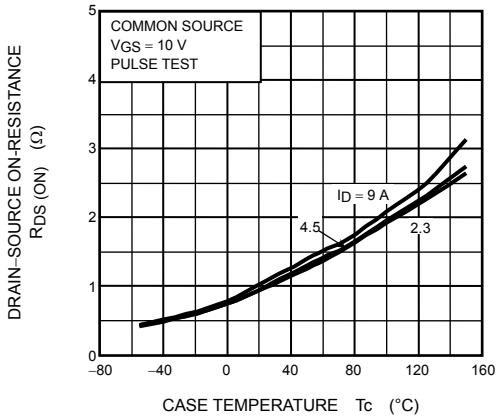
$|Y_{fs}| - I_D$



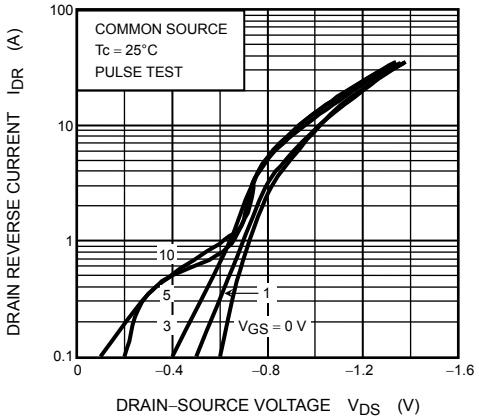
$R_{DS\ (ON)} - I_D$



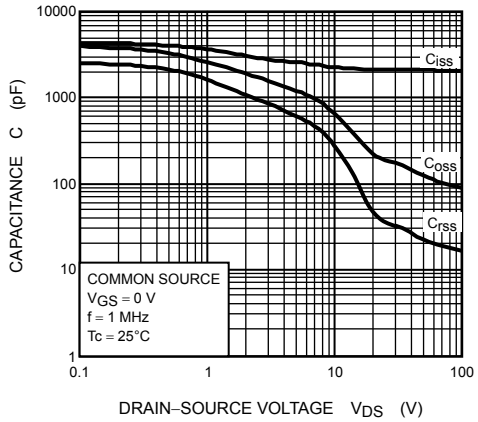
$R_{DS\ (ON)}$ – Tc



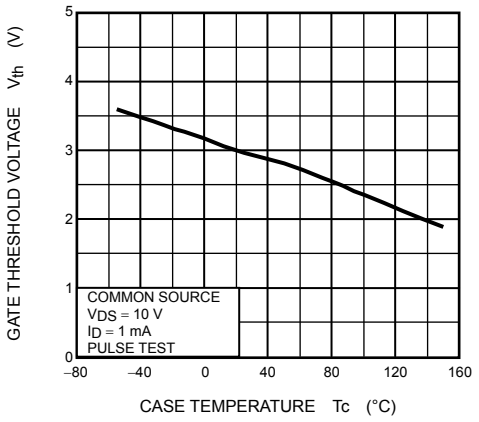
I_{DR} – V_{DS}



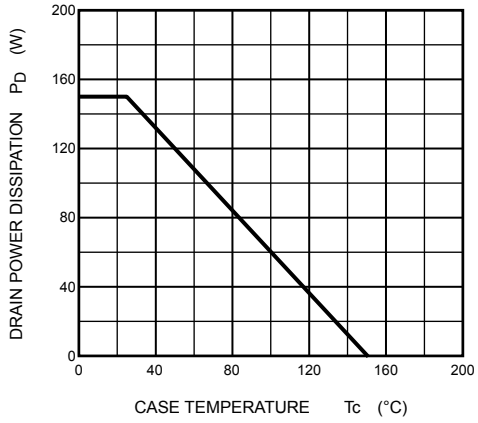
C – V_{DS}



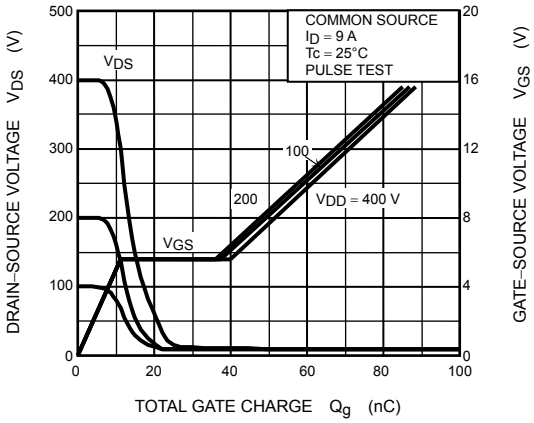
V_{th} – Tc



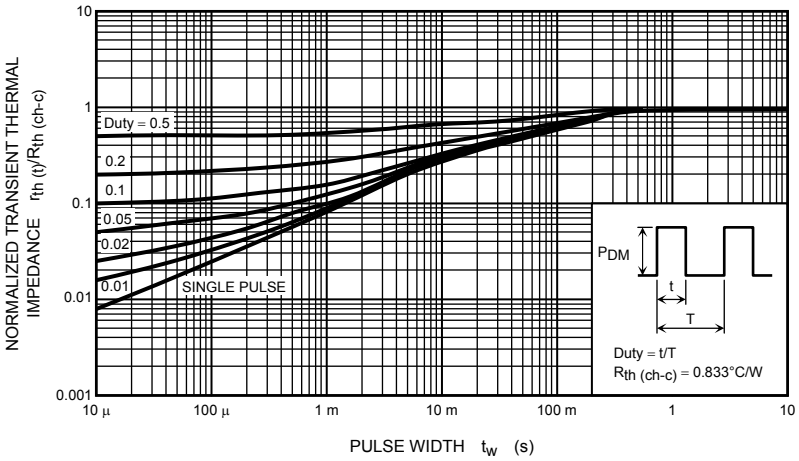
P_D – Tc



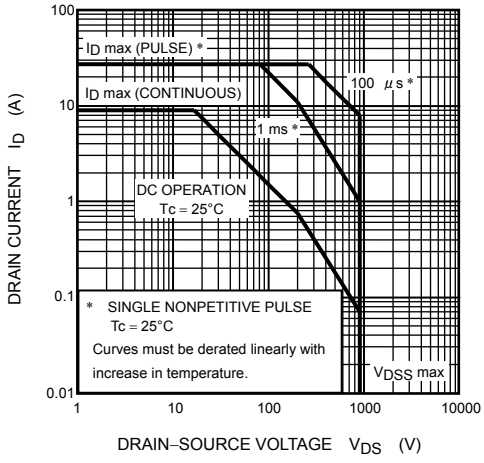
DYNAMIC INPUT/OUTPUT CHARACTERISTICS



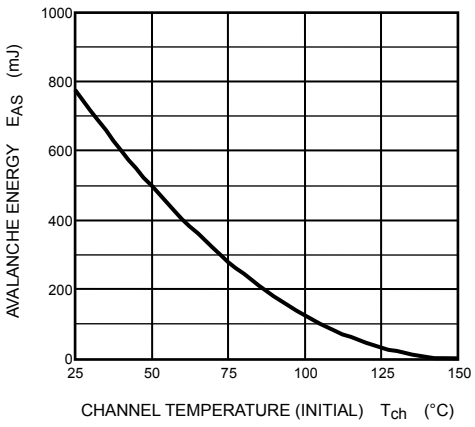
$r_{th} - t_w$

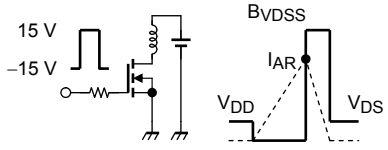


SAFE OPERATING AREA



$E_{AS} - T_{ch}$



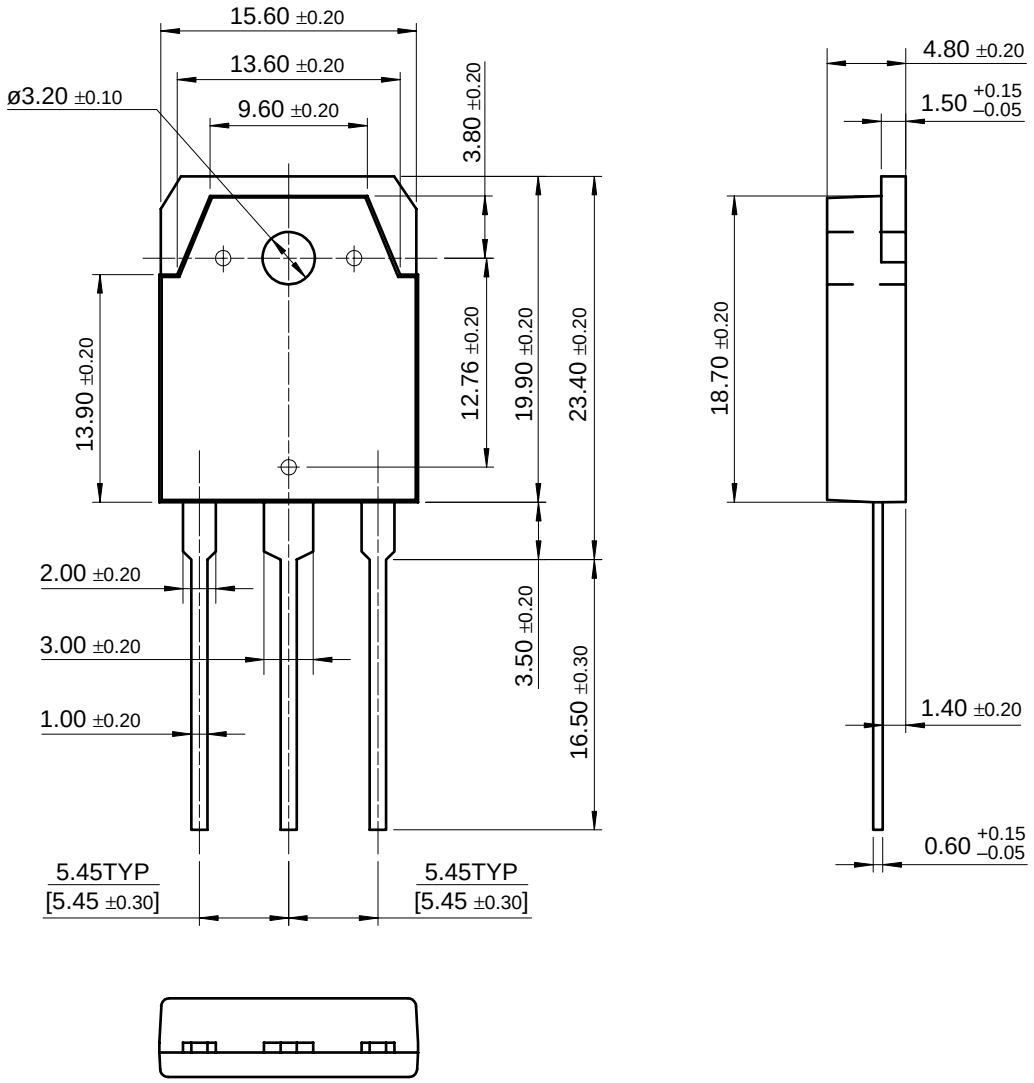


$R_G = 25\ \Omega$
$V_{DD} = 90$ V, L = 17.6 mH

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

THINKI TO-3P Package Dimensions

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



Dimensions in Millimeters