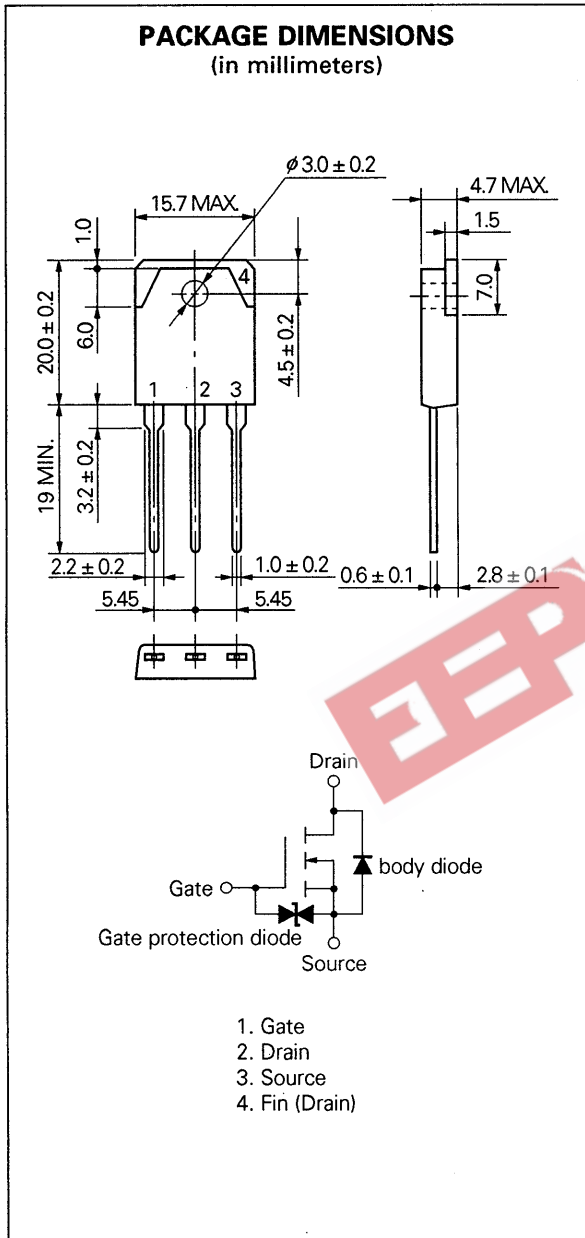


N-CHANNEL MOS FIELD EFFECT POWER TRANSISTOR
2SK1491

SWITCHING
N-CHANNEL POWER MOS FET
INDUSTRIAL USE



DESCRIPTION

The 2SK1491 is N-channel MOS Field Effect Transistor designed for high voltage switching applications

FEATURES

- Low On-state Resistance
 $R_{DS(on)} \leq 0.15 \Omega \text{ MAX. (} V_{GS} = 10 \text{ V, } I_D = 13 \text{ A)}$
- Low C_{iss} $C_{iss} = 1\,950 \text{ pF TYP.}$
- Built-in G-S Gate Protection Diodes
- High Avalanche Capability Ratings

QUALITY GRADE

Standard

Please refer to "Quality grade on NEC Semiconductor Devices" (Document number IEI-1209) published by NEC Corporation to know the specification of quality grade on the devices and its recommended applications.

ABSOLUTE MAXIMUM RATINGS

Maximum Temperatures

Storage Temperature	-55 to +150 °C
Channel Temperature	150 MAX. °C

Maximum Power Dissipation

Total Power Dissipation ($T_a = 25 \text{ °C}$)	120	W
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Maximum Voltages and Currents ($T_a = 25 \text{ °C}$)

V_{DSS}	Drain to Source Voltage	250	V
V_{GSS}	Gate to Source Voltage	±30	V
$I_{D(DC)}$	Drain Current (DC)	±25	A
$I_{D(pulse)}^*$	Drain Current (pulse)	±100	A

* $PW \leq 10 \mu s$, Duty Cycle $\leq 1 \%$

Maximum Avalanche Capability Ratings**

I_{AS}	Single Avalanche Current	37.5	A
E_{AS}	Single Avalanche Energy	1 250	mJ

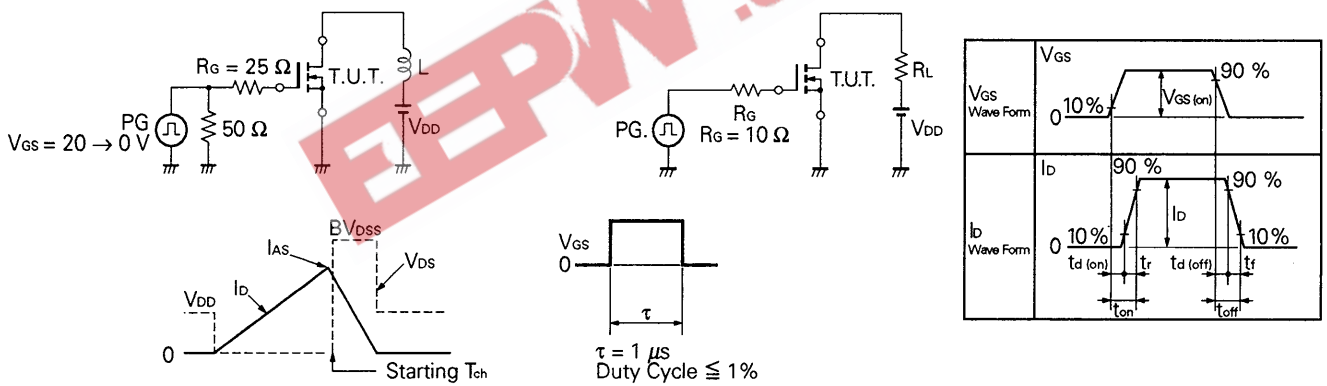
** Starting $T_{ch} = 25 \text{ °C}$, $R_G = 25 \Omega$, $V_{GS} = 20 \text{ V} \rightarrow 0$

ELECTRICAL CHARACTERISTICS (T_a = 25 °C)

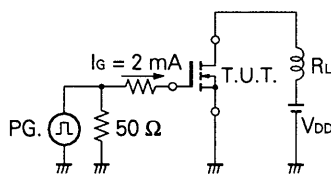
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Drain to Source On-state Resistance	R _{DS(on)}		0.12	0.15	Ω	V _{GS} = 10 V, I _D = 13 A
Gate to Source Cutoff Voltage	V _{GS(off)}	2.5		3.5	V	V _{DS} = 10 V, I _D = 1 mA
Forward Transfer Admittance	y _{fs}	7.0			S	V _{DS} = 10 V, I _D = 13 A
Drain Leakage Current	I _{DSS}			100	μA	V _{DS} = 250 V, V _{GS} = 0
Gate to Source Leakage Current	I _{GSS}			±10	μA	V _{GS} = ±30 V, V _{DS} = 0
Input Capacitance	C _{iss}		1 950		pF	V _{DS} = 10 V
Output Capacitance	C _{oss}		980		pF	V _{GS} = 0
Reverse Transfer Capacitance	C _{rss}		410		pF	f = 1 MHz
Turn-On Delay Time	t _{d(on)}		35		ns	V _{GS} = 10 V V _{DD} = 150 V I _D = 13 A, R _G = 10 Ω R _L = 11.5 Ω
Rise Time	t _r		110		ns	
Turn-Off Delay Time	t _{d(off)}		110		ns	
Fall Time	t _f		50		ns	
Total Gate Charge	Q _G		55		nC	V _{GS} = 10 V I _D = 25 A V _{DD} = 200 V
Gate to Source Charge	Q _{GS}		12		nC	
Gate to Drain Charge	Q _{GD}		32		nC	
Diode Forward Voltage	V _{F(S-D)}		1.0		V	I _F = 25 A, V _{GS} = 0
Reverse Recovery Time	t _{rr}		340		ns	I _F = 25 A, V _{GS} = 0 di/dt = 50 A/μs
Reverse Recovery Charge	Q _{rr}		2.3		μC	

Test Circuit 1: Avalanche Capability

Test Circuit 2: Switching Time

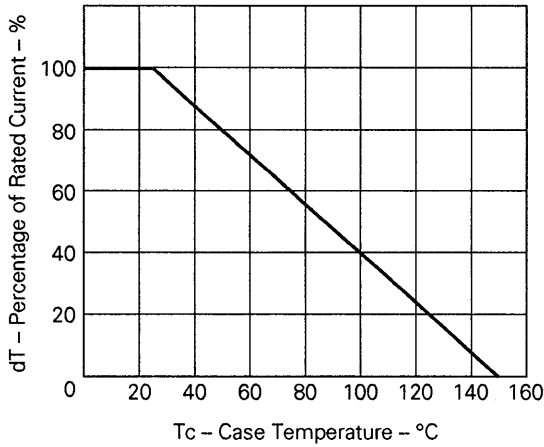


Test Circuit 3: Gate Charge

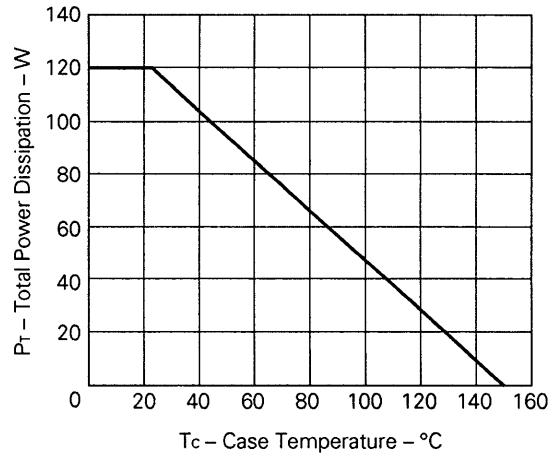


TYPICAL CHARACTERISTICS (T_a = 25 °C)

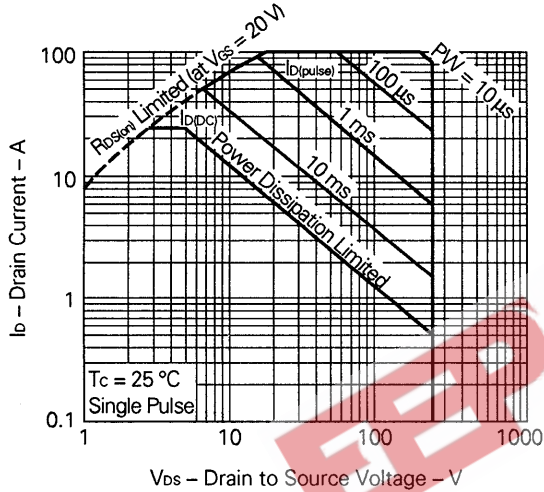
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



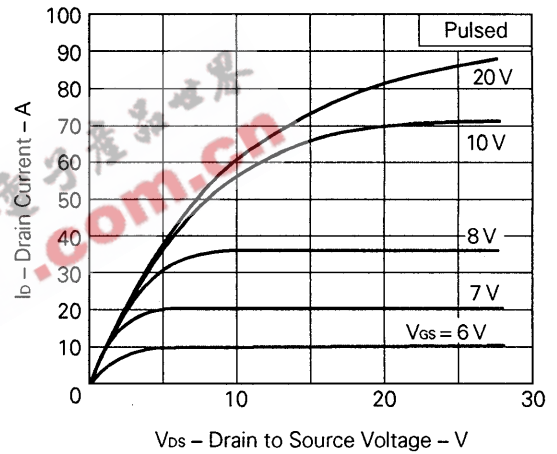
TOTAL POWER DISSIPATION vs. CASE TEMPERATURE



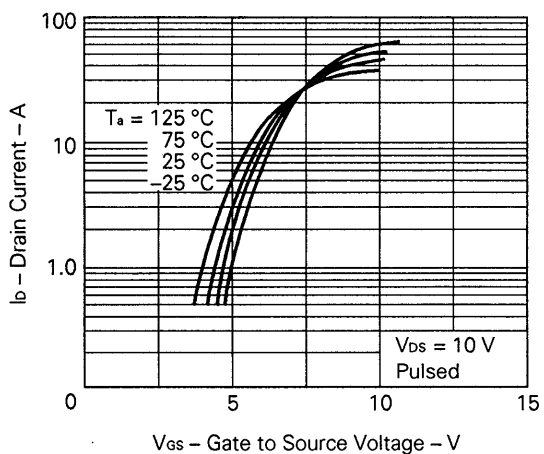
FORWARD BIAS SAFE OPERATING AREA

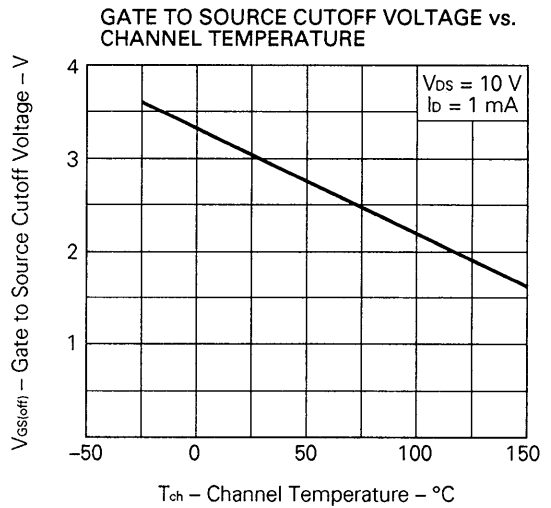
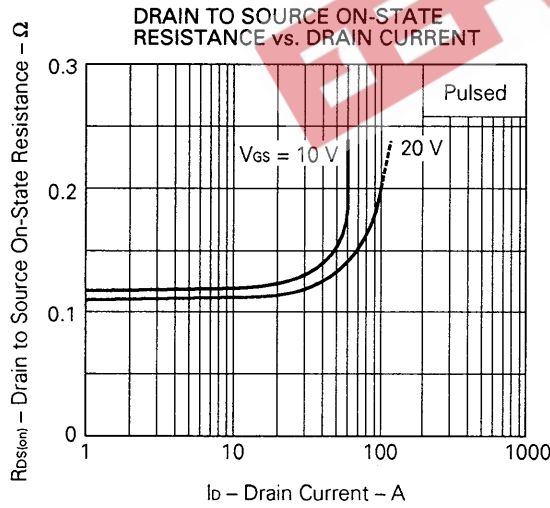
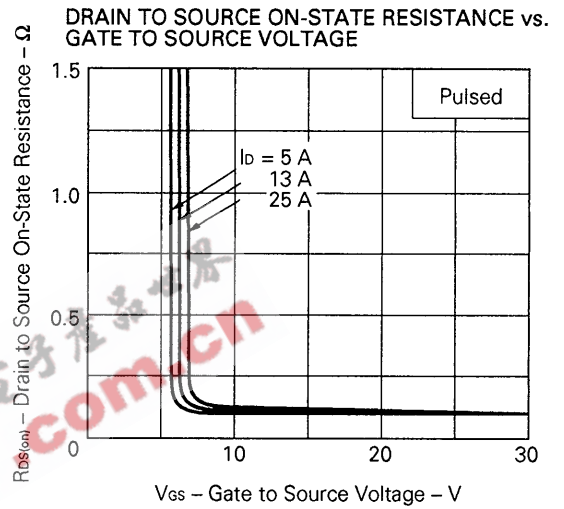
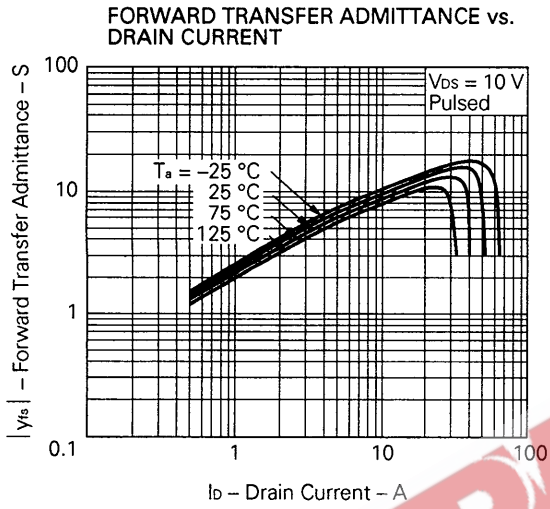
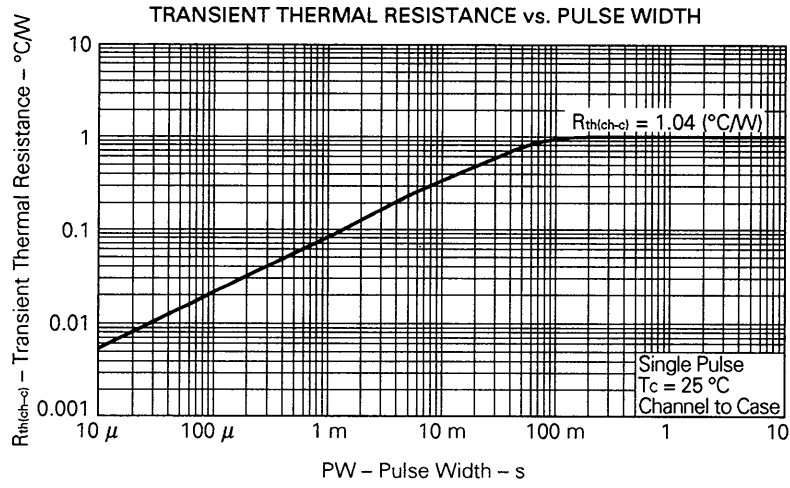


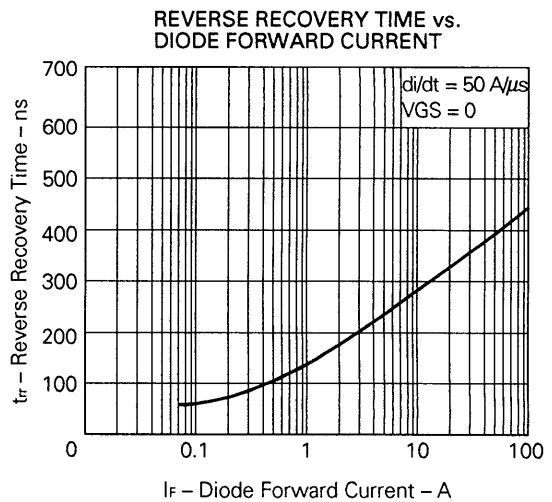
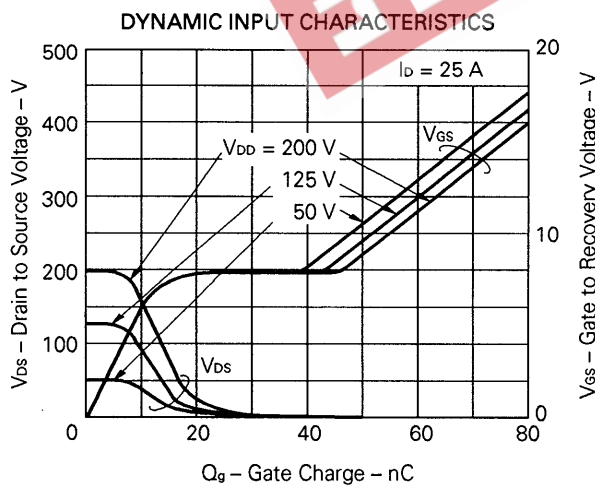
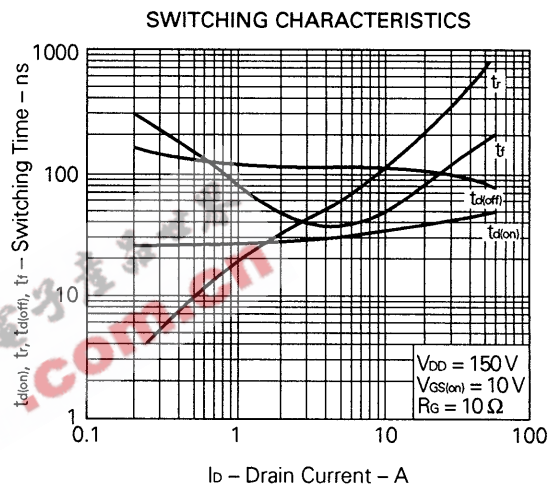
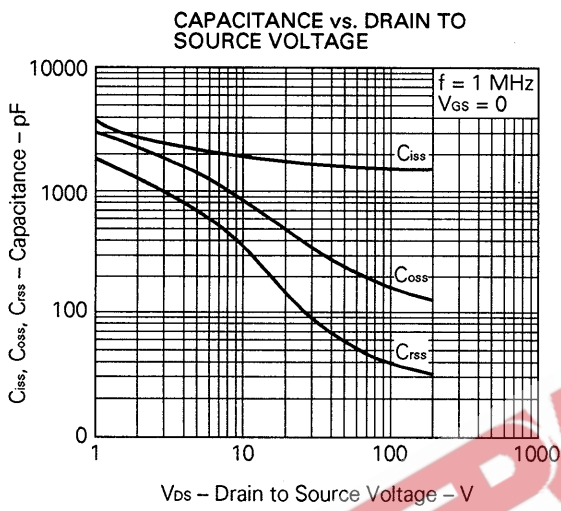
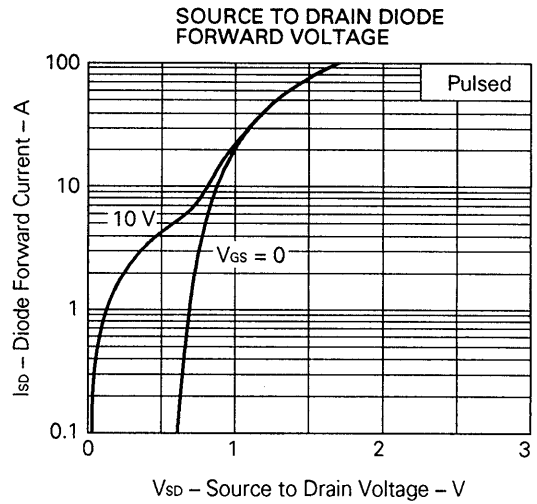
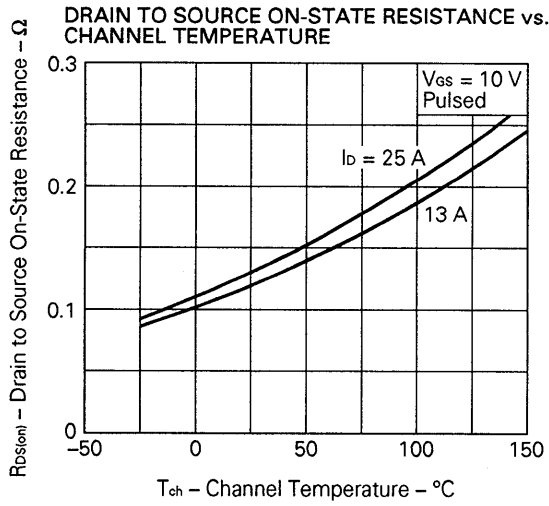
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE

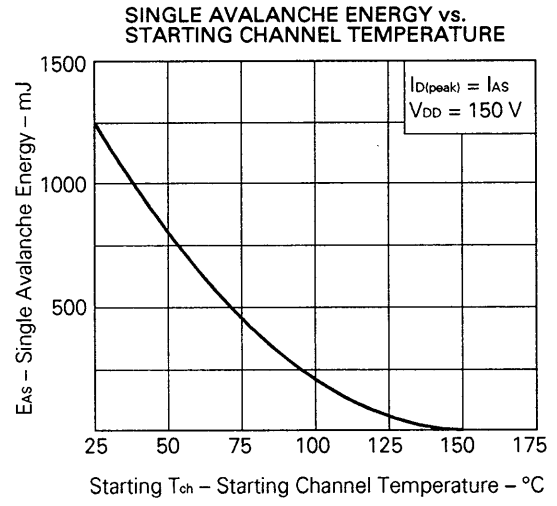
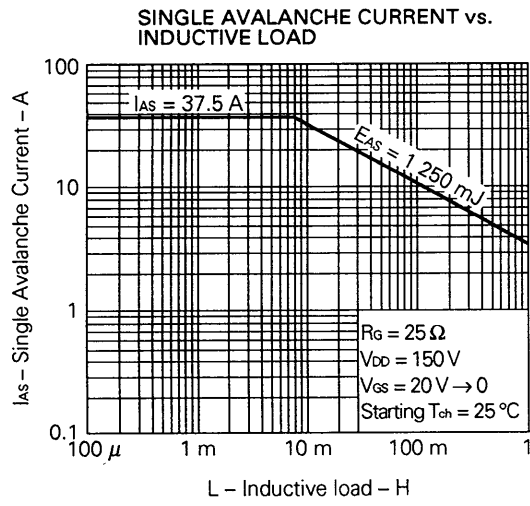


TRANSFER CHARACTERISTICS









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Reference

Application note name	No.
Safe operating area of Power MOS FET.	TEA-1034
Application circuit using Power MOS FET.	TEA-1035
Quality control of NEC semiconductors devices.	TEI-1202
Quality control guide of semiconductors devices.	MEI-1202
Assembly manual of semiconductors devices.	IEI-1207

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