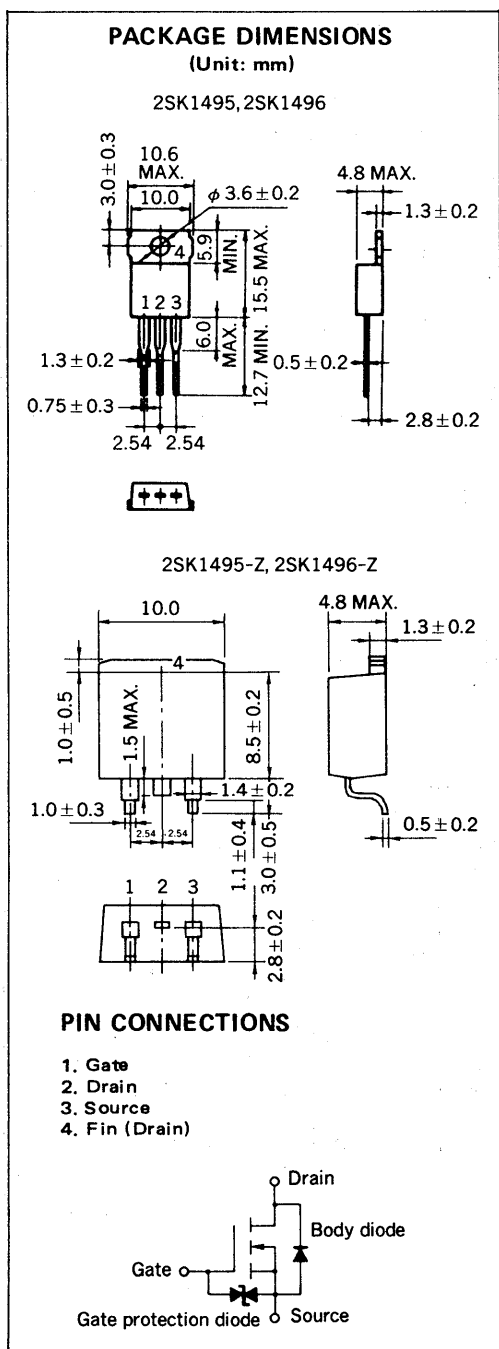


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P1 98.2

# N-CHANNEL MOS FIELD EFFECT POWER TRANSISTORS 2SK1495, 2SK1495-Z/2SK1496, 2SK1496-Z

## SWITCHING N-CHANNEL POWER MOS FET INDUSTRIAL USE



**DESCRIPTION**

The 2SK1495/2SK1496 is N-channel MOS Field Effect Transistor designed for high voltage switching applications.

**FEATURES**

- Low On-state Resistance  
 $R_{DS(on)} = 0.9 \Omega \text{ MAX.}/1.0 \Omega \text{ MAX.}$  ( $V_{GS} = 10 \text{ V}, I_D = 4 \text{ A}$ )
- Low  $C_{iss}$   $C_{iss} = 1060 \text{ pF TYP.}$
- Built-in G-S Gate Protection Diodes
- High Avalanche Capability Ratings

**ABSOLUTE MAXIMUM RATINGS**

Maximum Temperatures

Storage Temperature	$T_{stg}$	-55 to +150	°C
Channel Temperature	$T_{ch}$	150	°C MAX.

Maximum Power Dissipation

Total Power Dissipation ( $T_A = 25 \text{ °C}$ )	$P_T$	70	W
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Maximum Voltages and Currents ( $T_A = 25 \text{ °C}$ )

Drain to Source Voltage	$V_{DSS}$	450/500	V
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(2SK1495/2SK1496)

Gate to Source Voltage	$V_{GSS}$	±30	V
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Drain Current (DC)	$I_{D(DC)}$	±7	A
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Drain Current (pulse)	$I_{D(pulse)}^*$	±28	A
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\*  $PW \leq 10 \mu s$ , Duty Cycle  $\leq 1 \%$

Maximum Avalanche Capability Ratings\*\*

Single Avalanche Current	$I_{AS}$	10.5	A
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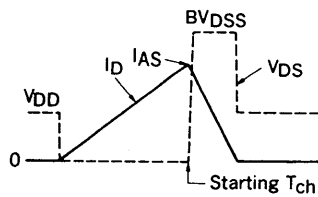
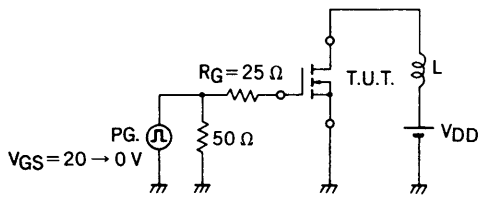
Single Avalanche Energy	$E_{AS}$	206	mJ
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\*\* Starting  $T_{ch} = 25 \text{ °C}$ ,  $R_G = 25 \Omega$ ,  $V_{GS} = 20 \text{ V} \rightarrow 0$

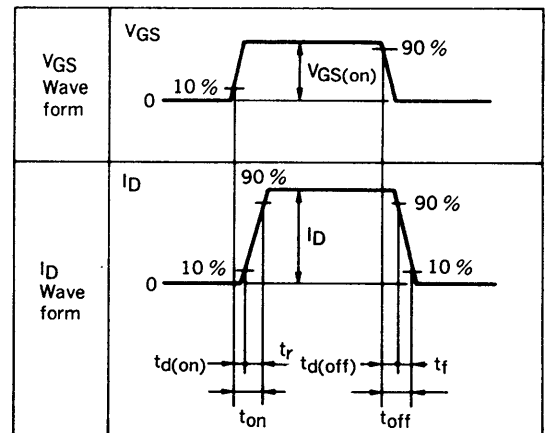
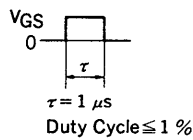
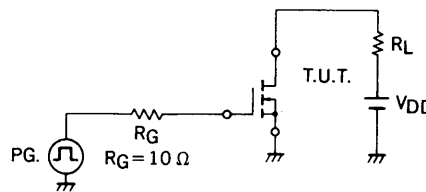
ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Drain to Source On-state Resistance (2SK1493/2SK1494)	R <sub>DS(on)</sub>		0.7/0.8	0.9/1.0	Ω	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 4 A
Gate to Source Cutoff Voltage	V <sub>GS(off)</sub>	2.5		3.5	V	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 1 mA
Forward Transfer Admittance	y <sub>fs</sub>	3.0			S	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 4 A
Drain Leakage Current	I <sub>DSS</sub>			100	μA	V <sub>DS</sub> = 450V/500V, V <sub>GS</sub> = 0
Gate to Source Leakage Current	I <sub>GSS</sub>			±10	μA	V <sub>GS</sub> = ±30 V, V <sub>DS</sub> = 0
Input Capacitance	C <sub>iss</sub>		1 060		pF	V <sub>DS</sub> = 10 V
Output Capacitance	C <sub>oss</sub>		340		pF	V <sub>GS</sub> = 0
Reverse Transfer Capacitance	C <sub>rss</sub>		150		pF	f = 1 MHz
Turn-On Delay Time	t <sub>d(on)</sub>		20		ns	V <sub>GS</sub> = 10 V
Rise Time	t <sub>r</sub>		30		ns	V <sub>DD</sub> = 150 V
Turn-Off Delay Time	t <sub>d(off)</sub>		70		ns	I <sub>D</sub> = 4 A, R <sub>G</sub> = 10 Ω
Fall Time	t <sub>f</sub>		20		ns	R <sub>L</sub> = 37.5 Ω
Total Gate Charge	Q <sub>G</sub>		36		nC	V <sub>GS</sub> = 10 V
Gate to Source Charge	Q <sub>GS</sub>		7		nC	I <sub>D</sub> = 7 A
Gate to Drain Charge	Q <sub>GD</sub>		21		nC	V <sub>DD</sub> = 400 V
Diode Forward Voltage	V <sub>F(S-D)</sub>		1.0		V	I <sub>F</sub> = 7 A, V <sub>GS</sub> = 0
Reverse Recovery Time	t <sub>rr</sub>		420		ns	I <sub>F</sub> = 7 A
Reverse Recovery Charge	Q <sub>rr</sub>		2.1		μC	di/dt = 50 A/μs

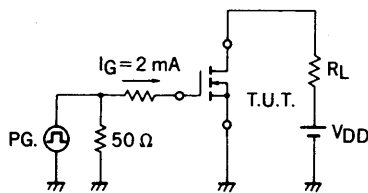
Test Circuit 1: Avalanche Capability



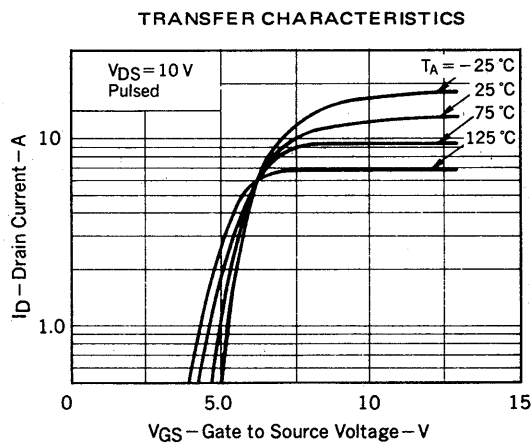
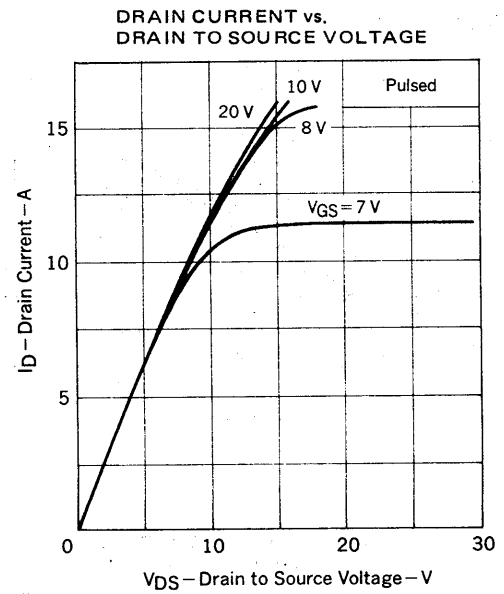
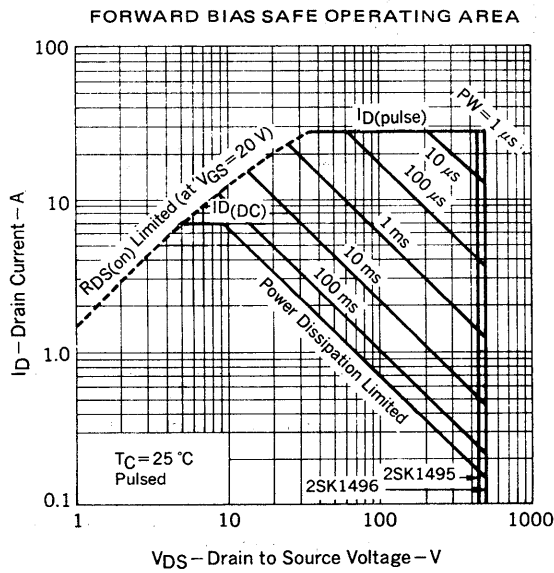
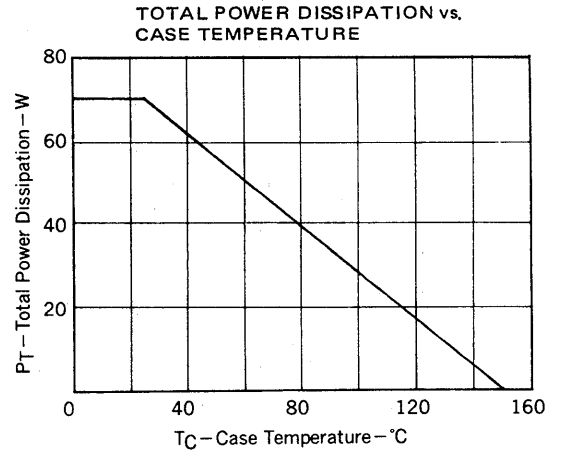
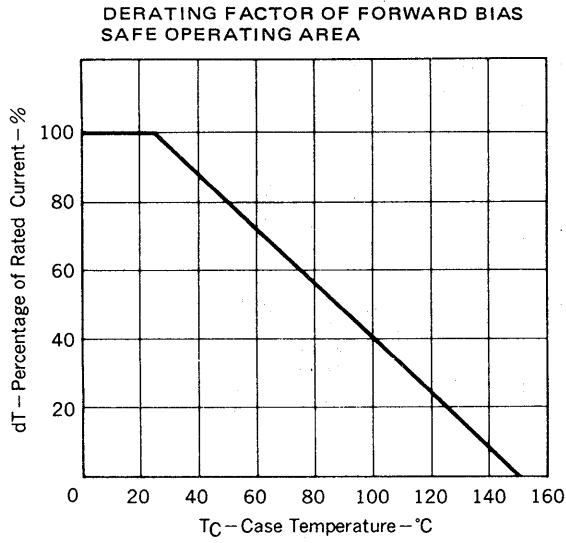
Test Circuit 2: Switching Time



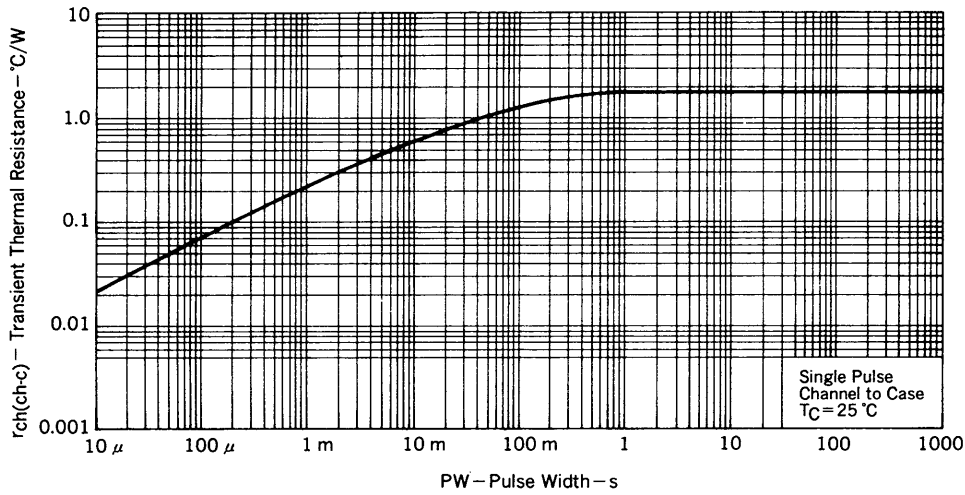
Test Circuit 3: Gate Charge



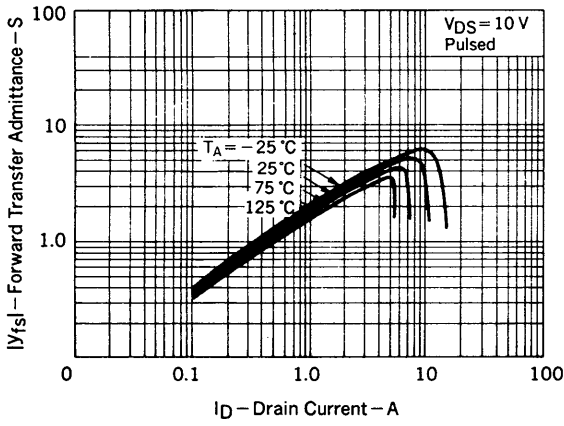
TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C)



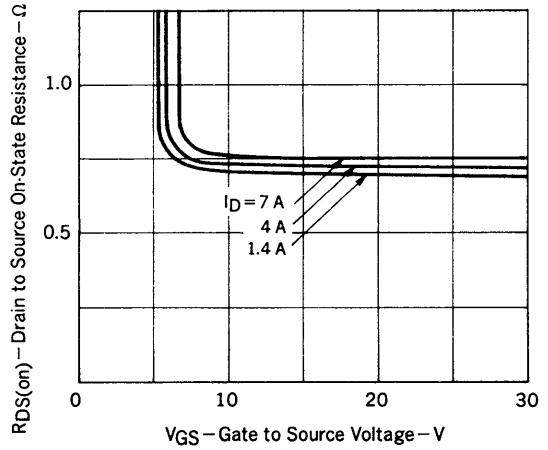
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



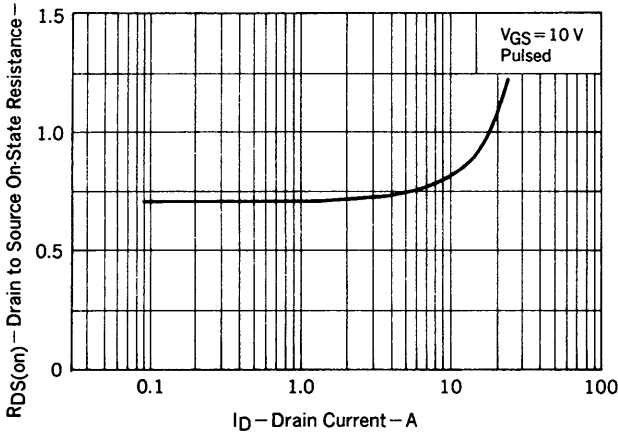
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



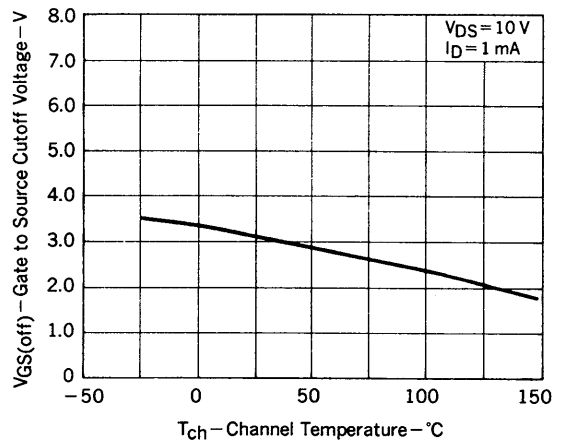
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



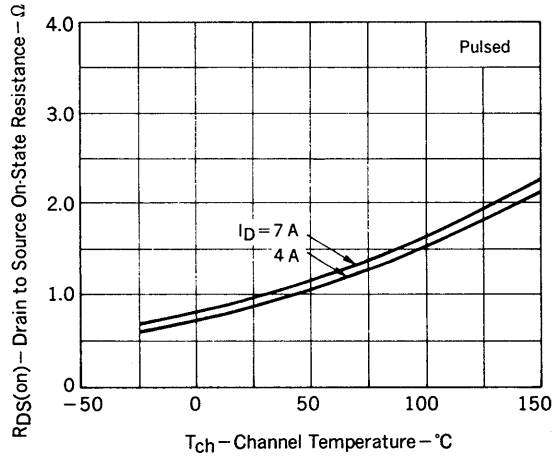
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



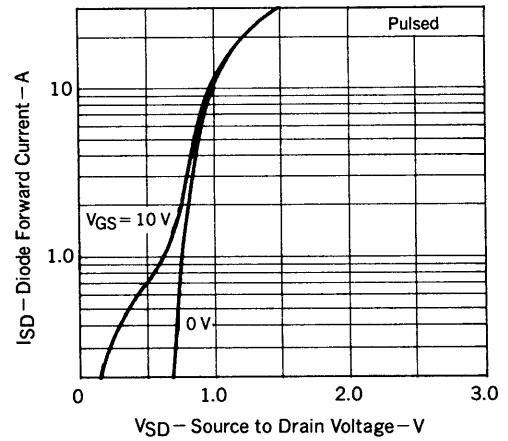
GATE TO SOURCE CUTOFF VOLTAGE vs. CHANNEL TEMPERATURE



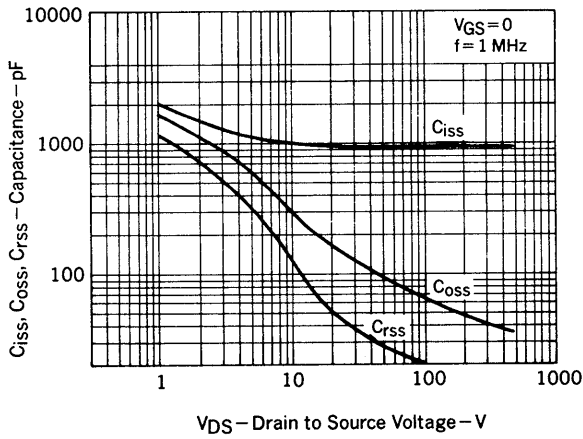
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



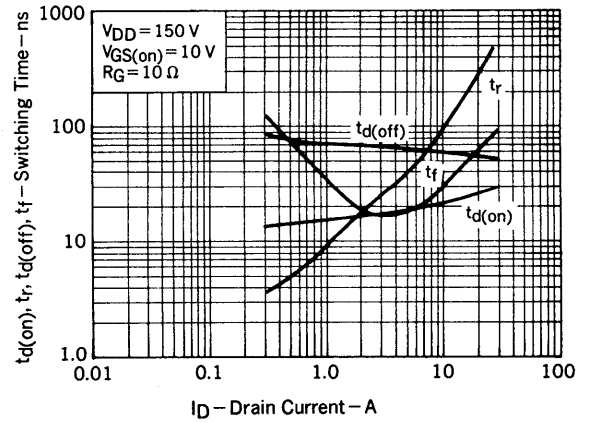
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



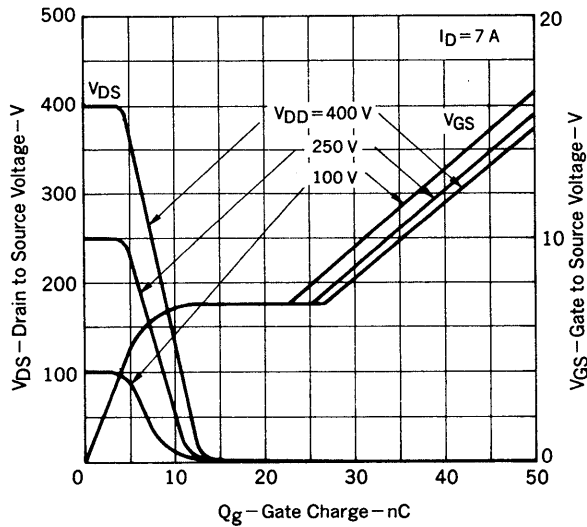
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



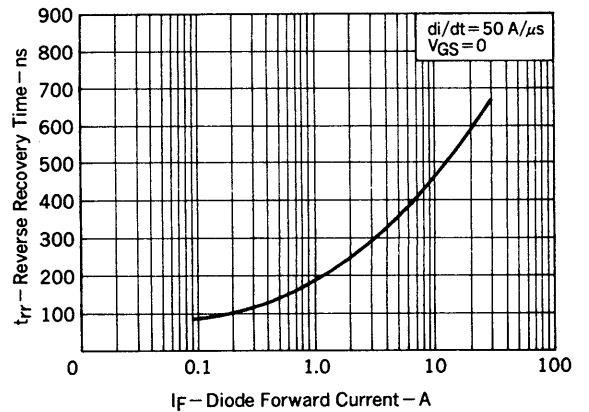
SWITCHING CHARACTERISTICS



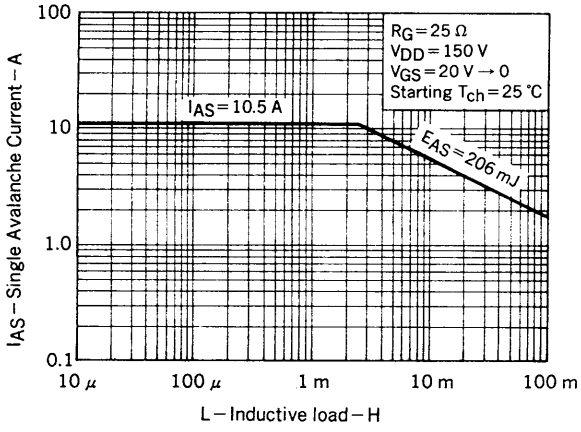
DYNAMIC INPUT CHARACTERISTICS



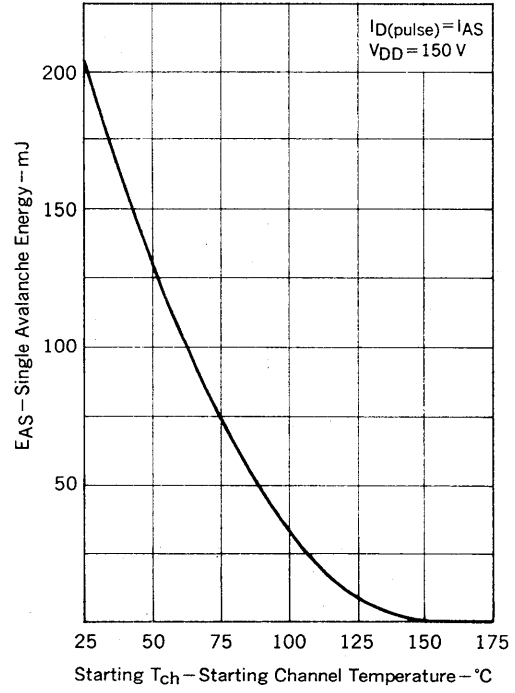
REVERSE RECOVERY TIME vs. DIODE FORWARD CURRENT



SINGLE AVALANCHE CURRENT vs. INDUCTIVE LOAD



SINGLE AVALANCHE ENERGY vs. STARTING CHANNEL TEMPERATURE



**REFERENCE**

Application note name	No.
Safe operating area of Power MOS FET.	TEA-1037
Application circuit using Power MOS FET.	TEA-1035
Guide to quality assurance for semiconductor device.	MEI-1202
Power MOS FET features and application switching power supply	TEA-1034



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