

MOS FIELD EFFECT POWER TRANSISTOR
2SJ303

SWITCHING
P-CHANNEL POWER MOS FET
INDUSTRIAL USE

DESCRIPTION

The 2SJ303 is P-channel MOS Field Effect Transistor designed for solenoid, motor and lamp driver.

FEATURES

- Low On-state Resistance.
 $R_{DS(on)} \leq 0.1 \Omega$ ($V_{GS} = -10 V, I_D = -7 A$)
 $R_{DS(on)} \leq 0.24 \Omega$ ($V_{GS} = -4 V, I_D = -6 A$)
- Low C_{iss} $C_{iss} = 1200 pF$ TYP.
- Built-in G-S Gate Protection Diode
- Isolated TO-220 Package

QUALITY GRADE

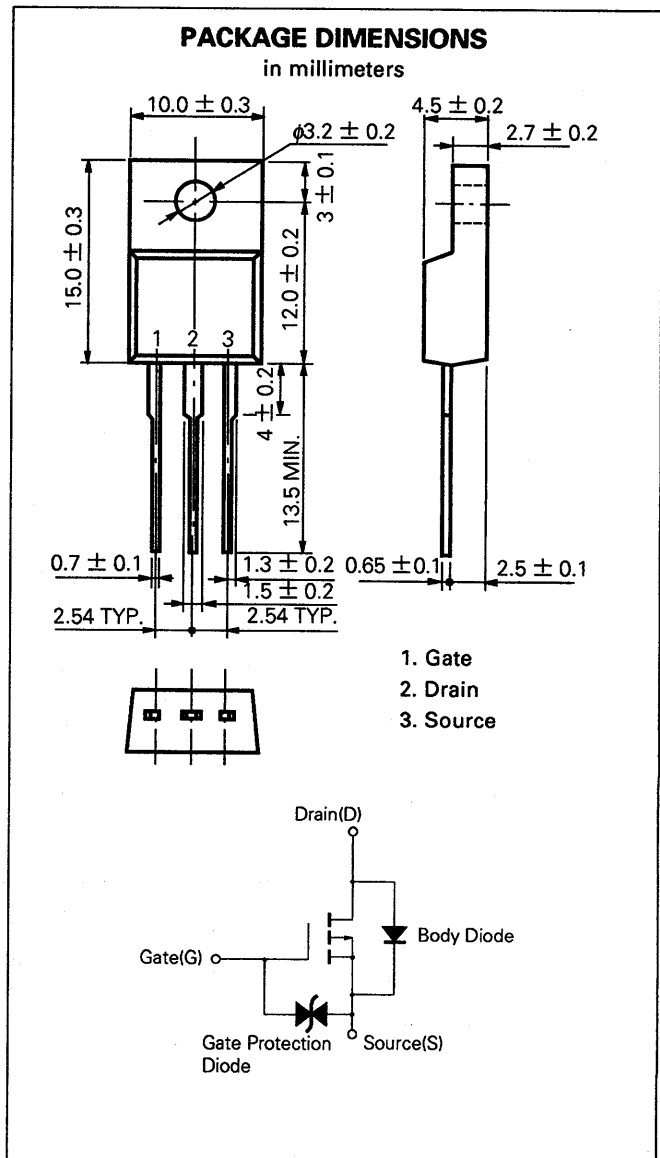
Standard

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 ($T_a = 25^\circ C$)

Drain to Source Voltage	V_{DSS}	-60	V
Gate to Source Voltage	V_{GSS}	-20, +10	V
Drain Current (DC)	$I_{D(DC)}$	∓ 14	A
Drain Current (pulse)	$I_{D(pulse)^*}$	∓ 56	A
Total Power Dissipation ($T_c = 25^\circ C$)	P_{T1}	35	W
Total Power Dissipation ($T_a = 25^\circ C$)	P_{T2}	2.0	W
Channel Temperature	T_{ch}	150	$^\circ C$
Storage Temperature	T_{stg}	-55 to +150	$^\circ C$

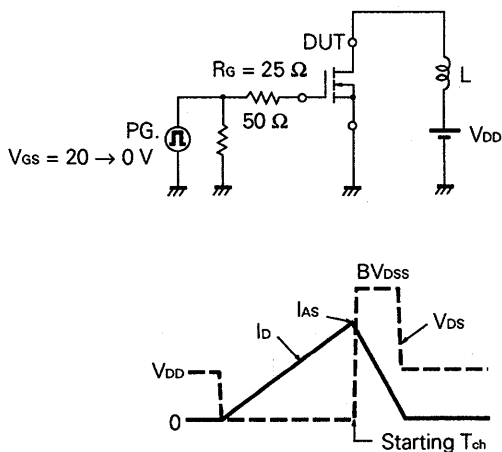
* $PW \leq 10 \mu s$, Duty Cycle $\leq 1\%$



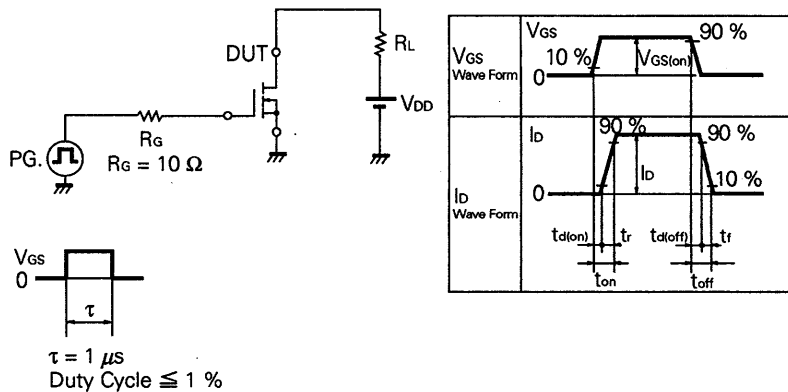
ELECTRICAL CHARACTERISTICS (T_a = 25 °C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Drain to Source On-state Resistance	R _{DS(on)}		75	100	mΩ	V _{GS} = -10 V, I _D = -7 A
Drain to Source On-state Resistance	R _{DS(on)}		130	240	mΩ	V _{GS} = -4.0 V, I _D = -6 A
Gate to Source Cutoff Voltage	V _{GS(off)}	-1.0		-2.0	V	V _{DS} = -10 V, I _D = -1 mA
Forward Transfer Admittance	Y _{fs1}	5.0			S	V _{DS} = -10 V, I _D = -7 A
Drain Leakage Current	I _{DSS}			-10	μA	V _{DS} = -60 V, V _{GS} = 0
Gate to Source Leakage Current	I _{GSS}			±10	μA	V _{GS} = ±16 V, V _{DS} = 0
Input Capacitance	C _{iss}		1200		pF	V _{DS} = -10 V
Output Capacitance	C _{oss}		670		pF	V _{GS} = 0
Reverse Transfer Capacitance	C _{rss}		290		pF	f = 1 MHz
Turn-On Delay Time	t _{d(on)}		30		ns	V _{GS(on)} = -10 V V _{DD} = -30 V I _D = -7 A, R _G = 10 Ω R _L = 4.3 Ω
Rise Time	t _r		110		ns	
Turn-Off Delay Time	t _{d(off)}		160		ns	
Fall Time	t _f		120		ns	
Total Gate Charge	Q _G		42		nC	V _{GS} = -10 V I _D = -16 A V _{DD} = -48 V
Gate to Source Charge	Q _{GS}		3		nC	
Gate to Drain Charge	Q _{GD}		17		nC	
Diode Forward Voltage	V _{SD}		1.0		V	I _F = -14 A, V _{GS} = 0
Reverse Recovery Time	t _{rr}		120		ns	I _F = -14 A, V _{GS} = 0
Reverse Recovery Charge	Q _{rr}		230		nC	di/dt = 50 A/μs

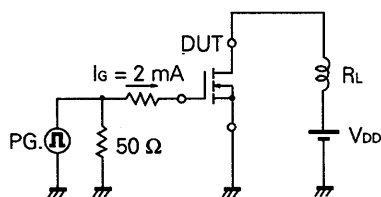
Test Circuit 1 : Avalanche Capability



Test Circuit 2 : Switching Time

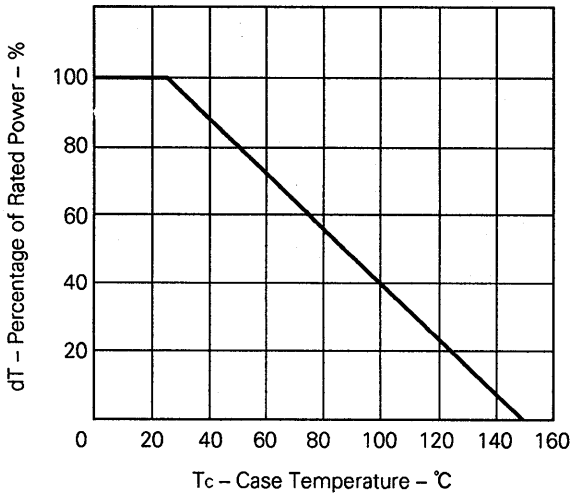


Test Circuit 3 : Gate Charge

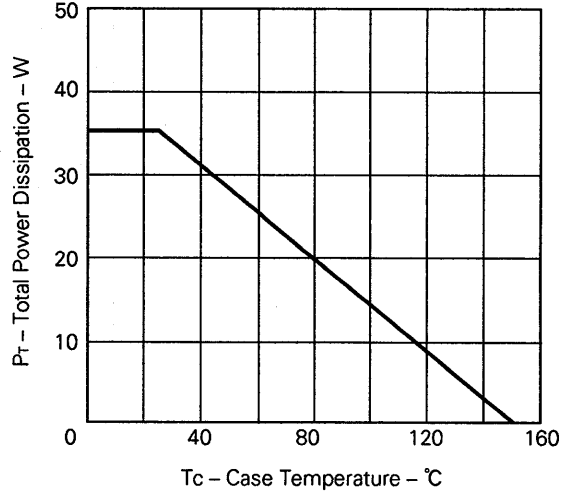


TYPICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)

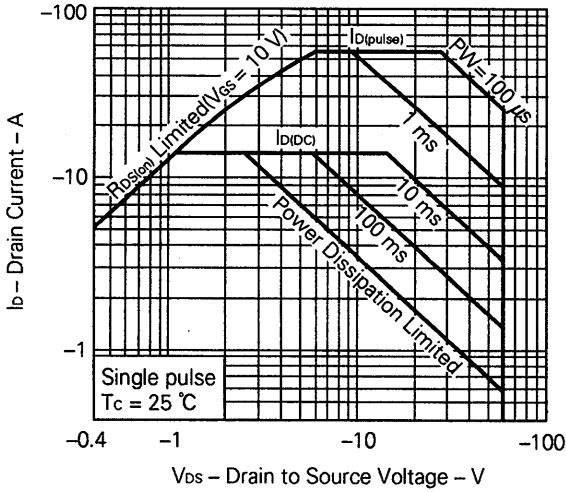
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



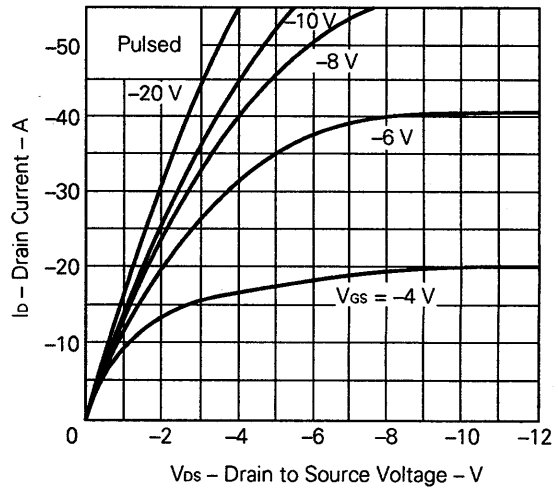
TOTAL POWER DISSIPATION vs. CASE TEMPERATURE



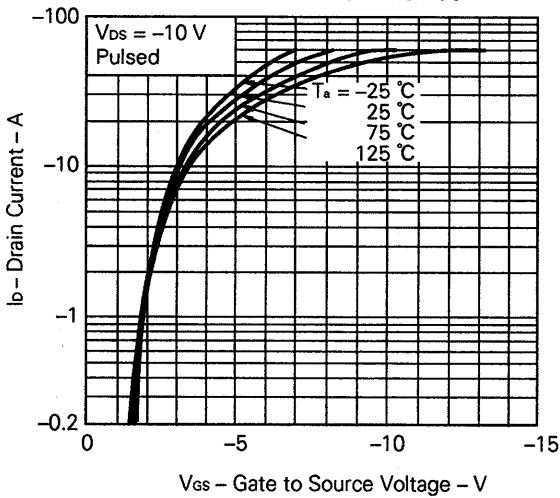
FORWARD BIAS SAFE OPERATING AREA

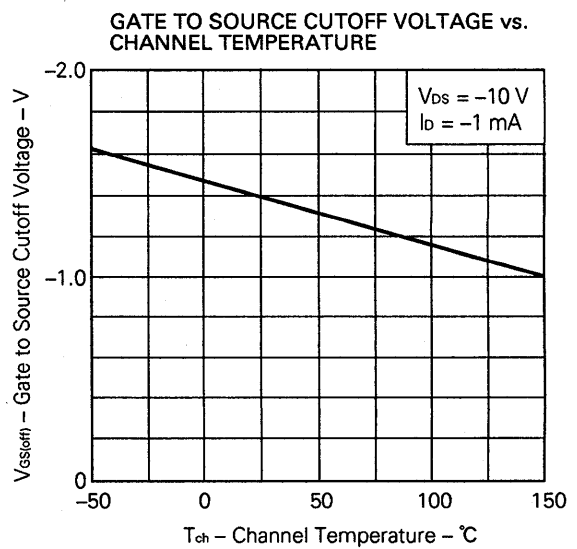
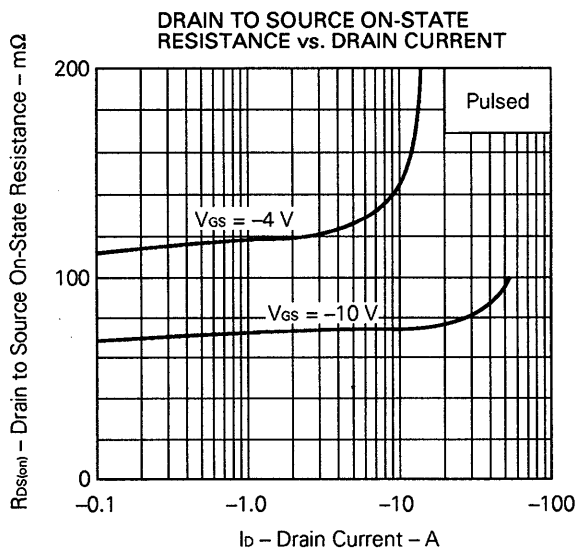
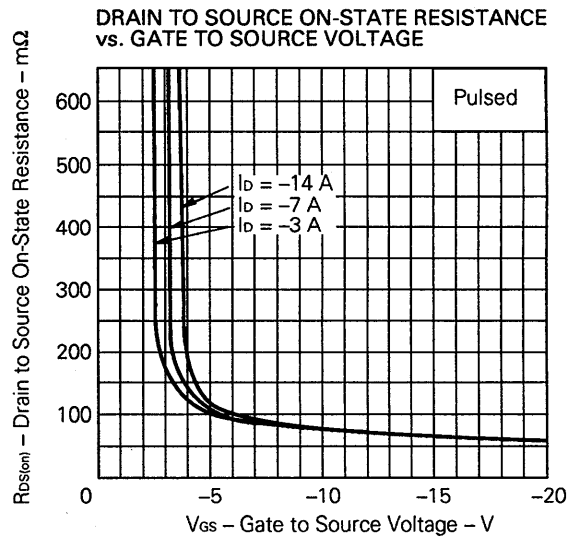
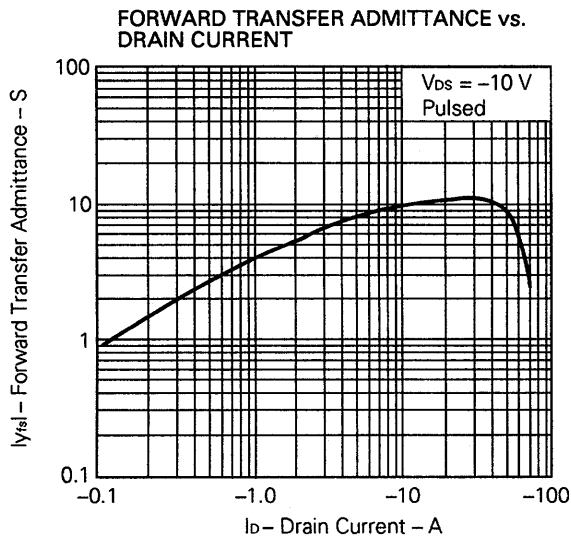
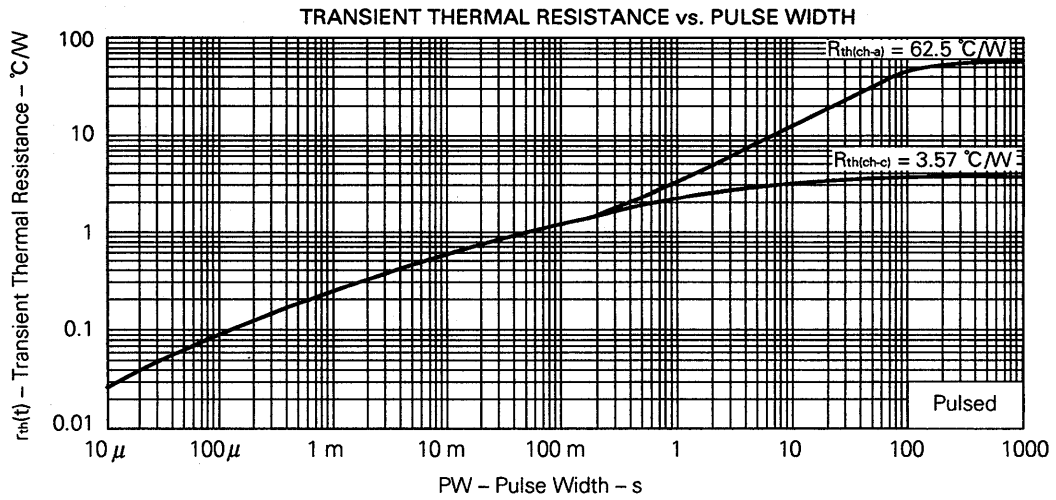


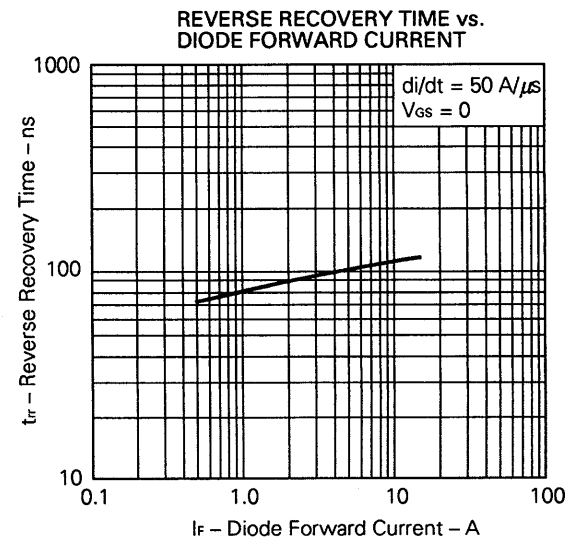
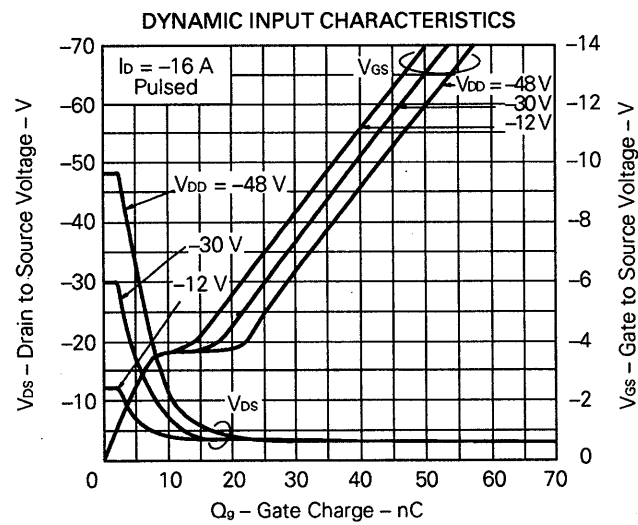
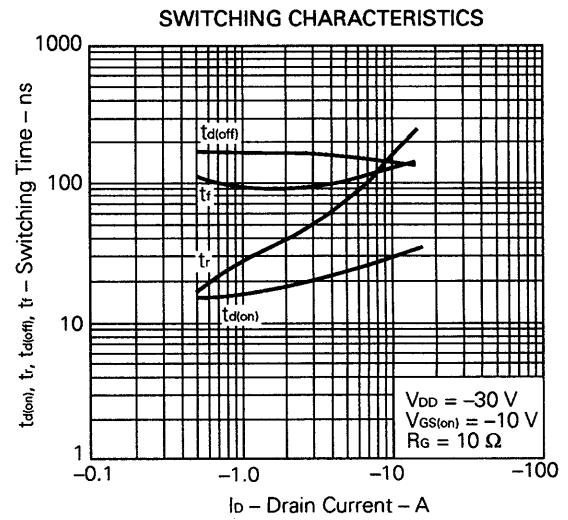
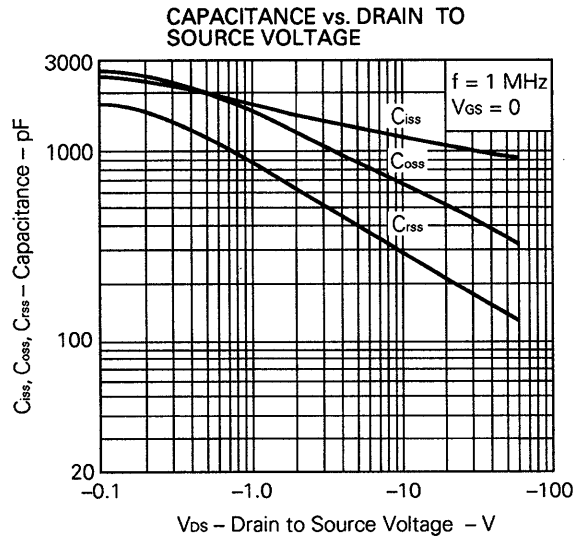
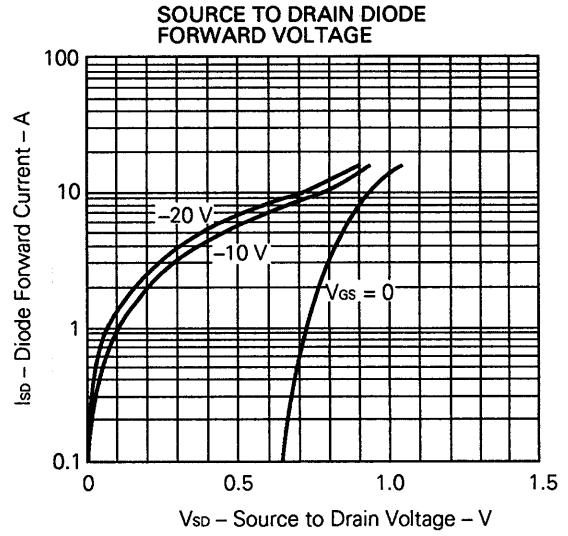
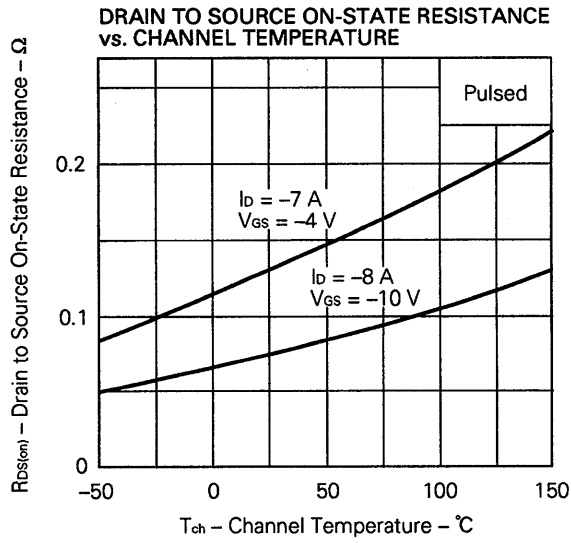
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE

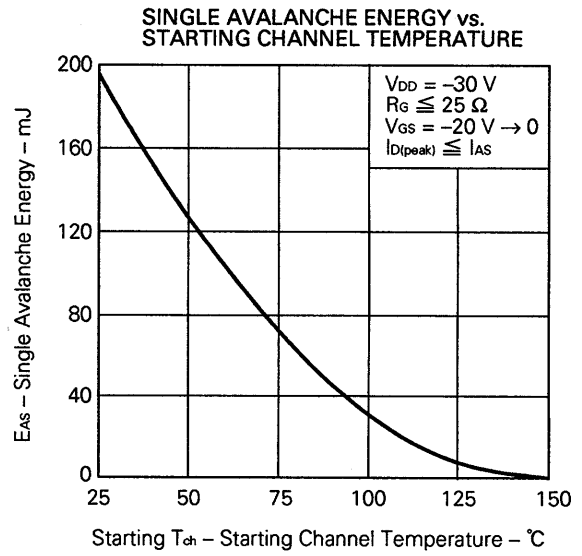
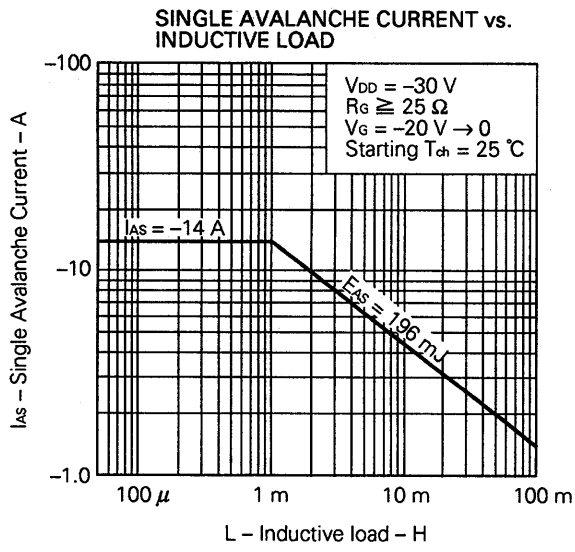


TRANSFER CHARACTERISTICS









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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