

### N-CHANNEL POWER MOS FET ARRAY SWITCHING INDUSTRIAL USE

#### DESCRIPTION

The μPA1572B is N-channel Power MOS FET Array that built in 4 circuits designed for solenoid, motor and lamp driver.

#### FEATURES

- Full Mold Package with 4 Circuits
- 4 V driving is possible
- Low On-state Resistance  
 $R_{DS(on)} = 0.6 \Omega$  MAX. ( $V_{GS} = 10 V, I_D = 1 A$ )  
 $R_{DS(on)} = 0.8 \Omega$  MAX. ( $V_{GS} = 4 V, I_D = 1 A$ )
- Low Input Capacitance  $C_{iss} = 110 pF$  TYP.

#### ORDERING INFORMATION

Type Number	Package
μPA1572BH	10Pin SIP

#### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ C$ )

Drain to Source Voltage ( $V_{GS} = 0$ )	$V_{DSS}$	60	V
Gate to Source Voltage ( $V_{DS} = 0$ )	$V_{GSS(AC)}$	±20	V
Drain Current (DC)	$I_D(DS)$	±2.0	A/unit
Drain Current (pulse)	$I_D(pulse)^{*1}$	±6.0	A/unit
Total Power Dissipation	$P_{T1}^*2$	20	W
Total Power Dissipation	$P_{T2}^*3$	3.0	W
Channel Temperature	$T_{CH}$	150	°C
Storage Temperature	$T_{stg}$	-55 to +150	°C
Single Avalanche Current	$I_{AS}^*4$	5.0	A
Single Avalanche Energy	$E_{AS}^*4$	0.1	mJ

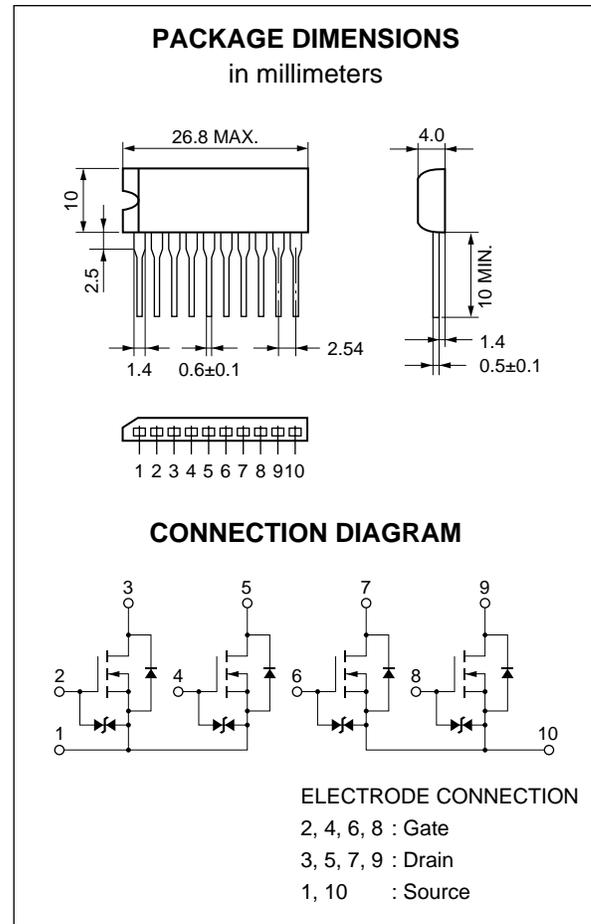
\*1  $PW \leq 10 \mu s$ , Duty Cycle  $\leq 1\%$  \*2 4 Circuits  $T_c = 25^\circ C$

\*3 4 Circuits  $T_A = 25^\circ C$

\*4 Starting  $T_{CH} = 25^\circ C$ ,  $V_{DD} = 30 V$ ,  $V_{GS} = 20 V \rightarrow 0$ ,  $R_G = 25 \Omega$ ,  $L = 100 \mu H$

Build-in Gate Diodes are for protection from static electricity in handing.  
In case high voltage over  $V_{GSS}$  is applied, please append gate protection circuits.

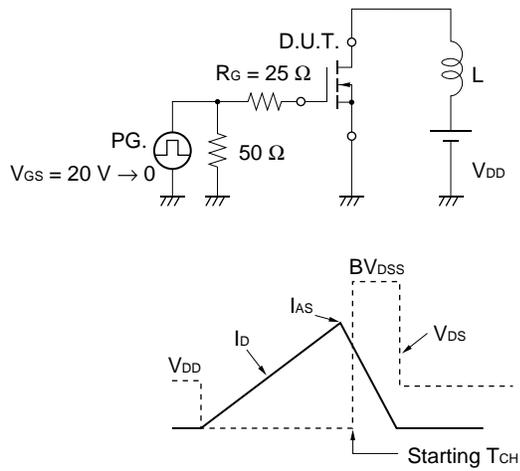
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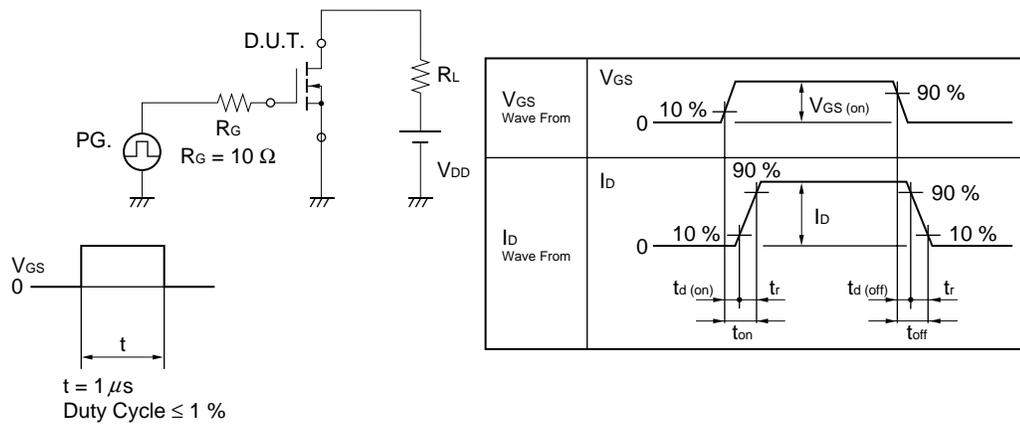
**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C)**

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Drain Leakage Current	I <sub>DSS</sub>			10	μA	V <sub>DS</sub> = 60 V, V <sub>GS</sub> = 0
Gate Leakage Current	I <sub>GSS</sub>			±10	μA	V <sub>GS</sub> = ±20 V, V <sub>DS</sub> = 0
Gate Cutoff Voltage	V <sub>GS (off)</sub>	1.0		2.0	V	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 1.0 mA
Forward Transfer Admittance	Y <sub>fs</sub>	0.5			S	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 1.0 A
Drain to Source ON-Resistance	R <sub>DS (on)1</sub>		0.3	0.6	Ω	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 1.0 A
Drain to Source ON-Resistance	R <sub>DS (on)2</sub>		0.4	0.8	Ω	V <sub>GS</sub> = 4.0 V, I <sub>D</sub> = 1.0 A
Input Capacitance	C <sub>iss</sub>		110		pF	V <sub>DS</sub> = 10 V, V <sub>GS</sub> = 0, f = 1.0 MHz
Output Capacitance	C <sub>oss</sub>		70		pF	
Reverse Transfer Capacitance	C <sub>rss</sub>		25		pF	
Turn-on Delay Time	t <sub>d (on)</sub>		30		ns	I <sub>D</sub> = 1.0 A, V <sub>GS (on)</sub> = 10 V, V <sub>DD</sub> = 30 V, R <sub>L</sub> = 30 Ω
Rise Time	t <sub>r</sub>		200		ns	
Turn-off Delay Time	t <sub>d (off)</sub>		100		ns	
Fall Time	t <sub>f</sub>		160		ns	
Total Gate Charge	Q <sub>G</sub>		5.4		nC	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 2.0 A, V <sub>DD</sub> = 48 V
Gate to Source Charge	Q <sub>GS</sub>		0.7		nC	
Gate to Drain Charge	Q <sub>GD</sub>		2.0		nC	
Body Diode Forward Voltage	V <sub>F (S-D)</sub>		1.0		V	I <sub>F</sub> = 2.0 A, V <sub>GS</sub> = 0
Reverse Recovery Time	t <sub>rr</sub>		130		ns	I <sub>F</sub> = 2.0 A, V <sub>GS</sub> = 0, di/dt = 50 A/μs
Reverse Recovery Charge	Q <sub>rr</sub>		110		nC	

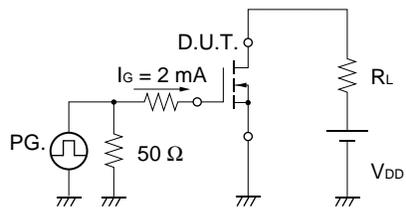
**Test Circuit 1 Avalanche Capability**



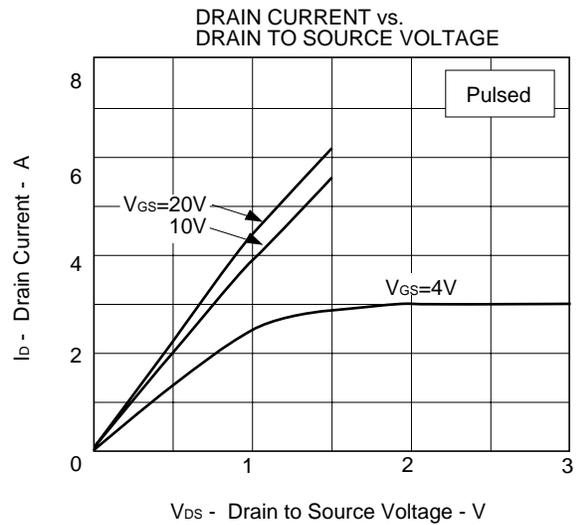
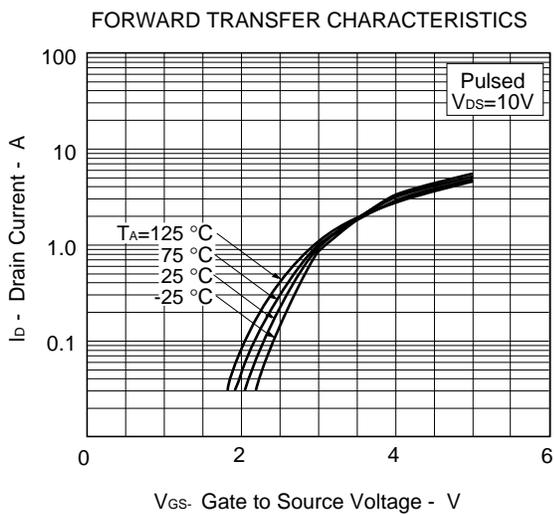
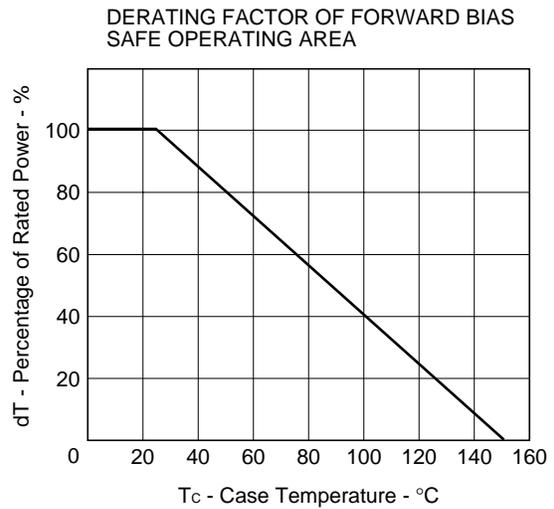
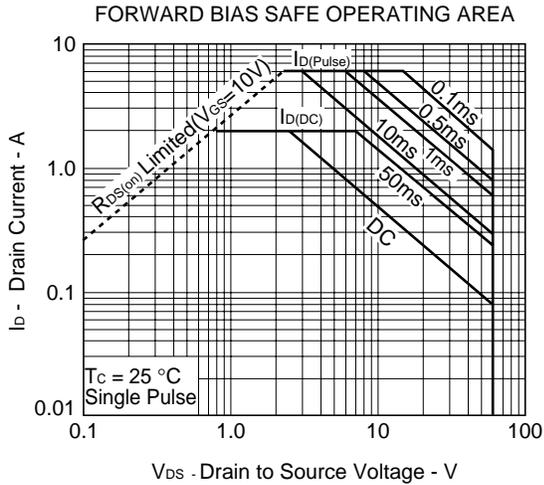
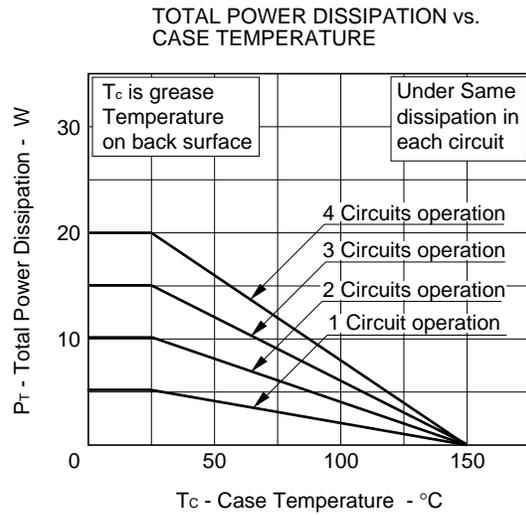
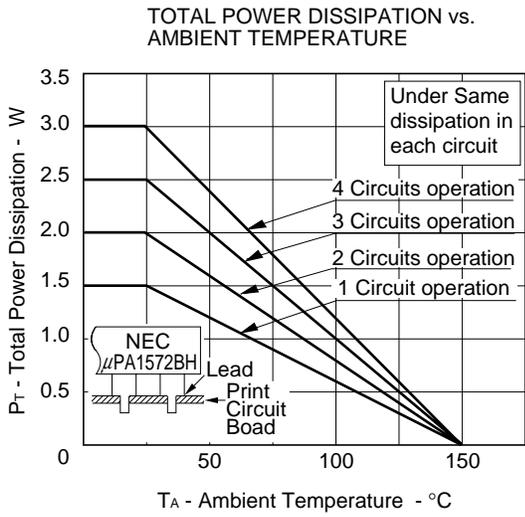
**Test Circuit 2 Switching Time**



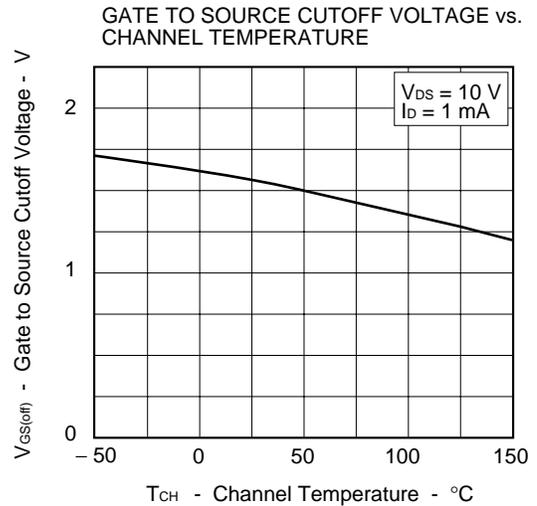
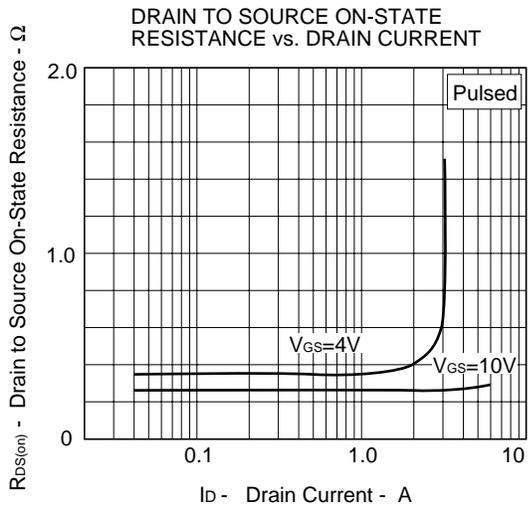
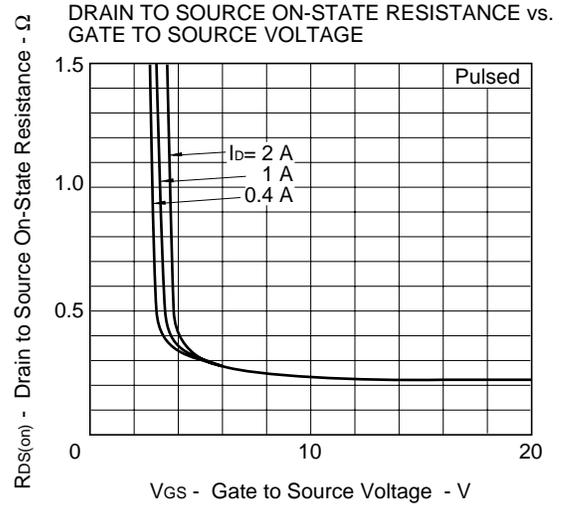
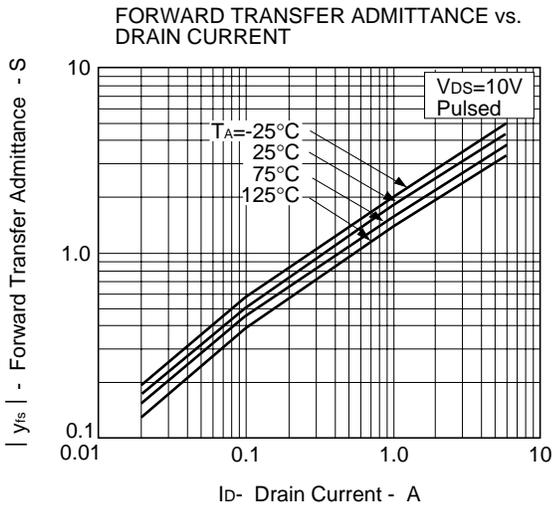
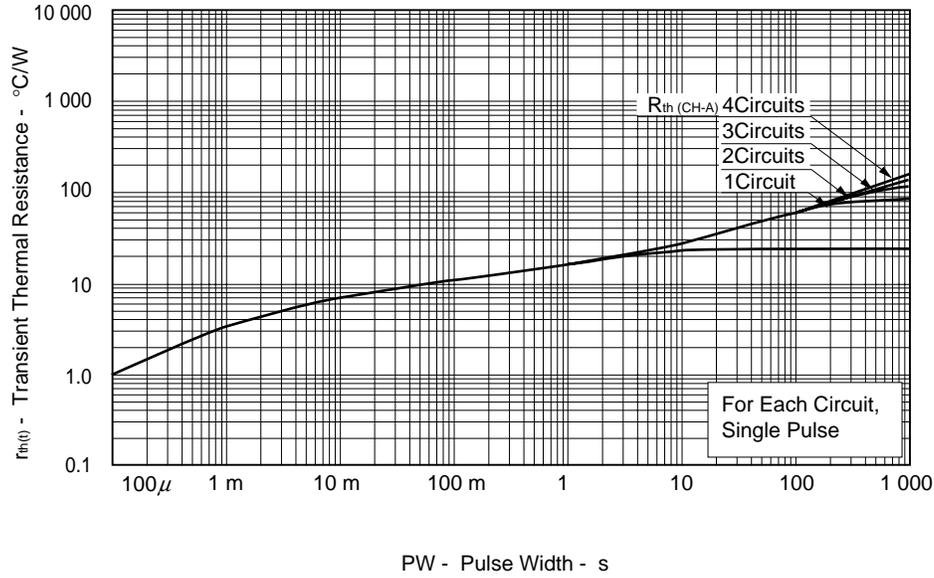
**Test Circuit 3 Gate Charge**

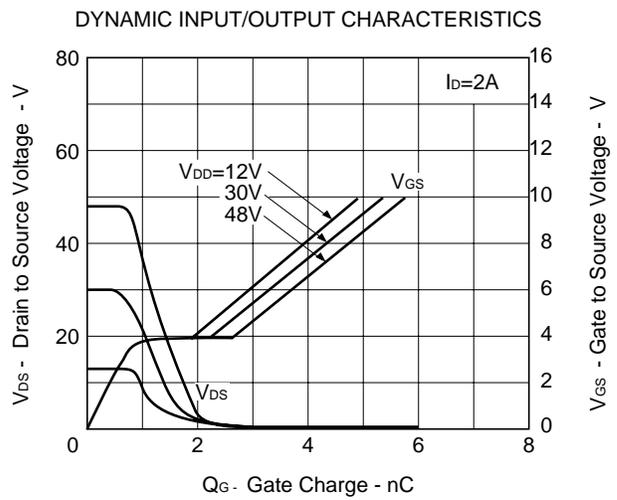
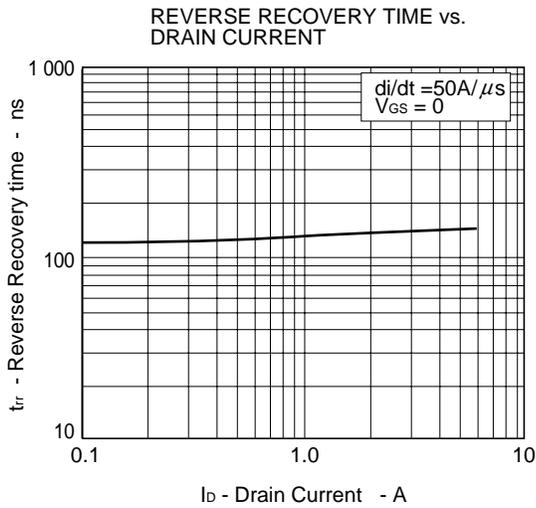
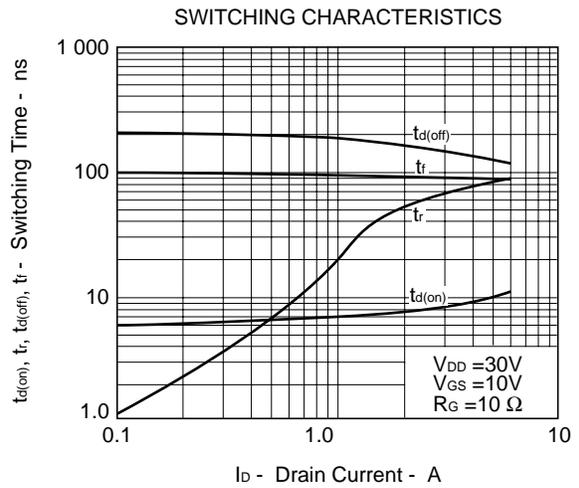
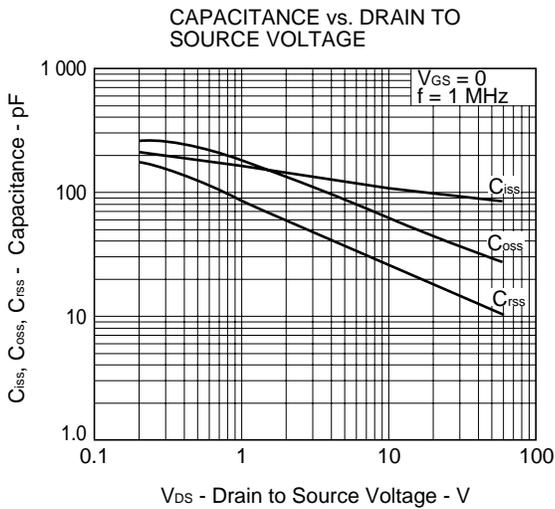
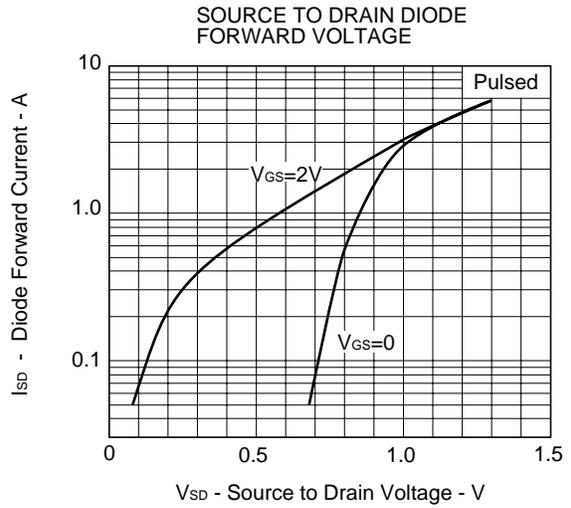
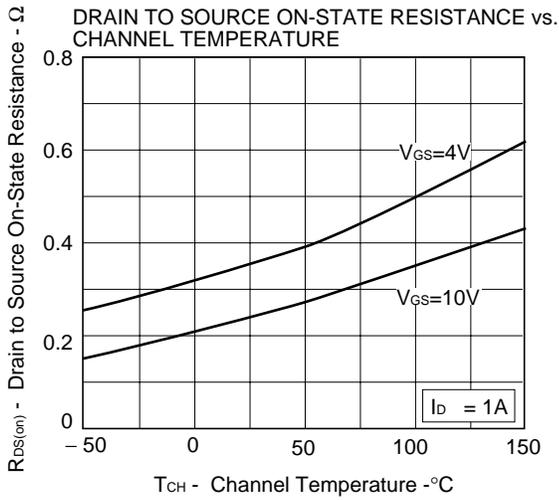


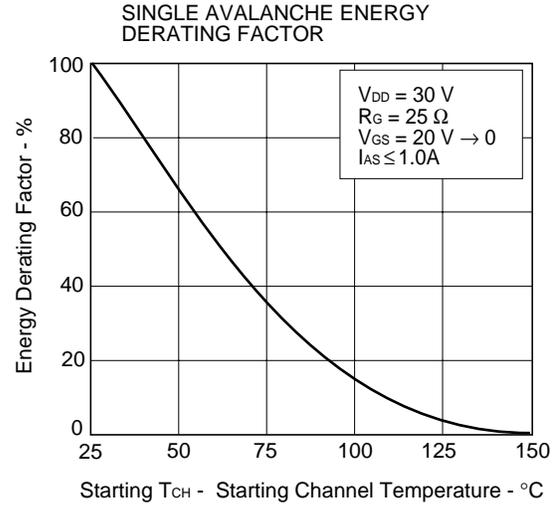
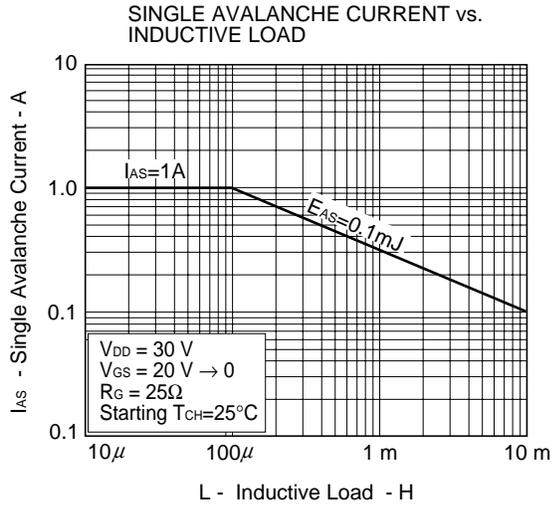
CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ )



TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH







REFERENCE

Document Name	Document No.
NEC semiconductor device reliability/quality control system	TEI-1202
Quality grade on NEC semiconductor devices	IEI-1209
Semiconductor device mounting technology manual	C10535E
Semiconductor device package manual	C10943X
Guide to quality assurance for semiconductor devices	MEI-1202
Semiconductor selection guide	X10679E
Power MOS FET features and application switching power supply	TEA-1034
Application circuits using Power MOS FET	TEA-1035
Safe operating area of Power MOS FET	TEA-1037

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Anti-radioactive design is not implemented in this product.