

MOS FIELD EFFECT TRANSISTOR μ PA679TB

N/P-CHANNEL MOS FIELD EFFECT TRANSISTOR FOR SWITCHING

DESCRIPTION

The μ PA679TB is a switching device, which can be driven directly by a 2.5 V power source.

The μ PA679TB features a low on-state resistance and excellent switching characteristics, and is suitable for applications such as power switch of portable machine and so on.

FEATURES

- 2.5 V drive available
- Low on-state resistance
 - N-ch $R_{DS(on)1} = 0.57 \Omega$ MAX. ($V_{GS} = 4.5$ V, $I_D = 0.30$ A)
 - $R_{DS(on)3} = 0.88 \Omega$ MAX. ($V_{GS} = 2.5$ V, $I_D = 0.15$ A)
 - P-ch $R_{DS(on)1} = 1.45 \Omega$ MAX. ($V_{GS} = -4.5$ V, $I_D = -0.20$ A)
 - $R_{DS(on)3} = 2.98 \Omega$ MAX. ($V_{GS} = -2.5$ V, $I_D = -0.15$ A)
- Two MOS FET circuits in same size package as SC-70

ORDERING INFORMATION

PART NUMBER	PACKAGE
μ PA679TB	SC-88 (SSP)

Marking: YA

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$)

Drain to Source Voltage ($V_{GS} = 0$ V)	V_{DSS}	20 / -20	V
Gate to Source Voltage ($V_{DS} = 0$ V)	V_{GSS}	$\pm 12 / \mp 12$	V
Drain Current (DC)	$I_{D(DC)}$	$\pm 0.35 / \mp 0.25$	A
Drain Current (pulse) ^{Note1}	$I_{D(pulse)}$	$\pm 1.40 / \mp 1.00$	A
Total Power Dissipation (2 units) ^{Note2}	P_T	0.2	W
Channel Temperature	T_{ch}	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

Notes 1. $PW \leq 10 \mu\text{s}$, Duty Cycle $\leq 1\%$

2. Mounted on FR-4 board of $2500 \text{ mm}^2 \times 1.1 \text{ mm}$

Remark The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

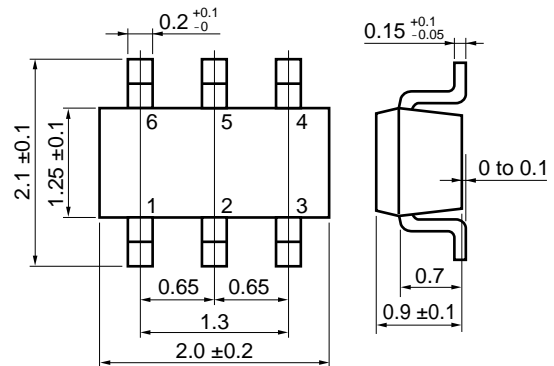
Caution This product is electrostatic-sensitive device due to low ESD capability and should be handled with caution for electrostatic discharge.

$V_{ESD} = \pm 100 \text{ V TYP. (C = 200 pF, R = 0 \Omega, \text{Single pulse})}$

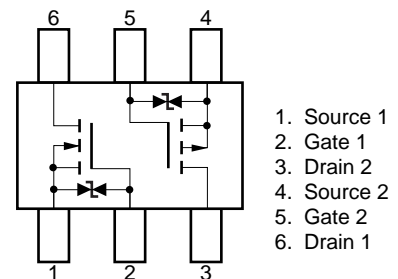
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PACKAGE DRAWING (Unit: mm)



PIN CONNECTION (Top View)



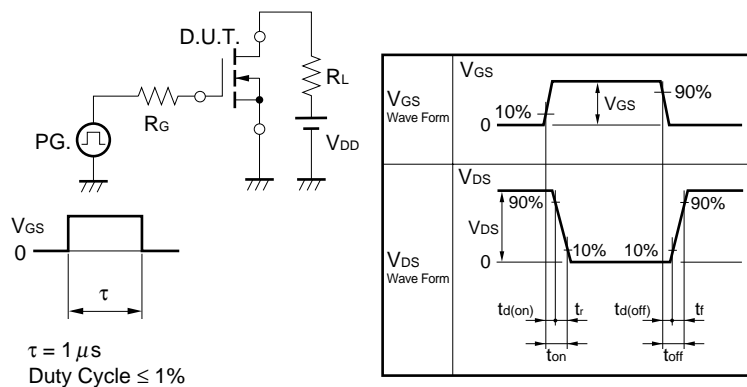
ELECTRICAL CHARACTERISTICS

(1) N-ch PART (T_A = 25°C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 20.0 V, V _{GS} = 0 V			1.0	μA
Gate Leakage Current	I _{GSS}	V _{GS} = ±12.0 V, V _{DS} = 0 V			±10	μA
Gate Cut-off Voltage ^{Note}	V _{GS(off)}	V _{DS} = 10.0 V, I _D = 1.0 mA	0.50	1.00	1.50	V
Forward Transfer Admittance ^{Note}	y _{fs}	V _{DS} = 10.0 V, I _D = 0.30 A	0.25	0.75		S
Drain to Source On-state Resistance ^{Note}	R _{DS(on)1}	V _{GS} = 4.5 V, I _D = 0.30 A		0.38	0.57	Ω
	R _{DS(on)2}	V _{GS} = 4.0 V, I _D = 0.30 A		0.41	0.60	Ω
	R _{DS(on)3}	V _{GS} = 2.5 V, I _D = 0.15 A		0.60	0.88	Ω
Input Capacitance	C _{iss}	V _{DS} = 10.0 V		28		pF
Output Capacitance	C _{oss}	V _{GS} = 0 V		11		pF
Reverse Transfer Capacitance	C _{rss}	f = 1.0 MHz		7		pF
Turn-on Delay Time	t _{d(on)}	V _{DD} = 10.0 V, I _D = 0.30 A		20		ns
Rise Time	t _r	V _{GS} = 4.0 V		51		ns
Turn-off Delay Time	t _{d(off)}	R _G = 10 Ω		94		ns
Fall Time	t _f			87		ns
Body Diode Forward Voltage	V _{F(S-D)}	I _F = 0.35 A, V _{GS} = 0 V		0.84		V

Note Pulsed: PW ≤ 350 μs, Duty cycle ≤ 2%

TEST CIRCUIT SWITCHING TIME

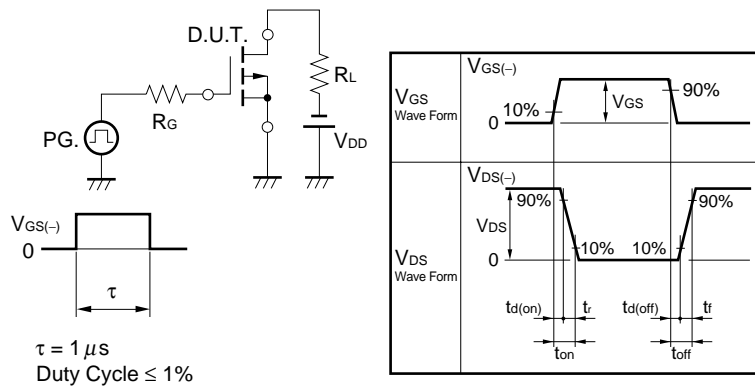


(2) P-ch PART (T_A = 25°C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -20.0 V, V _{GS} = 0 V			-1.0	μA
Gate Leakage Current	I _{GSS}	V _{GS} = ±12.0 V, V _{DS} = 0 V			±10	μA
Gate Cut-off Voltage ^{Note}	V _{GS(off)}	V _{DS} = -10.0 V, I _D = -1.0 mA	-0.80	-1.30	-1.80	V
Forward Transfer Admittance ^{Note}	y _{fs}	V _{DS} = -10.0 V, I _D = -0.20 A	0.2	0.6		S
Drain to Source On-state Resistance ^{Note}	R _{DS(on)1}	V _{GS} = -4.5 V, I _D = -0.20 A		1.17	1.45	Ω
	R _{DS(on)2}	V _{GS} = -4.0 V, I _D = -0.20 A		1.25	1.55	Ω
	R _{DS(on)3}	V _{GS} = -2.5 V, I _D = -0.15 A		2.25	2.98	Ω
Input Capacitance	C _{iss}	V _{DS} = -10.0 V		29		pF
Output Capacitance	C _{oss}	V _{GS} = 0 V		15		pF
Reverse Transfer Capacitance	C _{rss}	f = 1.0 MHz		3		pF
Turn-on Delay Time	t _{d(on)}	V _{DD} = -10.0 V, I _D = -0.20 A		23		ns
Rise Time	t _r	V _{GS} = -4.0 V		39		ns
Turn-off Delay Time	t _{d(off)}	R _G = 10 Ω		50		ns
Fall Time	t _f			33		ns
Body Diode Forward Voltage	V _{F(S-D)}	I _F = 0.25 A, V _{GS} = 0 V		0.88		V

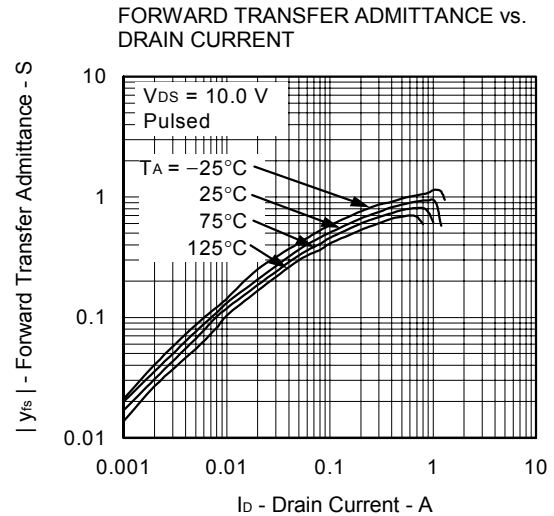
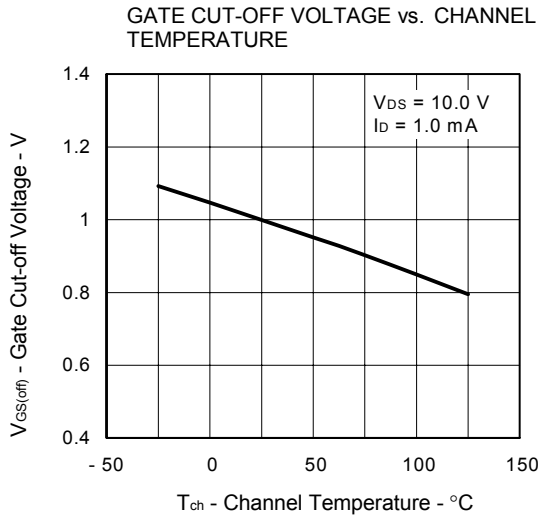
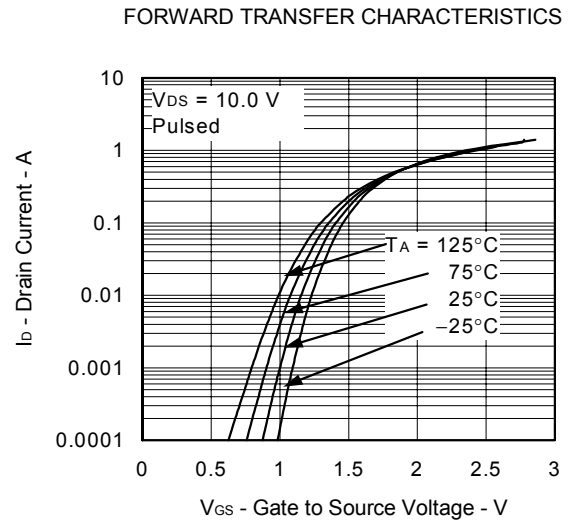
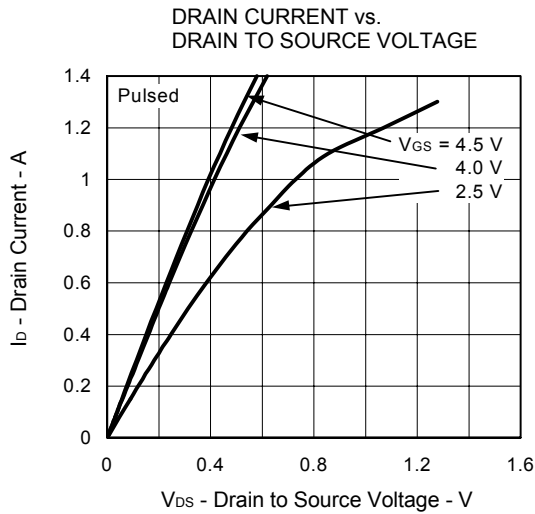
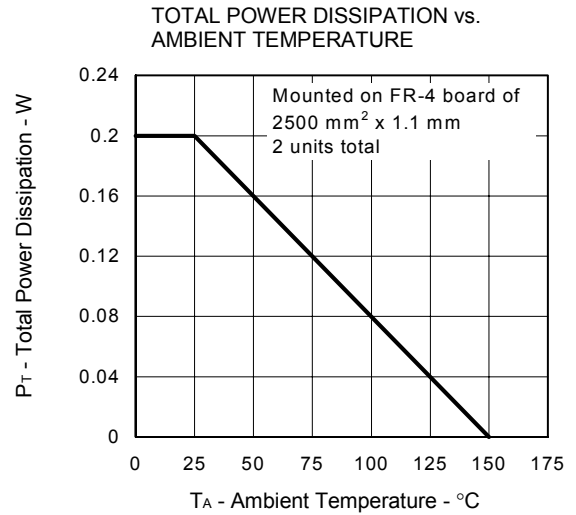
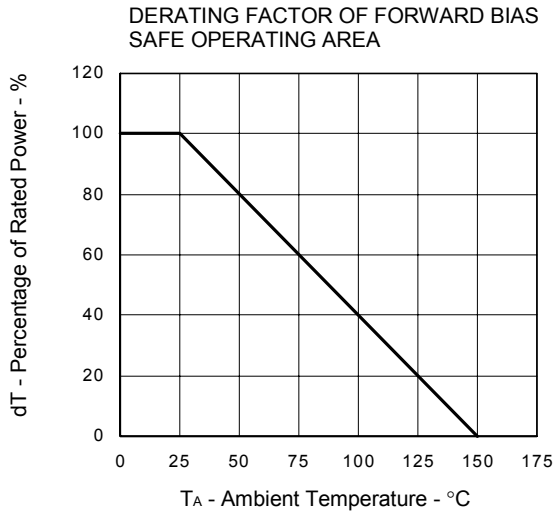
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TEST CIRCUIT SWITCHING TIME

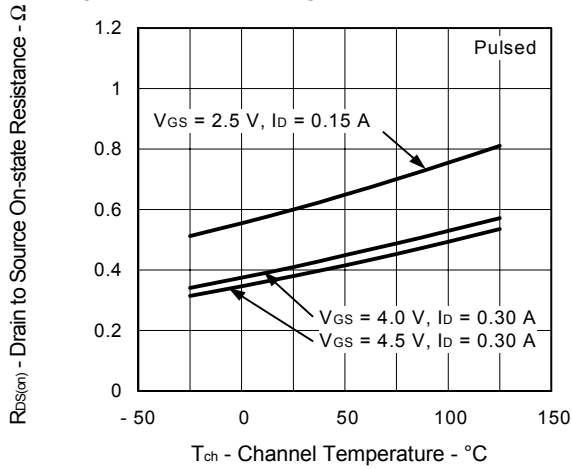


TYPICAL CHARACTERISTICS

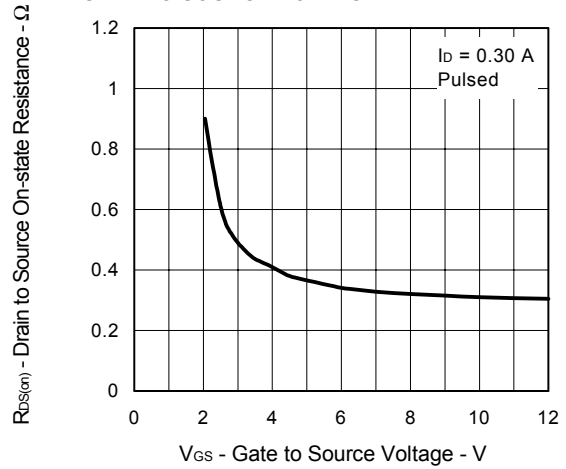
(1) N-ch PART ($T_A = 25^\circ\text{C}$)



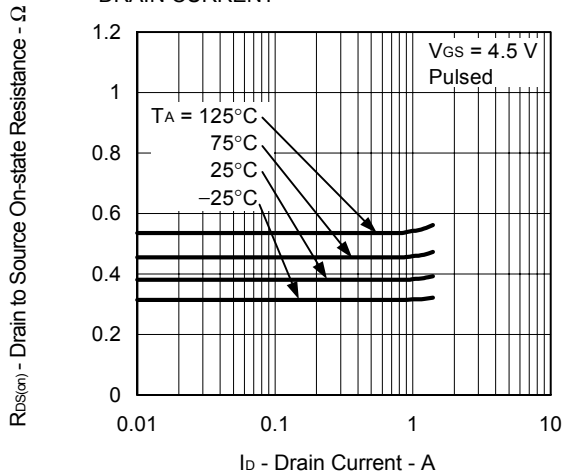
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



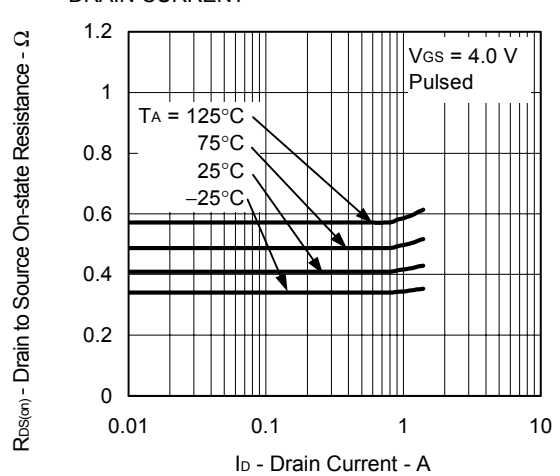
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



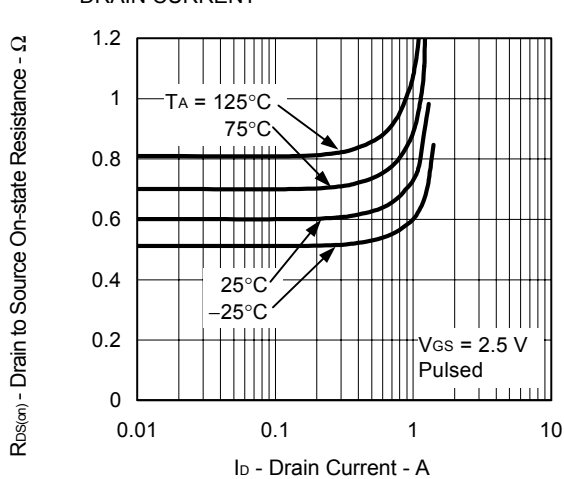
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



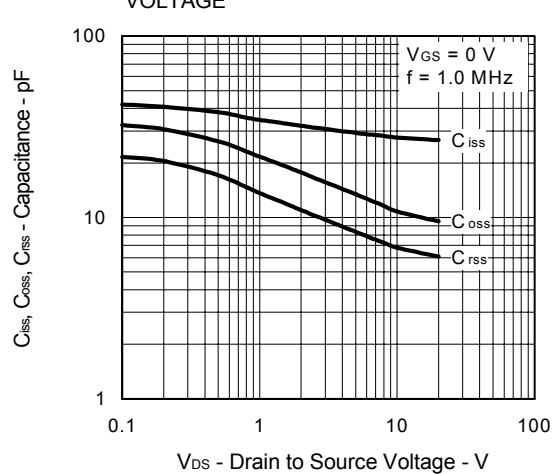
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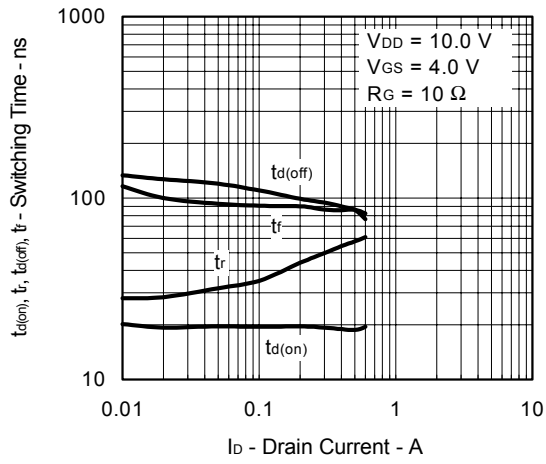
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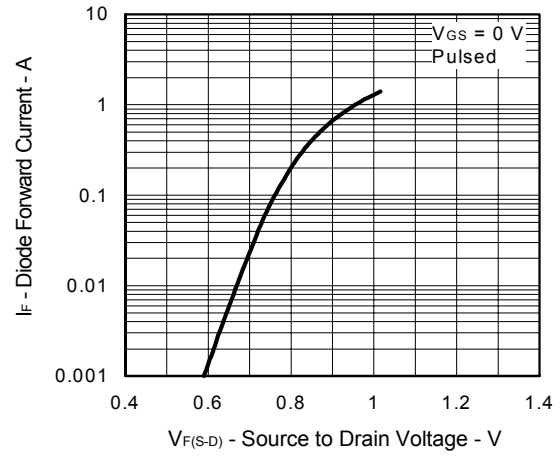
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



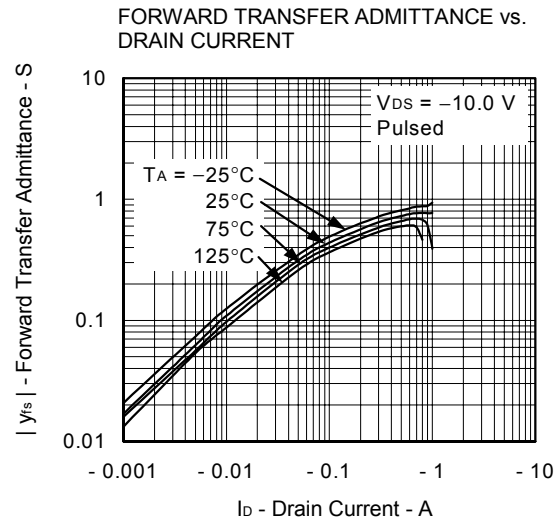
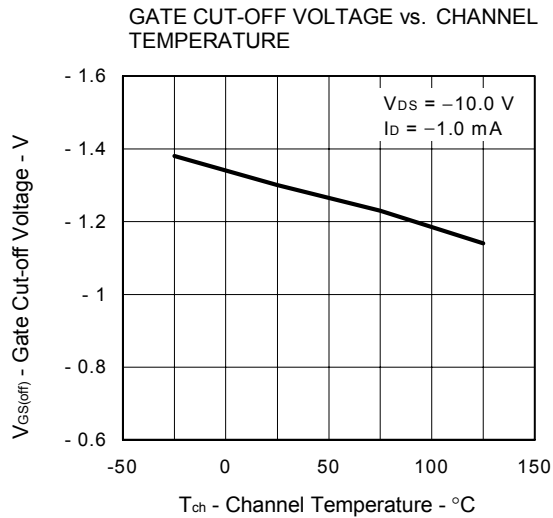
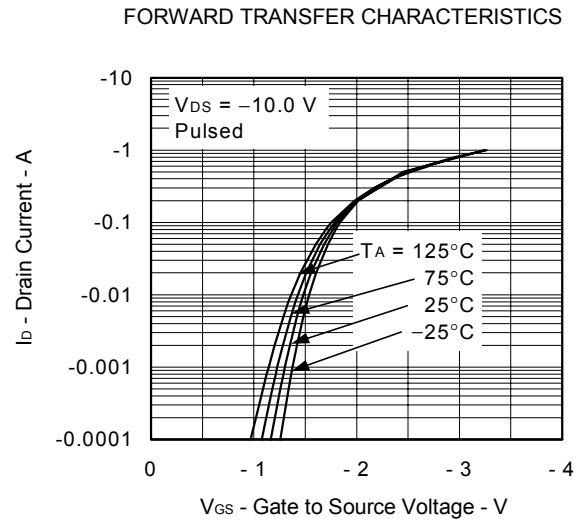
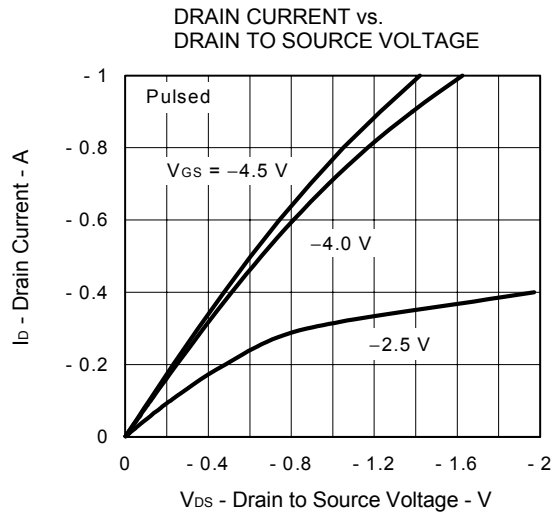
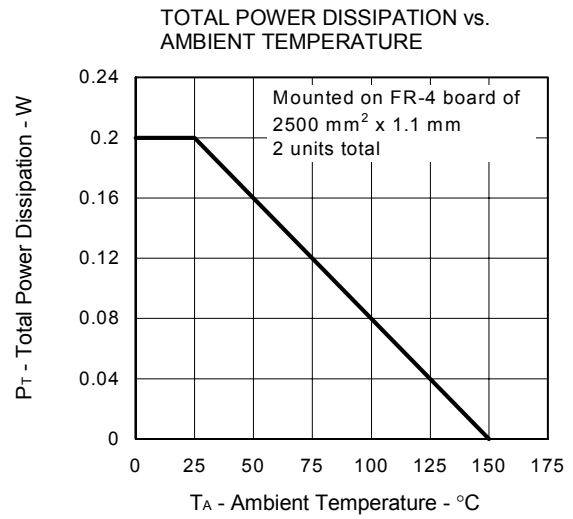
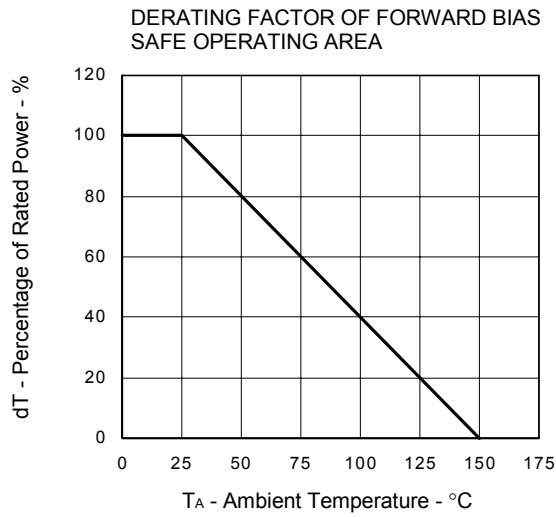
SWITCHING CHARACTERISTICS



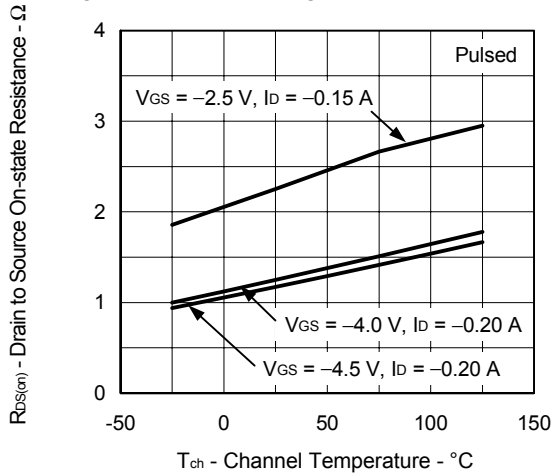
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



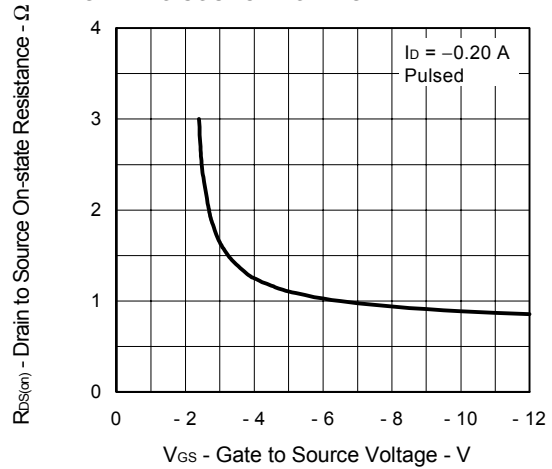
(2) P-ch PART ($T_A = 25^\circ\text{C}$)



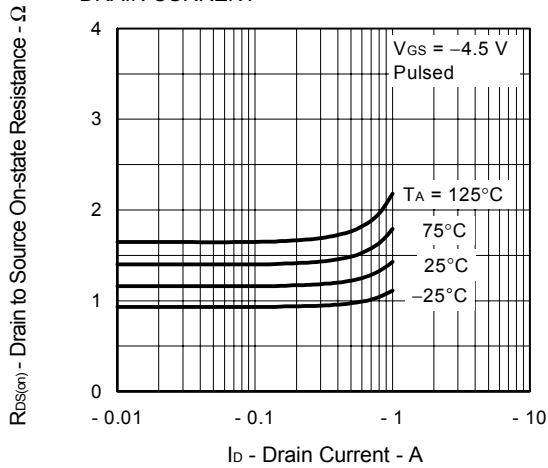
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



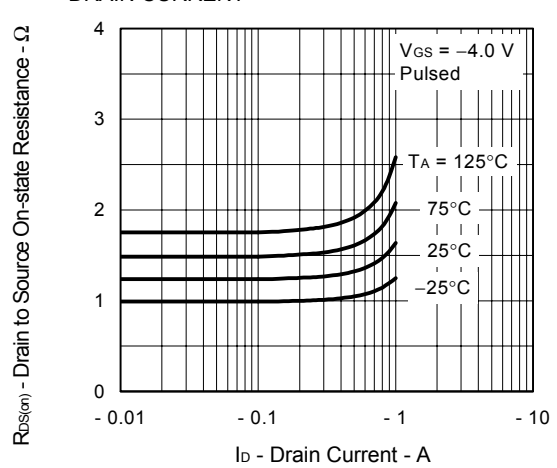
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



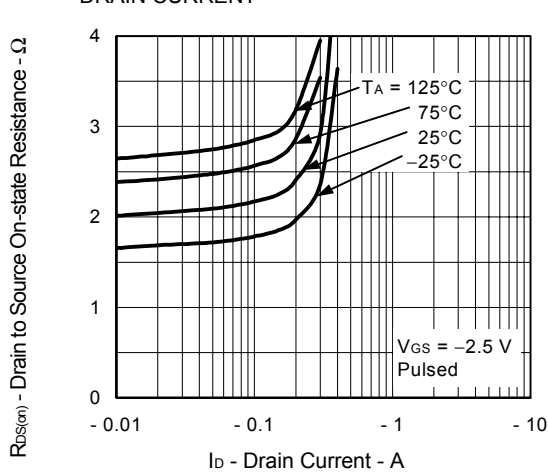
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



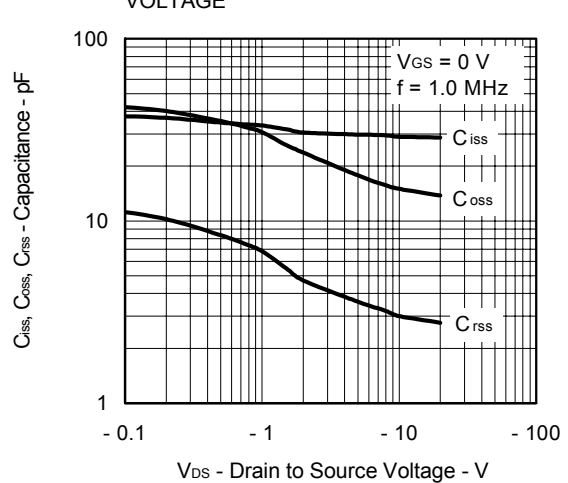
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



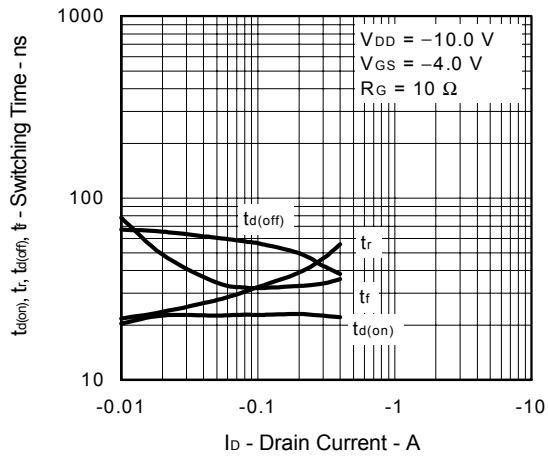
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



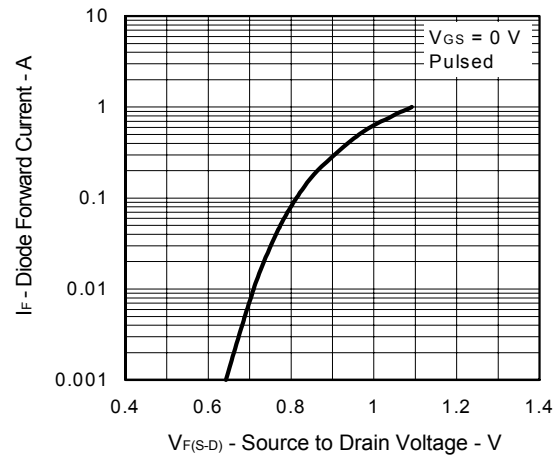
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



SWITCHING CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE



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