

TOSHIBA Field Effect Transistor Silicon P-Channel MOS Type (U-MOS V)

TPCC8103

Notebook PC Applications

Portable Equipment Applications

- Small footprint due to a small and thin package
- Low drain-source ON-resistance:
 $R_{DS\ (ON)} = 9.4\ m\Omega$ (typ.) ($V_{GS} = -10\ V$)
- Low leakage current: $I_{DSS} = -10\ \mu A$ (max) ($V_{DS} = -30\ V$)
- Enhancement mode: $V_{th} = -0.8$ to $-2.0\ V$ ($V_{DS} = -10\ V$, $I_D = -1.0\ mA$)

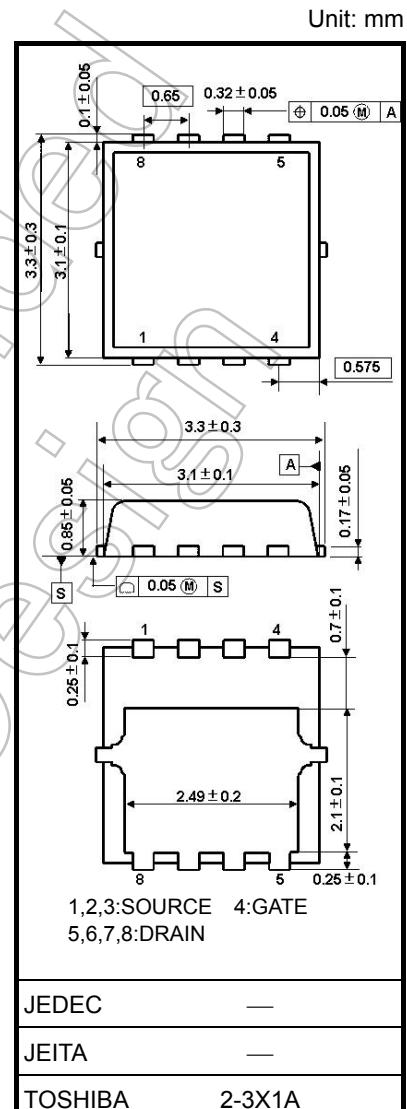
Absolute Maximum Ratings ($T_a = 25^\circ C$)

Characteristic	Symbol	Rating	Unit
Drain-source voltage	V_{DSS}	-30	V
Drain-gate voltage ($R_{GS} = 20\ k\Omega$)	V_{DGR}	-30	V
Gate-source voltage	V_{GSS}	± 20	V
Drain current	DC (Note 1)	I_D	A
	Pulsed (Note 1)	I_{DP}	
Drain power dissipation ($T_c = 25^\circ C$)	P_D	27	W
Drain power dissipation ($t = 10\ s$) (Note 2a)	P_D	1.9	W
Drain power dissipation ($t = 10\ s$) (Note 2b)	P_D	0.7	W
Single-pulse avalanche energy (Note 3)	E_{AS}	84	mJ
Avalanche current	I_{AR}	-18	A
Repetitive avalanche energy ($T_c = 25^\circ C$) (Note 4)	E_{AR}	1.59	mJ
Channel temperature	T_{ch}	150	°C
Storage temperature range	T_{stg}	-55 to 150	°C

Note: For Notes 1 to 4, refer to the next page.

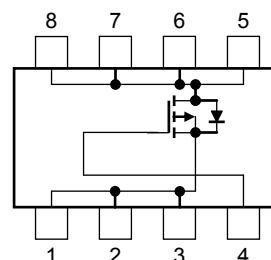
Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings. Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

This transistor is an electrostatic-sensitive device. Handle with care.



Weight: 0.02 g (typ.)

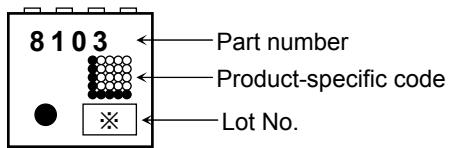
Circuit Configuration

Start of commercial production
2009-06

Thermal Characteristics

Characteristic	Symbol	Max	Unit
Thermal resistance, channel to case ($T_c = 25^\circ\text{C}$)	R_{th} (ch-c)	4.7	$^\circ\text{C}/\text{W}$
Thermal resistance, channel to ambient ($t = 10$ s) (Note 2a)	R_{th} (ch-a)	66	$^\circ\text{C}/\text{W}$
Thermal resistance, channel to ambient ($t = 10$ s) (Note 2b)	R_{th} (ch-a)	180	$^\circ\text{C}/\text{W}$

Marking (Note 5)



Note 1: Ensure that the channel temperature does not exceed 150°C .

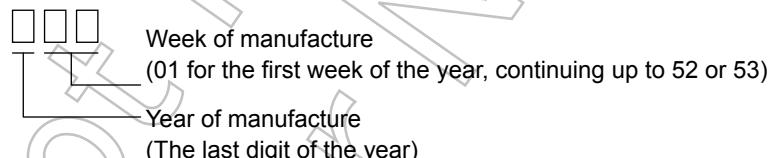
Note 2: (a) Device mounted on a glass-epoxy board (a) (b) Device mounted on a glass-epoxy board (b)



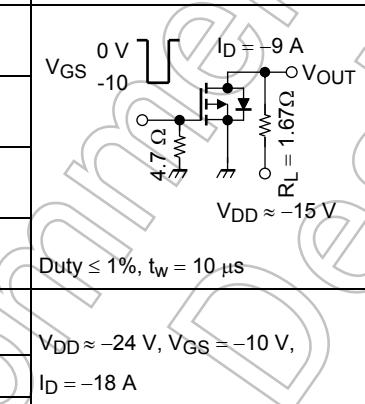
Note 3: $V_{DD} = -24$ V, $T_{ch} = 25^\circ\text{C}$ (initial), $L = 200 \mu\text{H}$, $R_G = 25 \Omega$, $I_{AR} = -18$ A

Note 4: Repetitive rating: pulse width limited by maximum channel temperature

Note 5: * Weekly code: (Three digits)

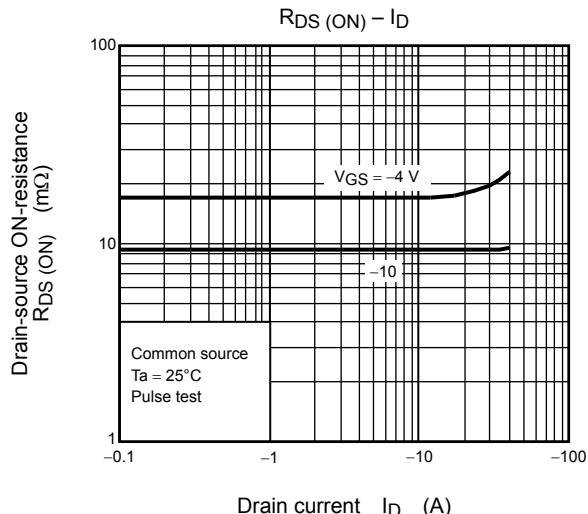
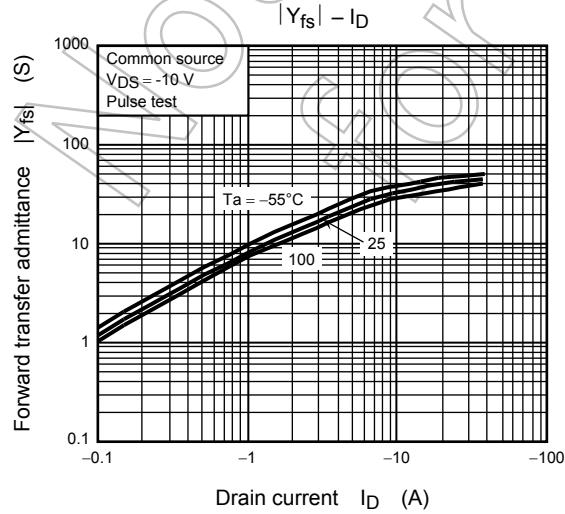
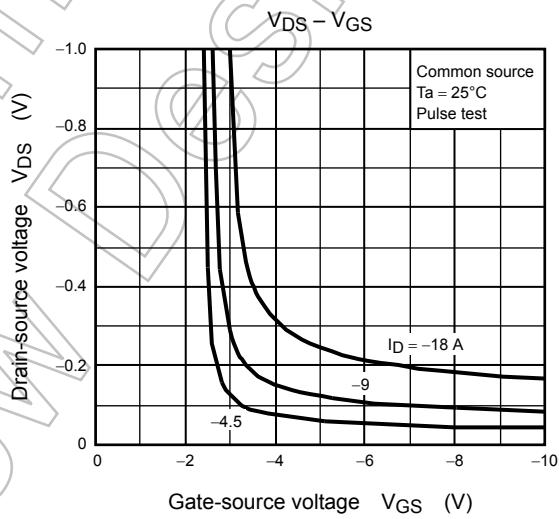
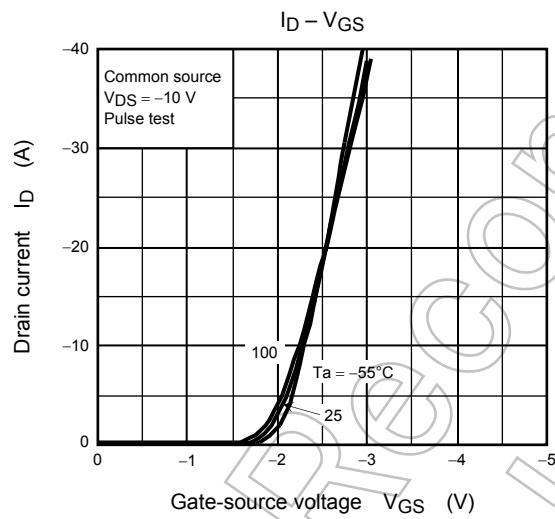
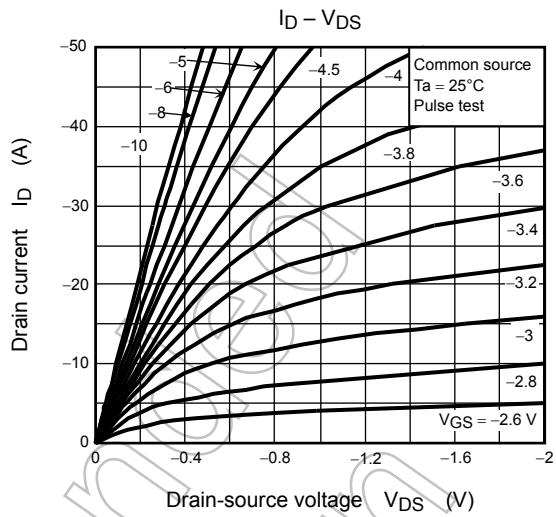
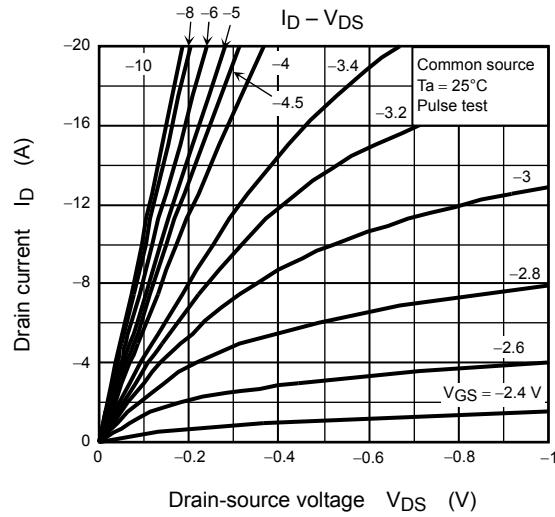


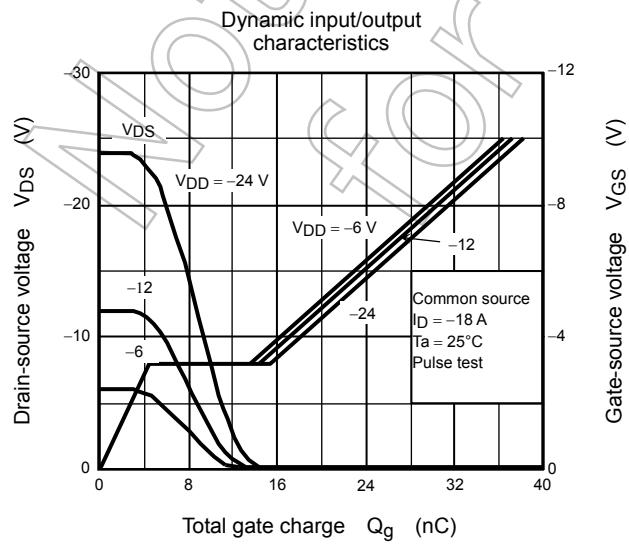
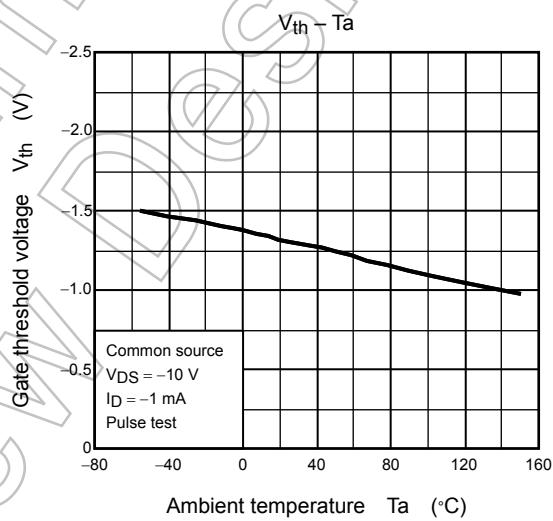
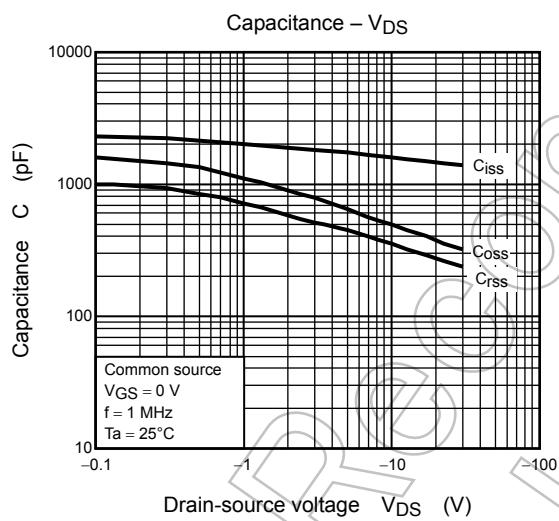
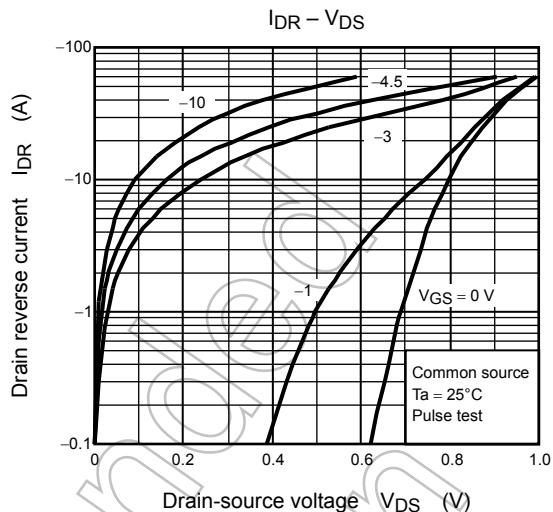
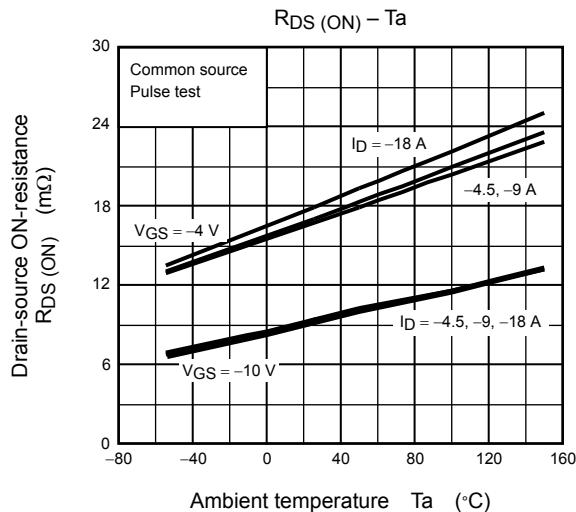
Electrical Characteristics ($T_a = 25^\circ\text{C}$)

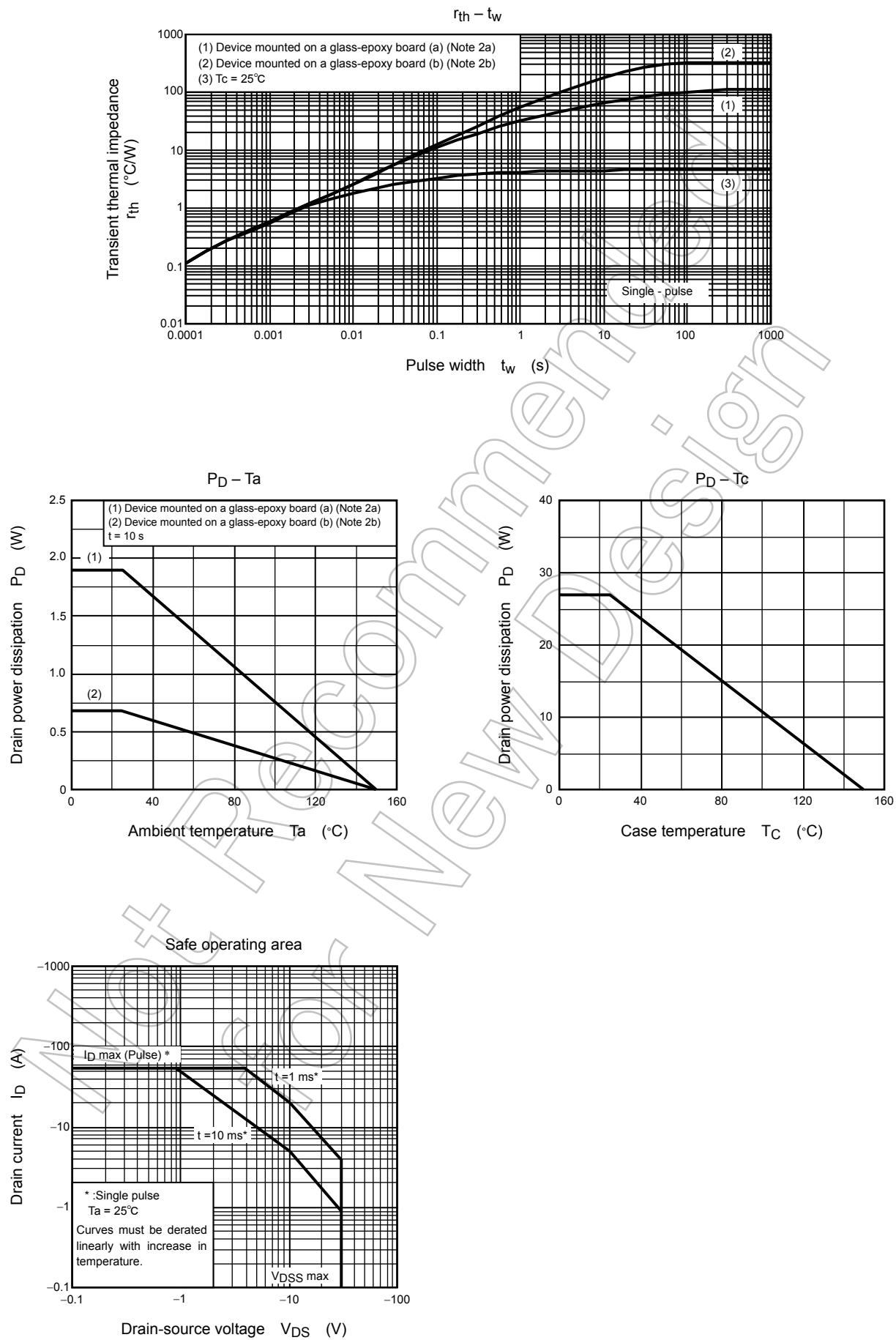
Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current	I_{GSS}	$V_{GS} = \pm 20\text{ V}$, $V_{DS} = 0\text{ V}$	—	—	± 100	nA
Drain cutoff current	I_{DSS}	$V_{DS} = -30\text{ V}$, $V_{GS} = 0\text{ V}$	—	—	-10	μA
Drain-source breakdown voltage	$V_{(\text{BR})\text{DSS}}$	$I_D = -10\text{ mA}$, $V_{GS} = 0\text{ V}$	-30	—	—	V
	$V_{(\text{BR})\text{DSX}}$	$I_D = -10\text{ mA}$, $V_{GS} = 20\text{ V}$	-13	—	—	
Gate threshold voltage	V_{th}	$V_{DS} = -10\text{ V}$, $I_D = -1.0\text{ mA}$	-0.8	—	-2.0	V
Drain-source ON-resistance	$R_{DS\text{ (ON)}}$	$V_{GS} = -4\text{ V}$, $I_D = -9\text{ A}$	—	17	25	$\text{m}\Omega$
		$V_{GS} = -10\text{ V}$, $I_D = -9\text{ A}$	—	9.4	12	
Forward transfer admittance	$ Y_{fs} $	$V_{DS} = -10\text{ V}$, $I_D = -9\text{ A}$	15	30	—	S
Input capacitance	C_{iss}	$V_{DS} = -10\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1\text{ MHz}$	—	1600	—	pF
Reverse transfer capacitance	C_{rss}		—	340	—	
Output capacitance	C_{oss}		—	490	—	
Switching time	Rise time	t_r		9.3	—	ns
	Turn-on time	t_{on}		16	—	
	Fall time	t_f		68	—	
	Turn-off time	t_{off}		175	—	
Total gate charge (gate-source plus gate-drain)	Q_g	$V_{DD} \approx -24\text{ V}$, $V_{GS} = -10\text{ V}$, $I_D = -18\text{ A}$	—	38	—	nC
Gate-source charge 1	Q_{gs1}		—	4.5	—	
Gate-drain ("Miller" charge)	Q_{gd}		—	11	—	

Source-Drain Ratings and Characteristics ($T_a = 25^\circ\text{C}$)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Drain reverse current	I_{DRP}	Pulse (Note 1)	—	—	-54	A
Forward voltage (diode)	V_{DSF}		$I_{DR} = -18\text{ A}$, $V_{GS} = 0\text{ V}$	—	1.2	V







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