



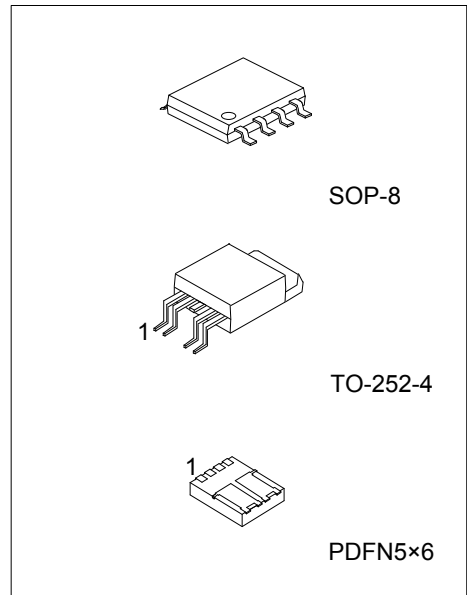
UTM4052

Power MOSFET

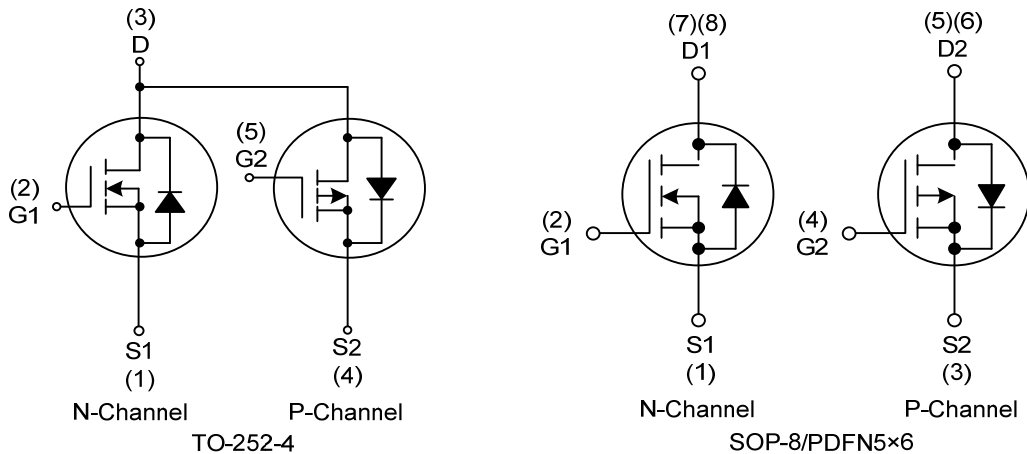
DUAL ENHANCEMENT MODE (N-CHANNEL/P-CHANNEL)

■ **FEATURES**

- * N-Channel: 40V/17A
 $R_{DS(ON)} \leq 38\text{ m}\Omega @ V_{GS} = 10V, I_D = 7.5A$
 $R_{DS(ON)} \leq 62\text{ m}\Omega @ V_{GS} = 5.0V, I_D = 5.0A$
- * P-Channel: -40V/-15A
 $R_{DS(ON)} \leq 50\text{ m}\Omega @ V_{GS} = -10V, I_D = -6.0A$
 $R_{DS(ON)} \leq 73\text{ m}\Omega @ V_{GS} = -5.0V, I_D = -3.5A$
- * Super High Dense Cell Design
- * Reliable and Rugged



■ **SYMBOL**



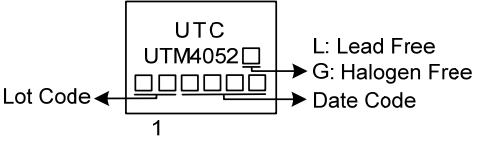
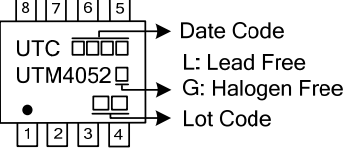
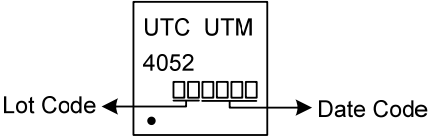
■ **ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UTM4052L-TN4-R	UTM4052G-TN4-R	TO-252-4	S1	G1	D	S2	G2	-	-	-	Tape Reel
UTM4052L-TN4-T	UTM4052G-TN4-T	TO-252-4	S1	G1	D	S2	G2	-	-	-	Tube
UTM4052L-S08-R	UTM4052G-S08-R	SOP-8	S1	G1	S2	G2	D2	D2	D1	D1	Tape Reel
UTM4052L-P5060-R	UTM4052G-P5060-R	PDFN5x6	S1	G1	S2	G2	D2	D2	D1	D1	Tape Reel

Note: Pin Assignment: G: Gate D: Drain S: Source

<p>UTM4052G-TN4-R</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Green Package</p>	<p>(1) R: Tape Reel, T: Tube</p> <p>(2) TN4: TO-252-4, S08: SOP-8, P5060: PDFN5x6</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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■ MARKING

PACKAGE	MARKING
TO-252-4	 <p>Diagram showing marking on a TO-252-4 package. The marking includes 'UTC' and 'UTM4052' followed by a small square. Below this, there are four squares representing a lot code and four squares representing a date code. A '1' is printed below the date code. To the right, 'L: Lead Free' and 'G: Halogen Free' are indicated. An arrow points from the lot code to 'Lot Code' and from the date code to 'Date Code'.</p>
SOP-8	 <p>Diagram showing marking on an SOP-8 package. The marking includes 'UTC' and 'UTM4052' followed by a small square. Above the marking are pins 8, 7, 6, and 5. Below are pins 1, 2, 3, and 4. To the right, 'L: Lead Free' and 'G: Halogen Free' are indicated. An arrow points from the date code to 'Date Code' and from the lot code to 'Lot Code'.</p>
PDFN5x6	 <p>Diagram showing marking on a PDFN5x6 package. The marking includes 'UTC UTM' and '4052' followed by a small square. Below this, there are four squares representing a lot code and four squares representing a date code. An arrow points from the lot code to 'Lot Code' and from the date code to 'Date Code'.</p>

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

PARAMETER		SYMBOL	RATINGS		UNIT
			N-CH	P-CH	
Drain-Source Voltage		V_{DS}	40	-40	V
Gate-Source Voltage		V_{GS}	± 20	± 20	V
Continuous Drain Current (Note 2)	$T_C=25^{\circ}\text{C}$	I_D	17	-15	A
Pulsed Drain Current (Note 2)	$T_C=25^{\circ}\text{C}$	I_{DM}	34	-30	A
Power Dissipation ($T_C=25^{\circ}\text{C}$)	SOP-8	P_D	3.1		W
	TO-252-4		25		W
	PDFN5x6		19		W
Junction Temperature		T_J	+150		$^{\circ}\text{C}$
Storage Temperature		T_{STG}	-55 ~ +150		$^{\circ}\text{C}$

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. Surface Mounted on 1in^2 pad area, $t \leq 10\text{sec}$.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient (Note)	SOP-8			
	TO-252-4	50	$^{\circ}\text{C}/\text{W}$	
	PDFN5x6	95	$^{\circ}\text{C}/\text{W}$	
Junction to Case	SOP-8	θ_{JC}	40	$^{\circ}\text{C}/\text{W}$
	TO-252-4		5	$^{\circ}\text{C}/\text{W}$
	PDFN5x6		6.6	$^{\circ}\text{C}/\text{W}$

Notes: Surface Mounted on 1in^2 pad area, $t \leq 10\text{sec}$.

■ ELECTRICAL CHARACTERISTICS (T_A=25°C, unless otherwise specified)

N-CHANNEL

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250uA	40			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =32V, V _{GS} =0V			1	uA
Gate-Source Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250uA	1.3	2.0	2.5	V
Drain-Source On-State Resistance (Note2)	R _{DS(ON)}	V _{GS} =10V, I _D =7.5A		30	38	mΩ
		V _{GS} =5.0V, I _D =5.0A		46	62	mΩ
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{ISS}	V _{GS} =0V, V _{DS} =20V, f=1.0MHz		480		pF
Output Capacitance	C _{OSS}			70		pF
Reverse Transfer Capacitance	C _{RSS}			50		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge (Note2)	Q _G	V _{DS} =20V, V _{GS} =10V, I _D =7.5A		17	24	nC
Gate-Source Charge	Q _{GS}			2.2		nC
Gate-Drain Charge	Q _{GD}			4		nC
Turn-ON Delay Time (Note2)	t _{D(ON)}	V _{DS} =20V, V _{GS} =10V, I _D =1A, R _G =6Ω, R _L =20Ω		7	14	ns
Turn-ON Rise Time	t _R			10	19	ns
Turn-OFF Delay Time	t _{D(OFF)}			17	32	ns
Turn-OFF Fall Time	t _F			3	6	ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Diode Continuous Forward Current (Note3)	I _S				20	A
Drain-Source Diode Forward Voltage(Note2)	V _{SD}	T _J =25°C, I _S =2A, V _{GS} =0V		0.8	1.1	V
Reverse Recovery Time	t _{rr}	I _{DS} =7.5A, dI/dt=100A/μs		21		ns
Reverse Recovery Charge	Q _{rr}			16		nC

■ ELECTRICAL CHARACTERISTICS (Cont.)

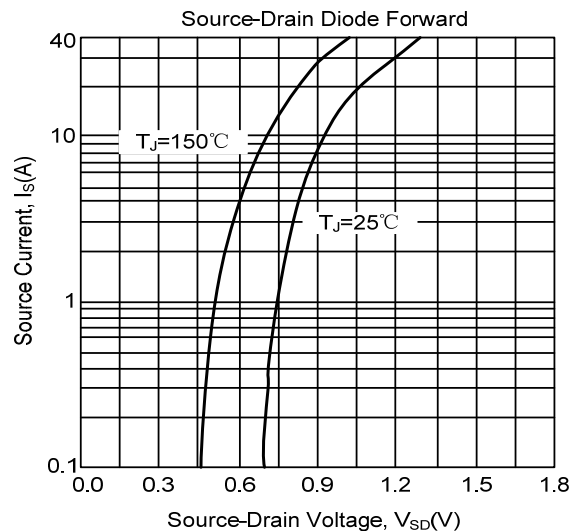
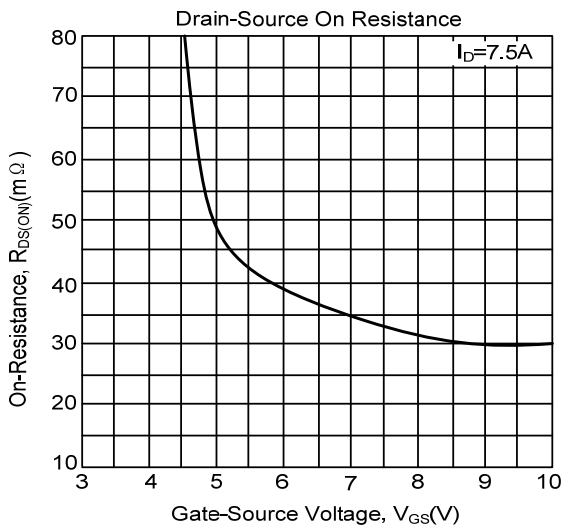
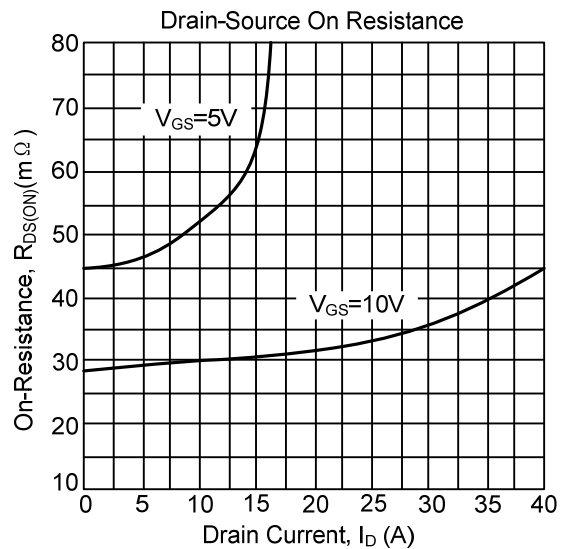
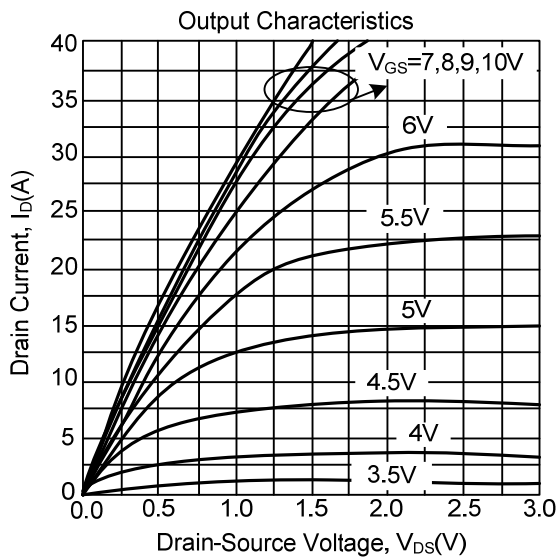
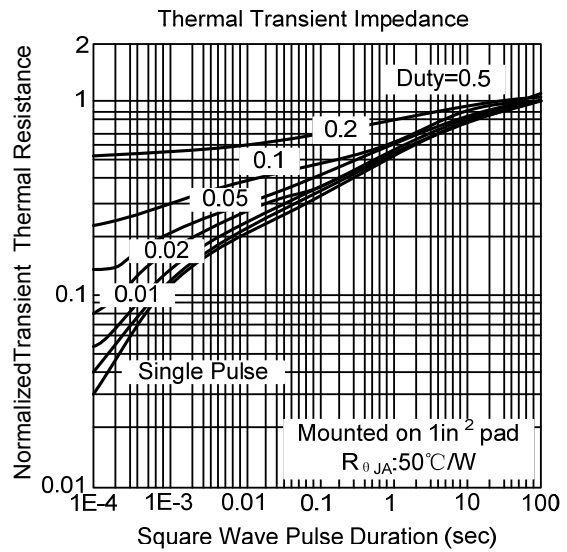
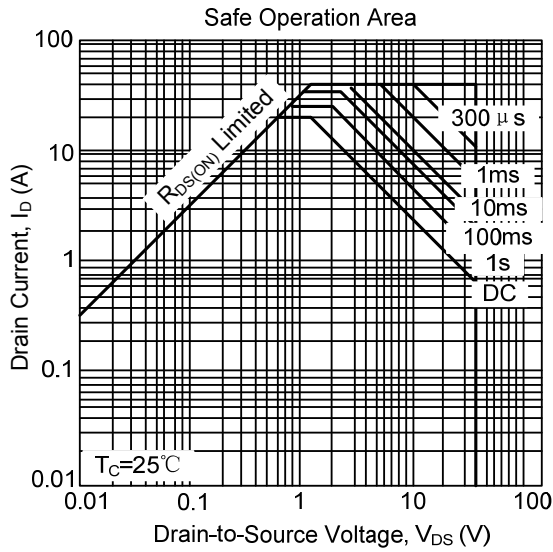
P-CHANNEL

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=-250\mu A$	-40			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=-32V, V_{GS}=0V$			-1	μA
Gate-Source Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$			± 100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.3	-2.0	-2.5	V
Drain-Source On-State Resistance (Note2)	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-6.0A$		45	50	m Ω
		$V_{GS}=-5.0V, I_D=-3.5A$		52	73	m Ω
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	$V_{GS}=0V, V_{DS}=-20V, f=1.0MHz$		970		pF
Output Capacitance	C_{OSS}			100		pF
Reverse Transfer Capacitance	C_{RSS}			70		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge (Note2)	Q_G	$V_{DS}=-20V, V_{GS}=-10V, I_D=-6A$		17	24	nC
Gate-Source Charge	Q_{GS}			2.2		nC
Gate-Drain Charge	Q_{GD}			4		nC
Turn-ON Delay Time (Note2)	$t_{D(ON)}$	$V_{DS}=-20V, V_{GS}=-10V, I_D=-1A, R_G=6\Omega, R_L=20\Omega$		5	10	ns
Turn-ON Rise Time	t_R			11	21	ns
Turn-OFF Delay Time	$t_{D(OFF)}$			37	68	ns
Turn-OFF Fall Time	t_F			12	23	ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Diode Continuous Forward Current (Note3)	I_S				-18	A
Drain-Source Diode Forward Voltage(Note2)	V_{SD}	$I_S=-2A, V_{GS}=0V, T_J=25^\circ C$		-0.8	-1.1	V
Reverse Recovery Time	t_{rr}	$I_{DS}=-6A, dI/dt=100A/\mu s$		17		ns
Reverse Recovery Charge	Q_{rr}			10		nC

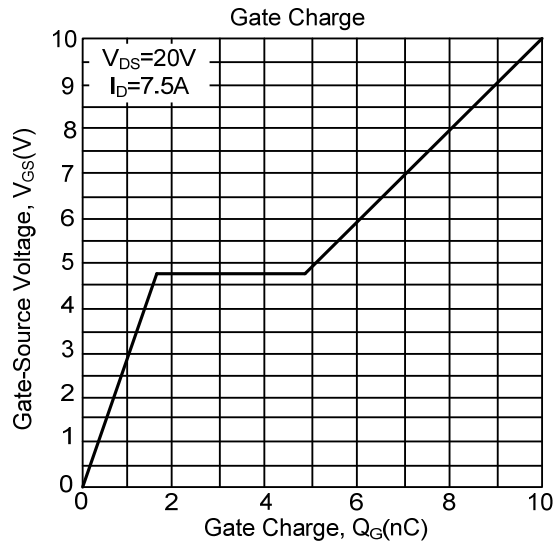
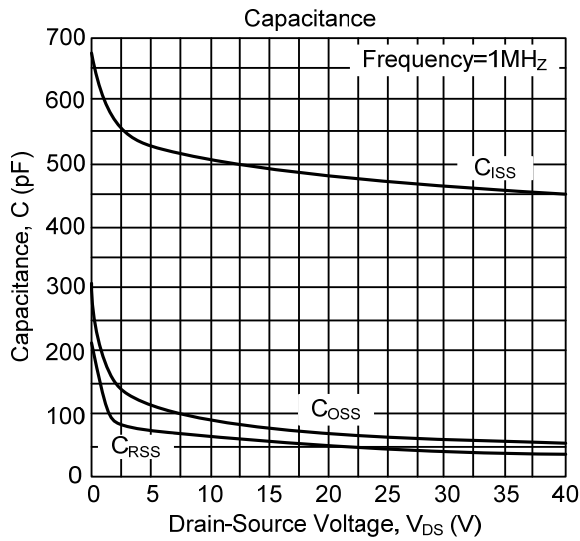
- Notes: 1. Pulse width limited by $T_{J(MAX)}$
 2. Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
 3. Surface Mounted on $1in^2$ pad area, $t \leq 10sec$.

TYPICAL CHARACTERISTICS

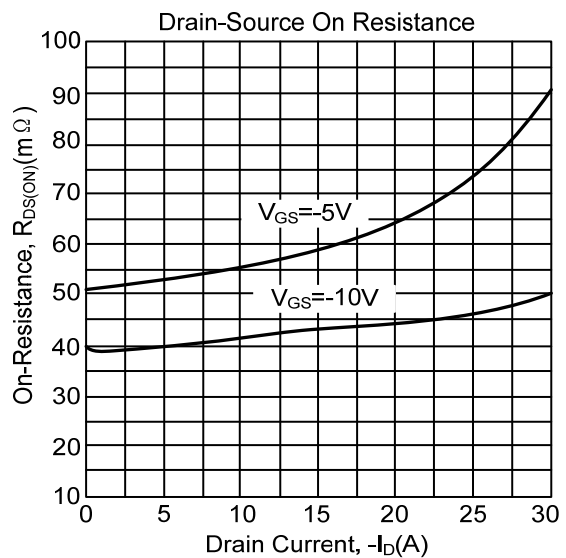
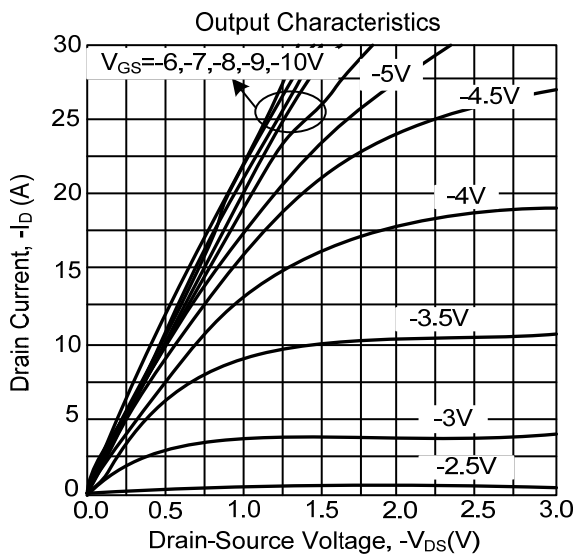
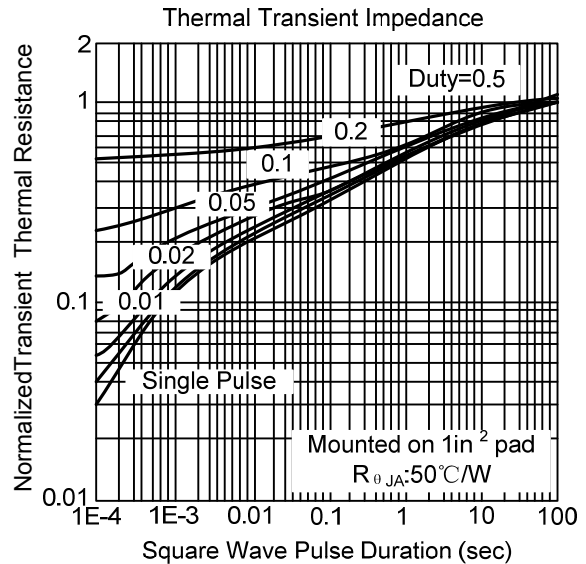
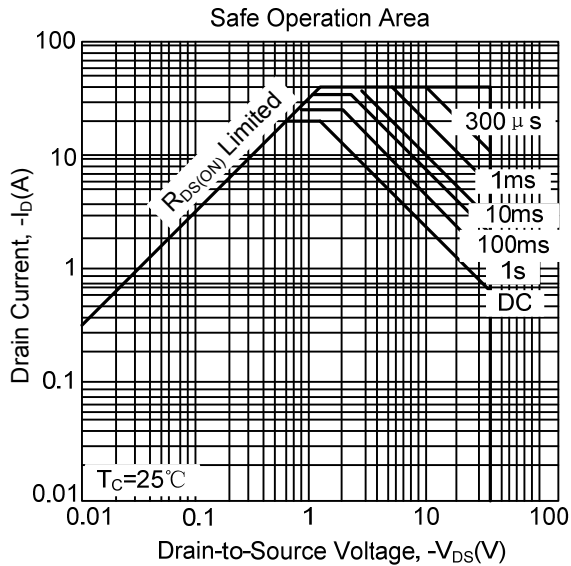
N-CHANNEL



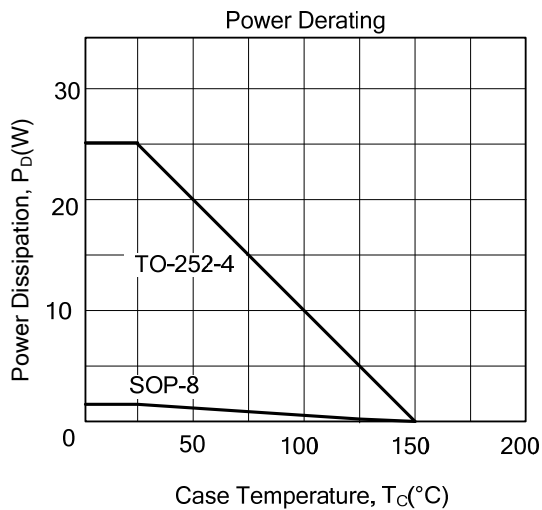
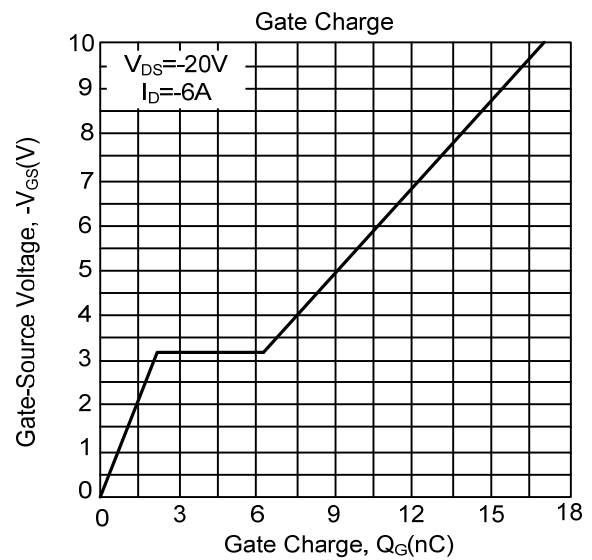
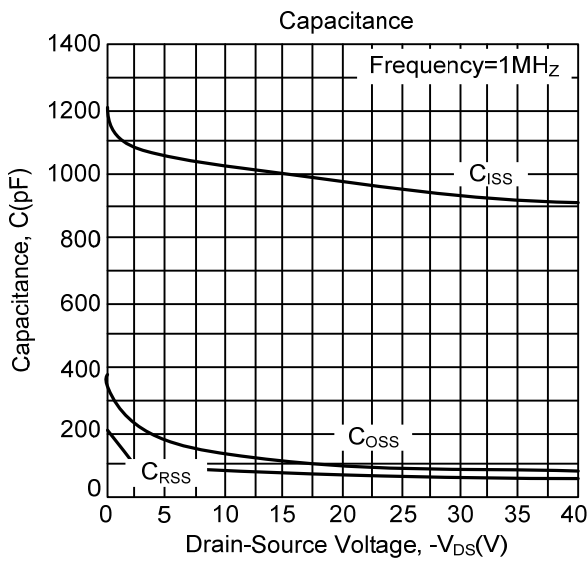
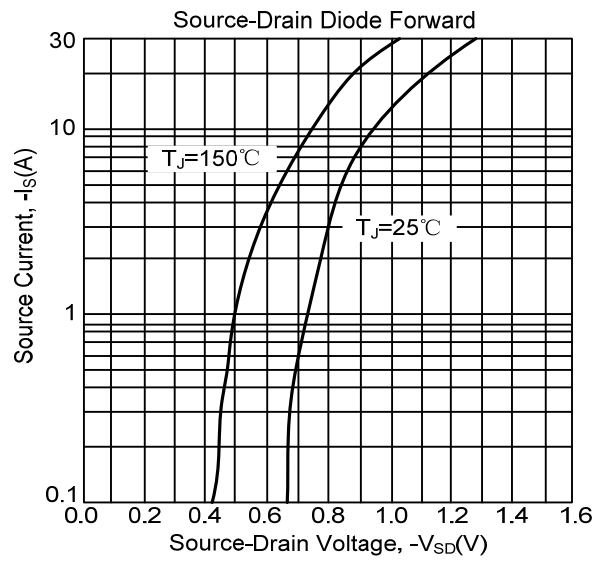
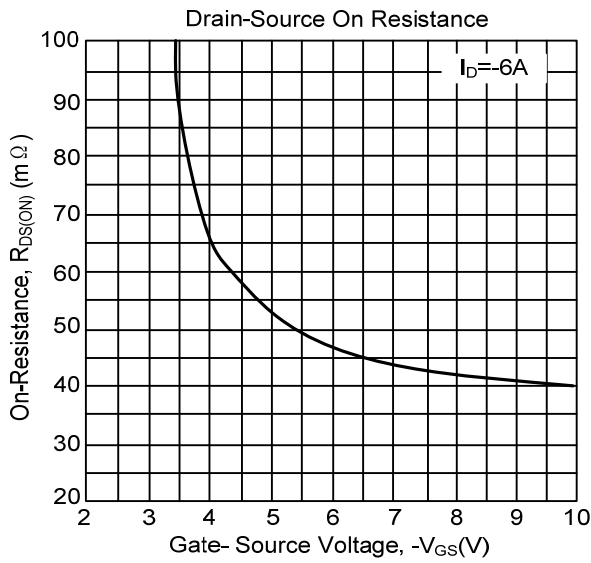
TYPICAL CHARACTERISTICS (Cont.)



P-CHANNEL



TYPICAL CHARACTERISTICS (Cont.)



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