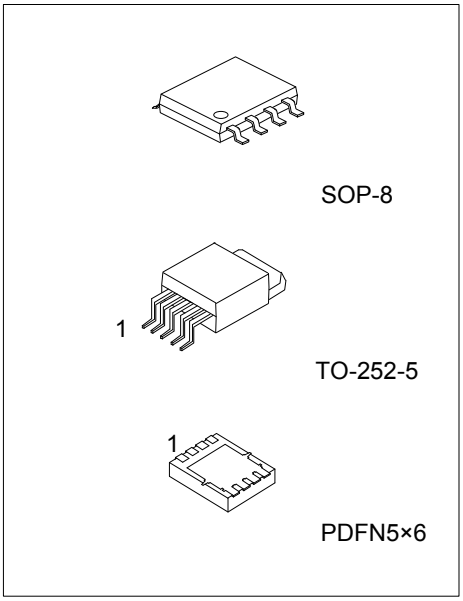
UD606

Power MOSFET

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



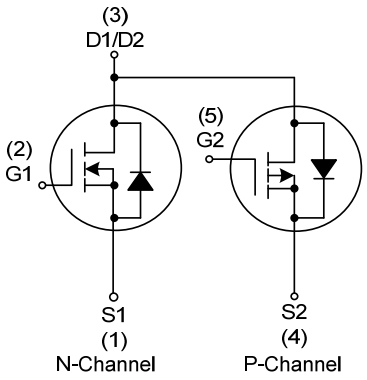
■ DESCRIPTION

The **UD606** can provide excellent $R_{DS(ON)}$ and low gate charge by using advanced trench technology MOSFETs. The **UD606** may be used in H-bridge, inverters and other applications.

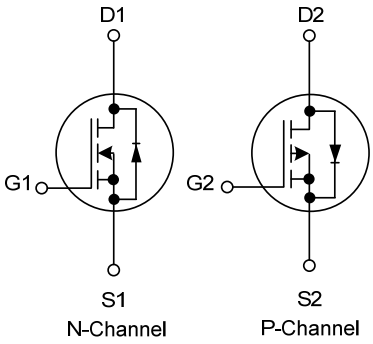
■ FEATURES

* N-Channel: 40V/8A
  $R_{DS(ON)}$ ≤ 33 mΩ @ V_{GS} =10V, I_D=8.0A
  $R_{DS(ON)}$ ≤ 55 mΩ @ V_{GS}= 4.5V, I_D=6.0A
* P-Channel: -40V/-8A
  $R_{DS(ON)}$ ≤ 50 mΩ @ V_{GS}= -10V, I_D=-8.0A
  $R_{DS(ON)}$ ≤ 70 mΩ @ V_{GS}= -4.5V, I_D=-4.0A
* Super high dense cell design
* Reliable and rugged

■ SYMBOL



TO-252-5

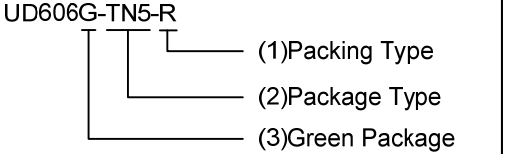


SOP-8/PDFN5×6

■ ORDERING INFORMATION

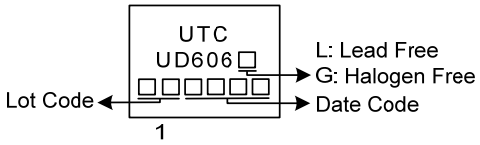
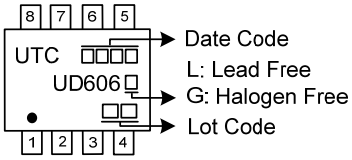
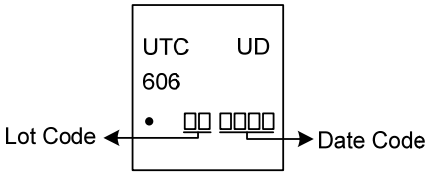
Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UD606L-TN5-R	UD606G-TN5-R	TO-252-5	S1	G1	D1/D2	S2	G2	-	-	-	Tape Reel
UD606L-S08-R	UD606G-S08-R	SOP-8	S1	G1	S2	G2	D2	D2	D1	D1	Tape Reel
UD606L-P5060-R	UD606G-P5060-R	PDFN5×6	S1	G1	S2	G2	D2	D2	D1	D1	Tape Reel

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



(1) R: Tape Reel
(2) TN5: TO-252-5, S08: SOP-8, P5060: PDFN5×6
(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

PACKAGE	MARKING
TO-252-5	
SOP-8	
PDFN5×6	

■ ABSOLUTE MAXIMUM RATINGS (T_A = 25°C, unless otherwise specified)

N-Channel:

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	40	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current (Note3)	T_C=25°C	I_D	8	A
Pulsed Drain Current (Note3)	T_C=25°C	I_{DM}	30	A
Power Dissipation	TO-252-5	P_D	2	W
	SOP-8		1.25	W
	PDFN5×6		1.57	W
Junction Temperature		T_J	+175	°C
Storage Temperature		T_{STG}	-55 ~ +175	°C

P-Channel:

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	-40	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current (Note3)	T_C=25°C	I_D	-8	A
Pulsed Drain Current (Note3)	T_C=25°C	I_{DM}	-30	A
Power Dissipation	TO-252-5	P_D	2	W
	SOP-8		1.25	W
	PDFN5×6		1.57	W
Junction Temperature		T_J	+175	°C
Storage Temperature		T_{STG}	-55 ~ +175	°C

Note: 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.

■ THERMAL DATA

PARAMETER			SYMBOL	MIN	TYP	MAX	UNIT
Junction to Ambient	N-Channel	TO-252-5	θ_{JA}		50	60	°C/W
		SOP-8			70	100	°C/W
		PDFN5×6			65	80	°C/W
	P-Channel	TO-252-5			40	50	°C/W
		SOP-8			68	100	°C/W
		PDFN5×6			63	80	°C/W

Note: Device mounted on FR-4 substrate P_C board, 2oz copper, with 1inch square copper plate.

■ 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	1.0	2.3	3.0	V
Drain-Source On-State Resistance (Note2)	$R_{DS(ON)}$	V_{GS}=10V, I_D=8.0A			33	mΩ
		V_{GS}=4.5V, I_D=6.0A			55	mΩ
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	V_{GS}=0V,V_{DS}=20V, f=1MHz		580		pF
Output Capacitance	C_{OSS}			100		pF
Reverse Transfer Capacitance	C_{RSS}			87		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge (Note2)	Q_G	V_{DS}=20V, V_{GS}=10V, I_D=8A		85		nC
Gate-Source Charge	Q_{GS}			9		nC
Gate-Drain Charge	Q_{GD}			7		nC
Turn-ON Delay Time (Note2)	$t_{D(ON)}$	V_{DS}=20V, V_{GS}=10V, R_G=3Ω I_D=1A		30		ns
Turn-ON Rise Time	t_R			30		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			140		ns
Turn-OFF Fall Time	t_F			70		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Diode Continuous Forward Current	I_S				8	A
Drain-Source Diode Forward Voltage(Note2)	V_{SD}	I_S=1A, V_{GS}=0V		0.76	1	V
Reverse Recovery Time	t_{rr}	I_F=8A, dI/dt=100A/μs		22.9		ns
Reverse Recovery Charge	Q_{rr}			18.3		nC

■ ELECTRICAL CHARACTERISTICS(Cont.)

P-CHANNEL

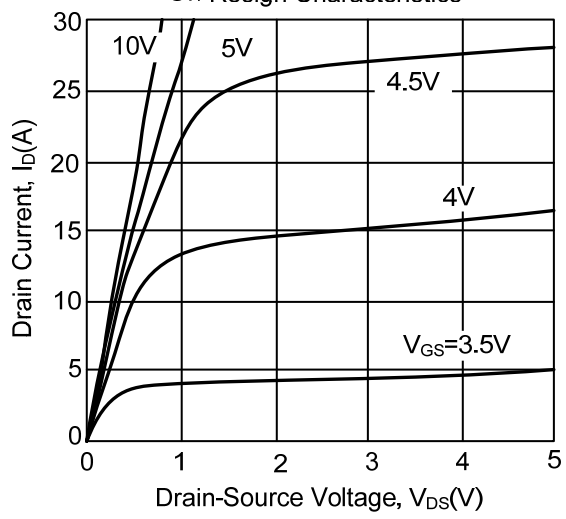
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=-250uA	-40			V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=-32V, V_{GS}=0V			-1	uA
Gate-Source Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±20V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=-250uA	-1.0	-1.8	-3.0	V
Drain-Source On-State Resistance (Note2)	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-8.0A		35	50	mΩ
		V_{GS}=-4.5V, I_D=-4.0A		55	70	mΩ
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	V_{GS}=0V, V_{DS}=-20V, f=1.0MHz		657		pF
Output Capacitance	C_{OSS}			143		pF
Reverse Transfer Capacitance	C_{RSS}			63		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge (Note2)	Q_G	V_{DS}=-20V, V_{GS}=-10V, I_D=-8A		14.1		nC
Gate-Source Charge	Q_{GS}			2.2		nC
Gate-Drain Charge	Q_{GD}			4.1		nC
Turn-ON Delay Time (Note2)	$t_{D(ON)}$	V_{DS}=-20V, V_{GS}=-10V, R_G=3Ω, R_L=2.5Ω		8		ns
Turn-ON Rise Time	t_R			12.2		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			24		ns
Turn-OFF Fall Time	t_F			12.5		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Diode Continuous Forward Current	I_S				-8	A
Drain-Source Diode Forward Voltage(Note2)	V_{SD}	I_S=-1A, V_{GS}=0V		-0.75	-1	V
Reverse Recovery Time	t_{rr}	I_F=-8A, dI/dt=100A/μs		23.2		ns
Reverse Recovery Charge	Q_{rr}			18.2		nC

Notes: 1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Pulse width ≤ 300us, duty cycle ≤ 0.5%.
3. Surface Mounted on 1in ^{2} pad area, t ≤ 10sec.

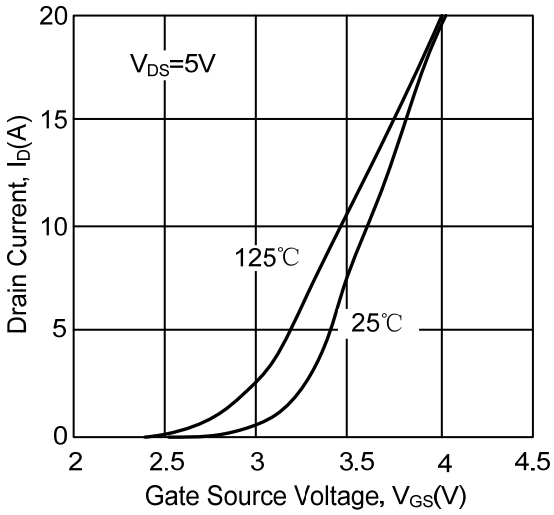
■ TYPICAL CHARACTERISTICS

N-CHANNEL

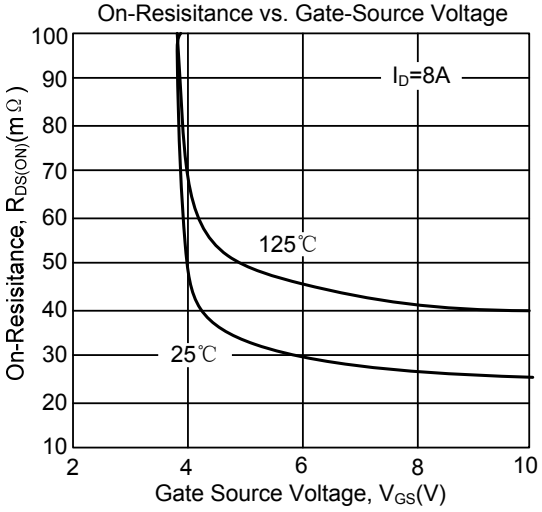
On-Resign Characteristics



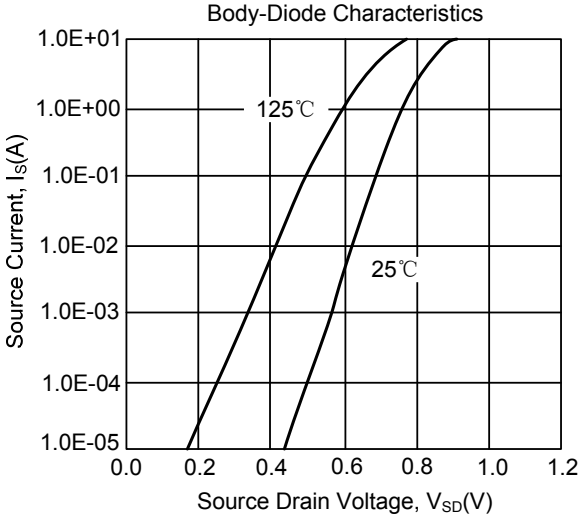
Transfer Characteristics



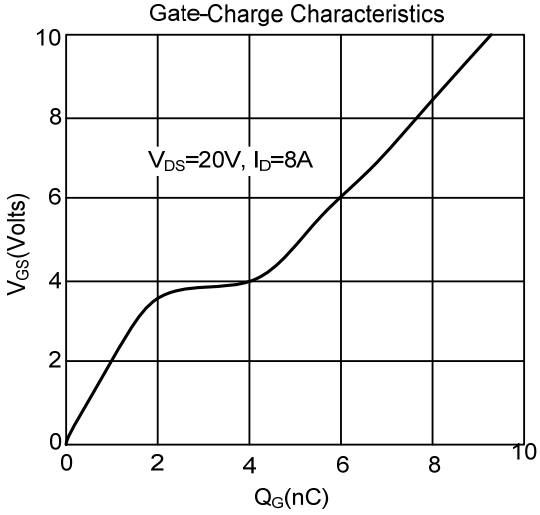
On-Resisitance vs. Gate-Source Voltage



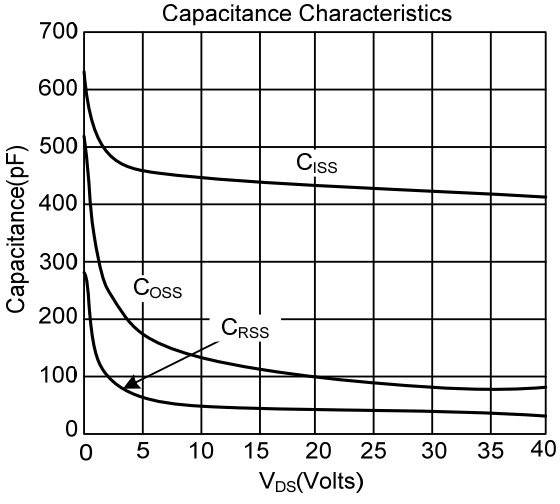
Body-Diode Characteristics



Gate-Charge Characteristics

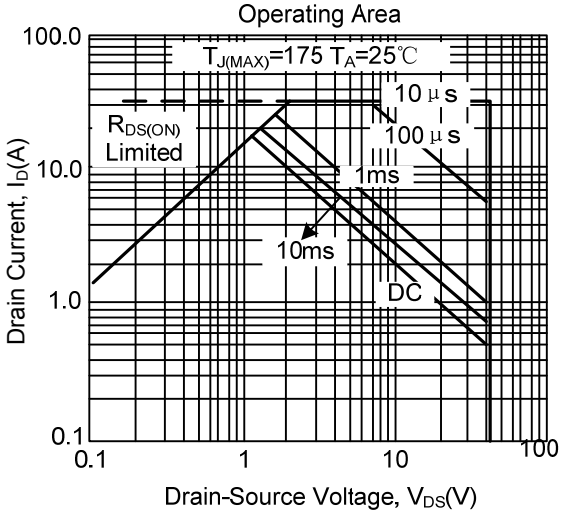


Capacitance Characteristics

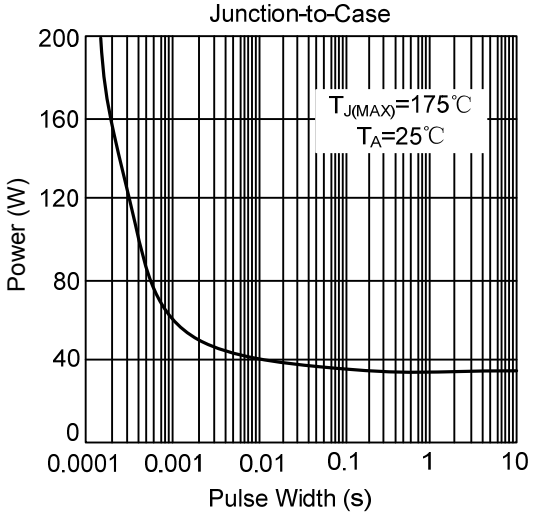


■ TYPICAL CHARACTERISTICS (Cont.)

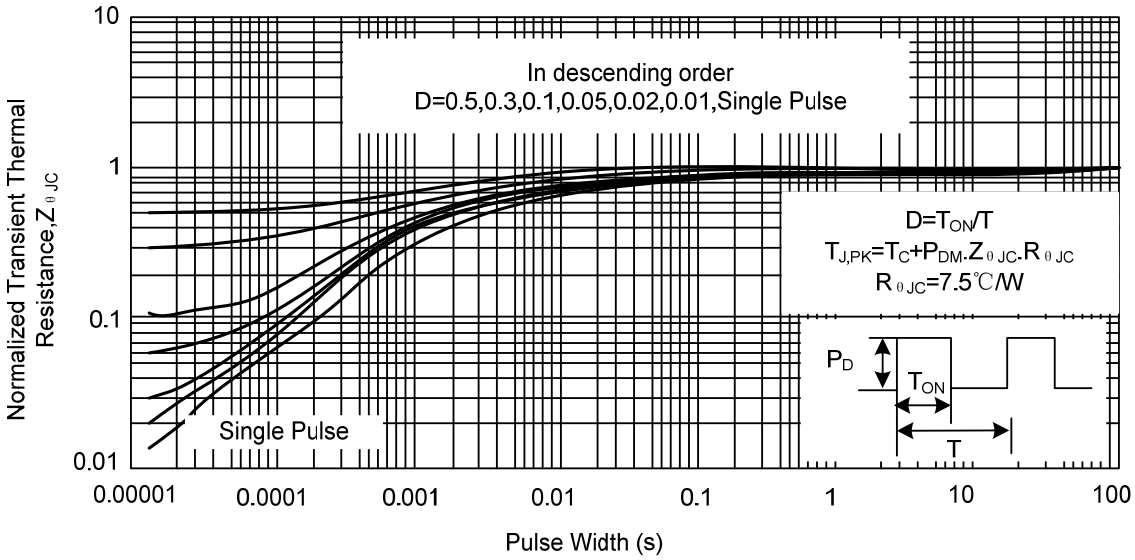
Maximum Forward Biased Safe Operating Area



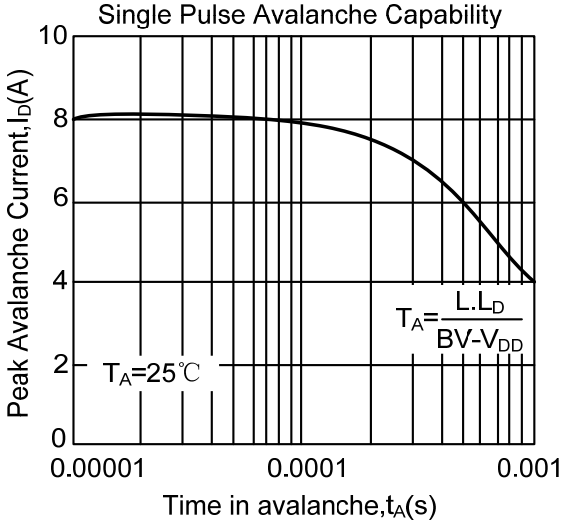
Single Pulse Power Rating Junction-to-Case



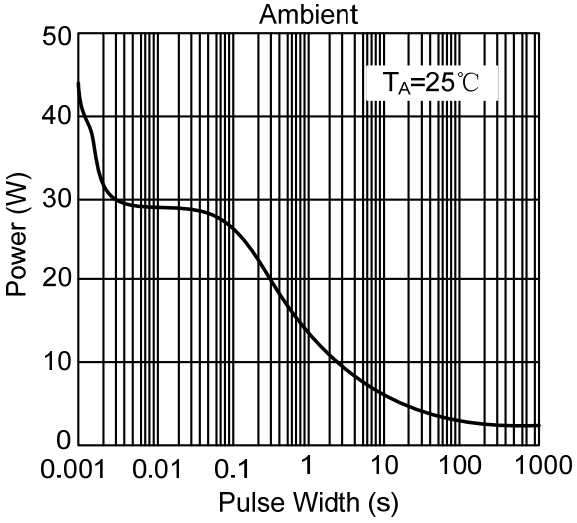
Normalized Maximum Transient Thermal Impedance (Note F)



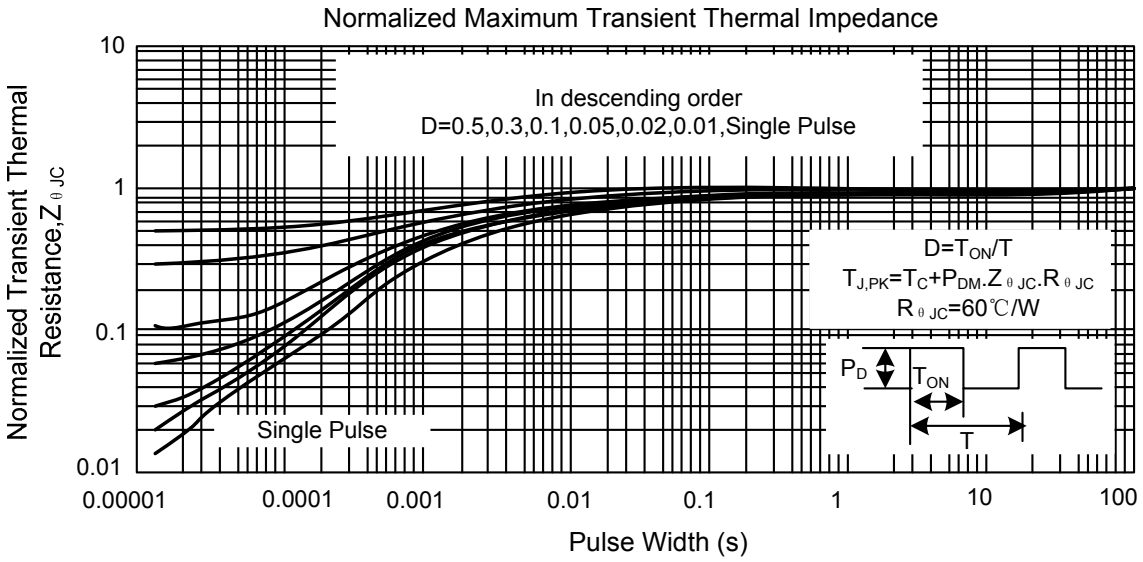
Single Pulse Avalanche Capability

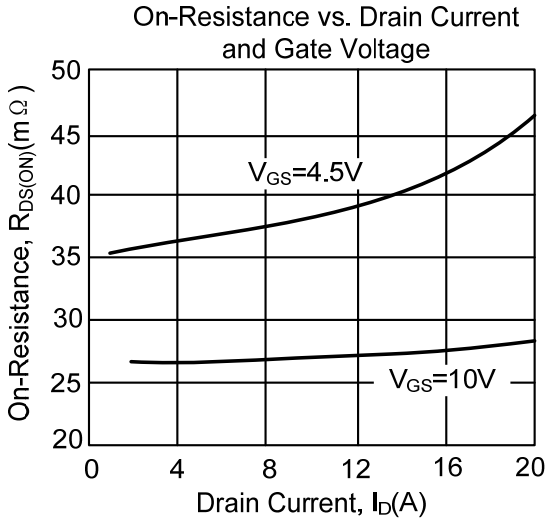


Single Pulse Power Rating Junction-to-Ambient



■ TYPICAL CHARACTERISTICS (Cont.)

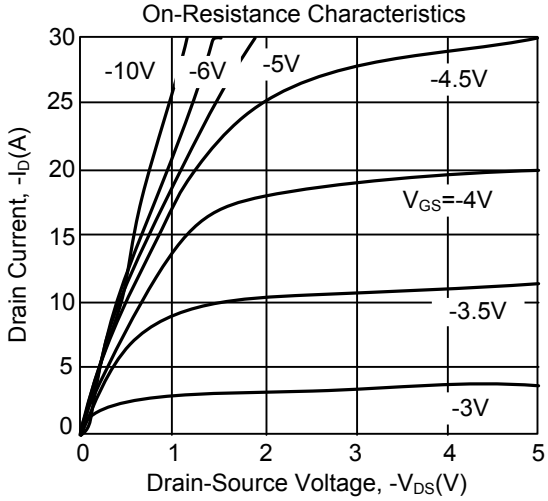




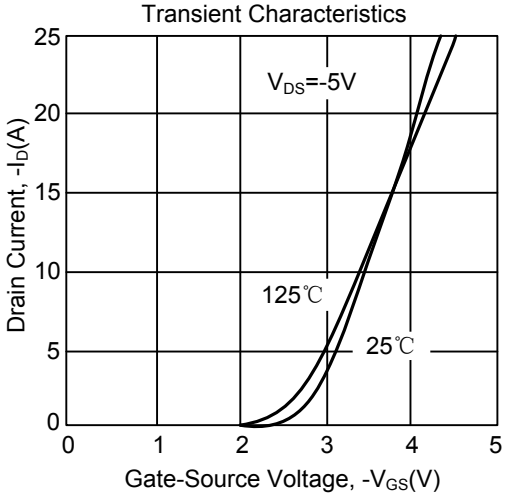
■ TYPICAL CHARACTERISTICS (Cont.)

P-CHANNEL:

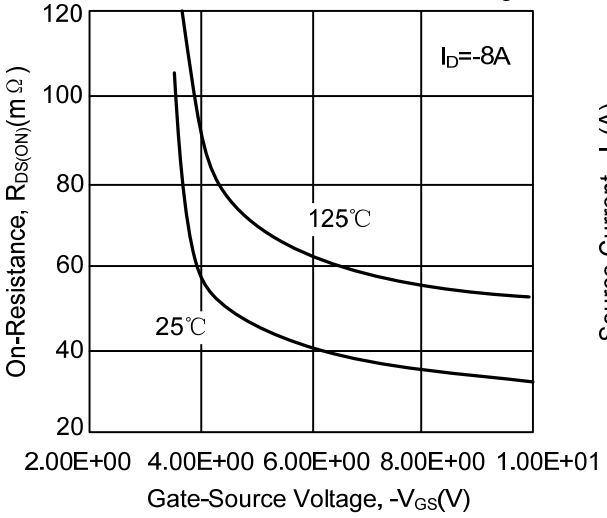
On-Resistance Characteristics



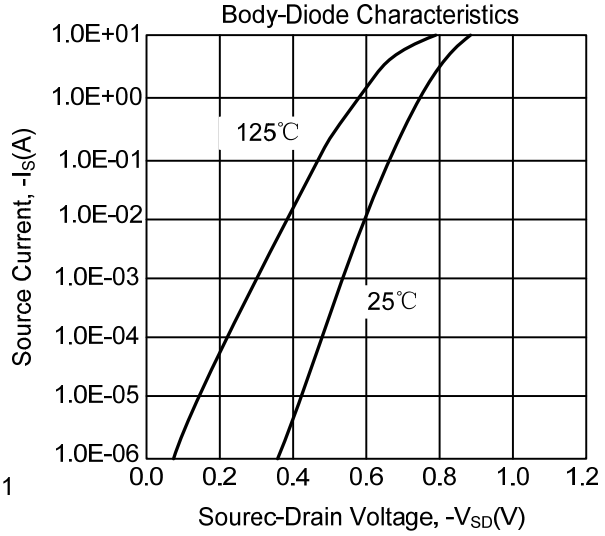
Transient Characteristics



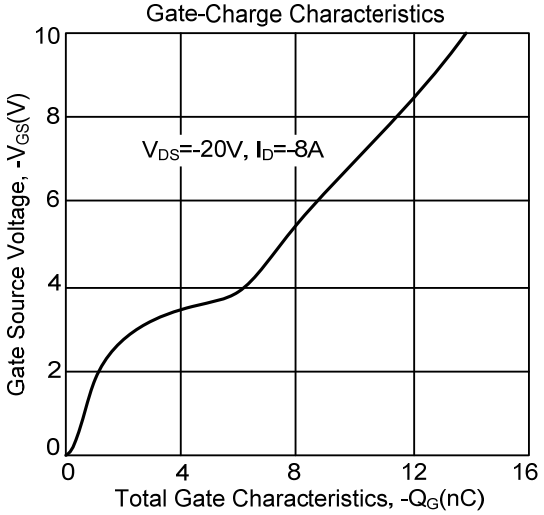
On-Resistance vs. Gate-Source Voltage



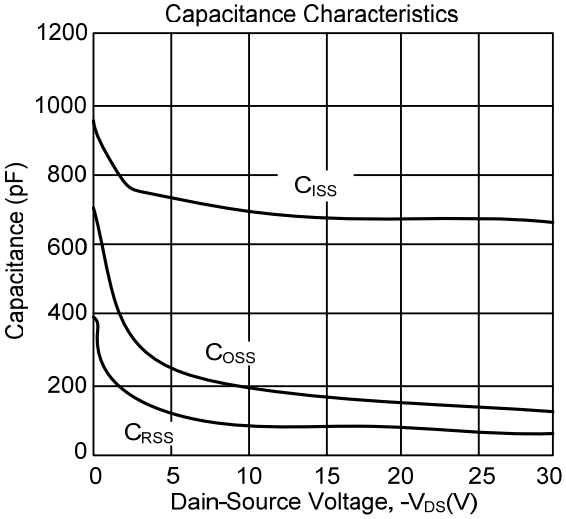
Body-Diode Characteristics



Gate-Charge Characteristics

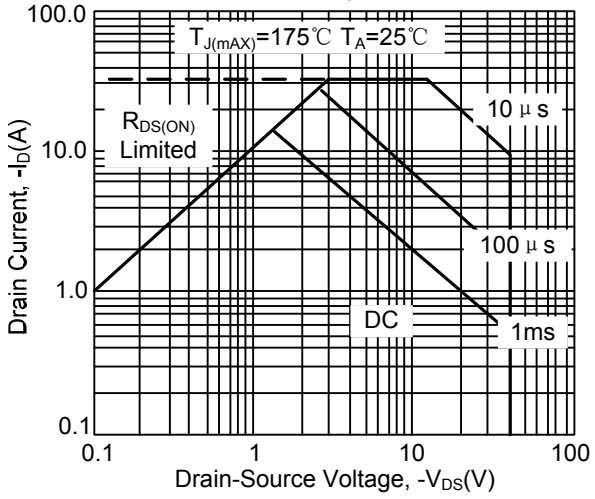


Capacitance Characteristics

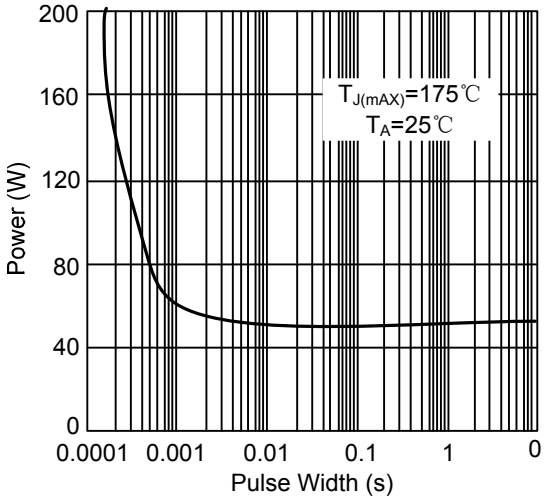


■ TYPICAL CHARACTERISTICS (Cont.)

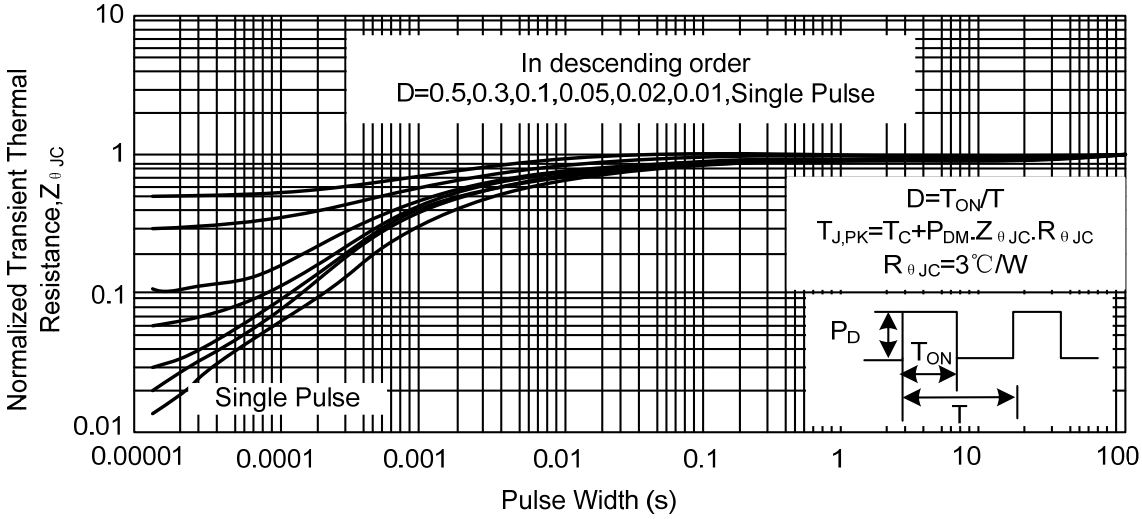
Maximum Forward Biased Safe Operating Area



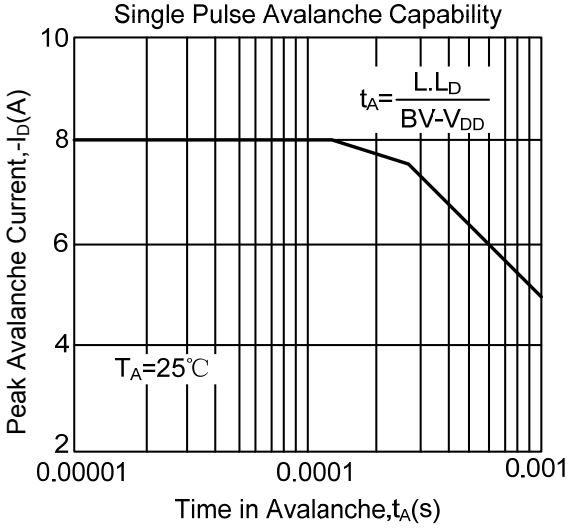
Single Pulse Power Rating Junction-to-Case



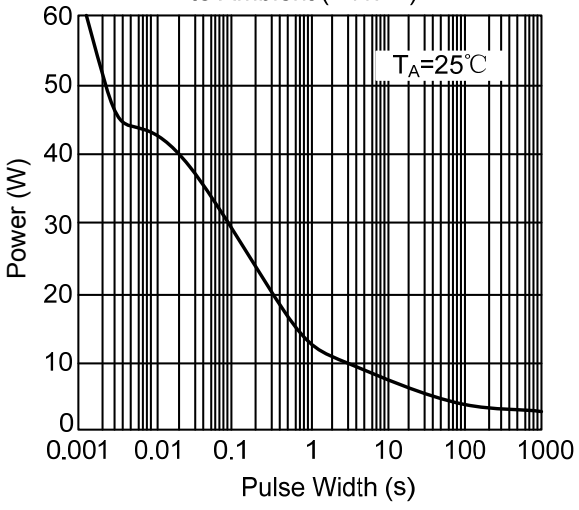
Normalized Maximum Transient Thermal Impedance



Single Pulse Avalanche Capability



Single Pulse Power Rating Junction-to-Ambient (Note H)



■ TYPICAL CHARACTERISTICS (Cont.)