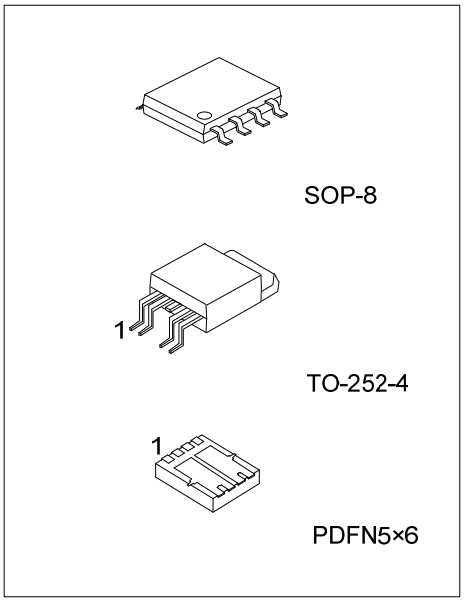
UTT6NP10

Power MOSFET

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



■ DESCRIPTION

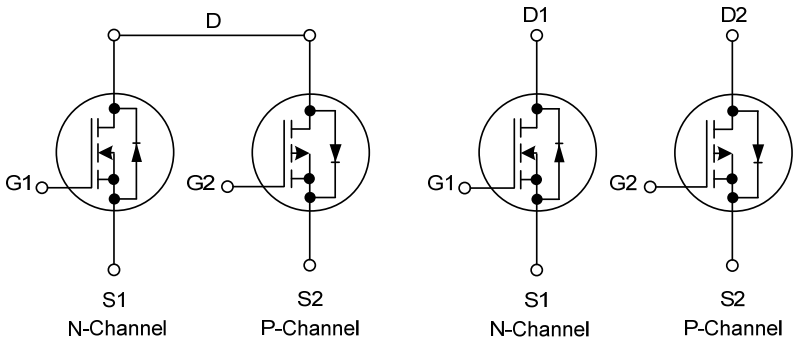
The UTC **UTT6NP10** incorporates an N-channel MOSFET and a P-channel MOSFET，it uses UTC's advanced technology to provide customers a minimum on-state resistance and high-speed switching, thereby enabling high-density mounting.

The UTC **UTT6NP10** is universally applied in high-speed switching, motor driver.

■ FEATURES

* $R_{DS(on)}$ ≤ 150 mΩ @ V_{GS}=10V, I_D=3.0A
  $R_{DS(on)}$ ≤ 200 mΩ @ V_{GS}=4.5V, I_D=3.0A
* $R_{DS(on)}$ ≤ 155 mΩ @ V_{GS}=-10V, I_D=-3.0A
  $R_{DS(on)}$ ≤ 210 mΩ @ V_{GS}=-4.5V, I_D=-3.0A
* High switching speed

■ SYMBOL



TO-252-4 SOP-8/PDFN5×6

■ ORDERING INFORMATION

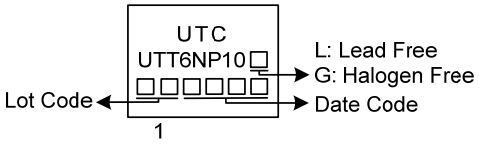
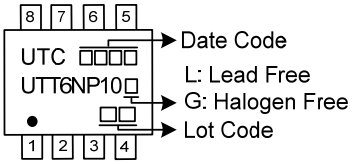
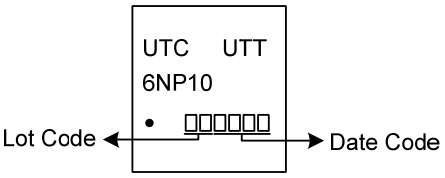
Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UTT6NP10L-TN4-R	UTT6NP10G- TN4-R	TO-252-4	S1	G1	D	S2	G2	-	-	-	Tape Reel
UTT6NP10L- S08-R	UTT6NP10G- S08-R	SOP-8	S1	G1	S2	G2	D2	D2	D1	D1	Tape Reel
UTT6NP10L-P5060-R	UTT6NP10G-P5060-R	PDFN5×6	S1	G1	S2	G2	D2	D2	D1	D1	Tape Reel

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

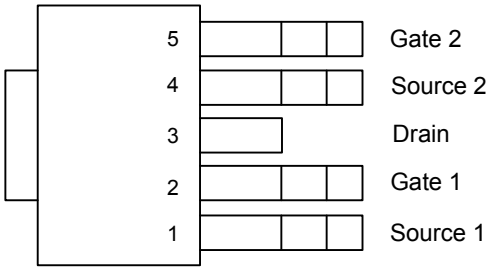
UTT6NP10G-TN4-R
(1)Packing Type
(2)Package Type
(3)Green Package

(1) R: Tape Reel
(2) TN4: TO-252-4, S08: SOP-8, P5060: PDFN5×6
(3) G: Halogen Free and Lead Free, L: Lead Free

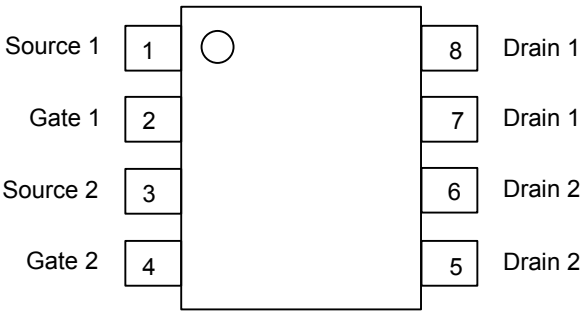
■ MARKING

PACKAGE	MARKING
TO-252-4	
SOP-8	
PDFN5x6	

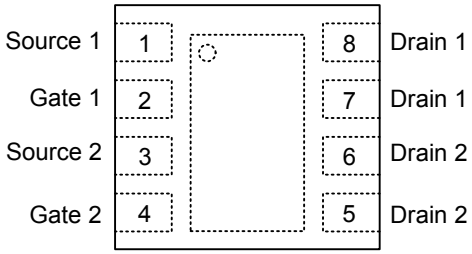
■ PIN CONFIGURATION



TO-252-4



SOP-8



Top View
DFN5060-8

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

PARAMETER		SYMBOL	RATINGS		UNIT
			N-CHANNEL	P-CHANNEL	
Drain-Source Voltage		V_{DSS}	100	-100	V
Gate-Source Voltage		V_{GSS}	±20	±20	V
Drain Current	Continuous (Note 3)	I_D	6	-6	A
	Pulsed (Note 1)	I_{DM}	12	-12	A
Power Dissipation (T_A=25°C)	TO-252-4	P_D	3.1		W
	SOP-8		1.4		W
	PDFN5x6		1.9		W
Junction Temperature		T_J	-55 ~ +150		°C
Storage Temperature Range		T_{STG}	-55 ~ +150		°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	RATINGS	UNIT
Junction to Ambient	TO-252-4	θ_{JA}	40	°C/W
	SOP-8		89.3	°C/W
	PDFN5x6		65	°C/W

Note: Device mounted on FR-4 substrate PC 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}	I_D=250μA, V_{GS}=0V	100			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=100V, V_{GS}=0V			10	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=+20V			+100	nA
	Reverse		V_{GS}=-20V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	1.0		3.0	V
Static Drain-Source On-State Resistance (Note 2)		$R_{DS(ON)}$	V_{GS}=10V, I_D=3.0A			150	mΩ
			V_{GS}=4.5V, I_D=3.0A			200	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=-25V, f=1.0MHz		923		pF
Output Capacitance		C_{OSS}			54		pF
Reverse Transfer Capacitance		C_{RSS}			43		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 2)		Q_G	V_{DS}=50V, V_{GS}=10V, I_D=6A (Note 1, 2)		23		nC
Gate to Source Charge		Q_{GS}			3.4		nC
Gate to Drain Charge		Q_{GD}			4.7		nC
Turn-ON Delay Time (Note 2)		$t_{D(ON)}$	V_{DD}=50V, V_{GS}=10V, I_D=6A, R_G =25Ω (Note 1, 2)		3.5		ns
Rise Time		t_R			17		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			22		ns
Fall-Time		t_F			17		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Drain-Source Diode Forward Voltage(Note 2)		V_{SD}	I_S=6.0A, V_{GS}=0V			1.3	V

■ ELECTRICAL CHARACTERISTICS (Cont.)

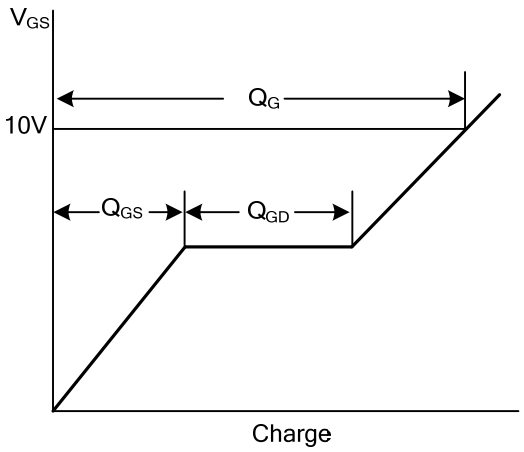
P-Channel

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=-250μA, V_{GS}=0V	-100			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=-100V, V_{GS}=0V			-10	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=+20V, V_{GS}=0V			+100	nA
	Reverse		V_{GS}=-20V, V_{GS}=0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=-250μA	-1.0		-3.0	V
Static Drain-Source On-State Resistance (Note 2)		$R_{DS(ON)}$	V_{GS}=-10V, I_D=-3.0A			155	mΩ
			V_{GS}=-4.5V, I_D=-3.0A			210	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=-25V, f=1.0MHz		1650		pF
Output Capacitance		C_{OSS}			90		pF
Reverse Transfer Capacitance		C_{RSS}			62		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 2)		Q_G	V_{DS}=-50V, V_{GS}=-10V, I_D=-6A (Note 1, 2)		34		nC
Gate to Source Charge		Q_{GS}			5.2		nC
Gate to Drain Charge		Q_{GD}			5.5		nC
Turn-ON Delay Time (Note 2)		$t_{D(ON)}$	V_{DD}=-50V, V_{GS}=-10V, I_D=-6A, R_G=3.3Ω (Note 1, 2)		6.5		ns
Rise Time		t_R			17		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			37		ns
Fall-Time		t_F			19		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Drain-Source Diode Forward Voltage(Note 2)		V_{SD}	I_S=-6.0A, V_{GS}=0V			-1.3	V

Notes: 1. Pulse Test: Pulse width limited by Max. junction temperature.
2. N-CH, P-CH are same, mounted on 2oz FR4 board t≦10s.

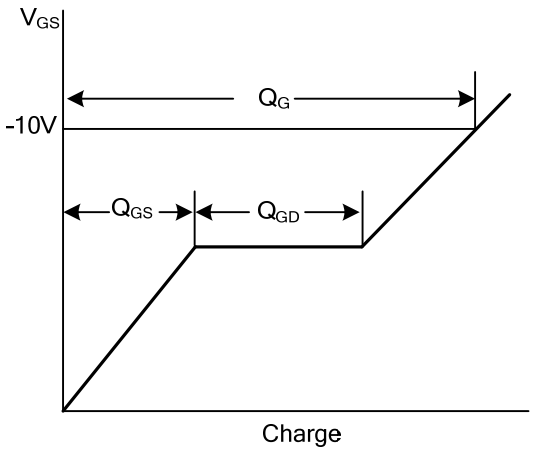
■ TEST CIRCUITS AND WAVEFORMS

N-CHANNEL



Gate Charge Waveforms

P-CHANNEL

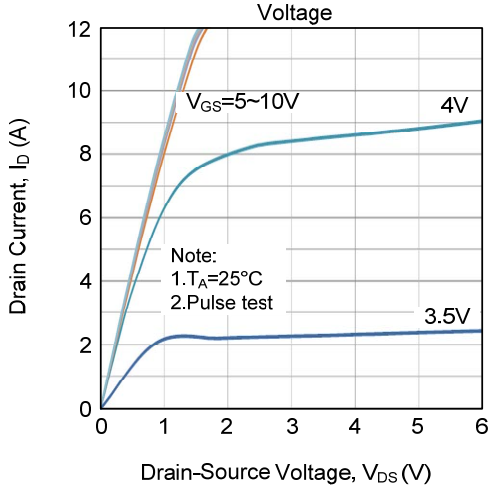


Gate Charge Waveforms

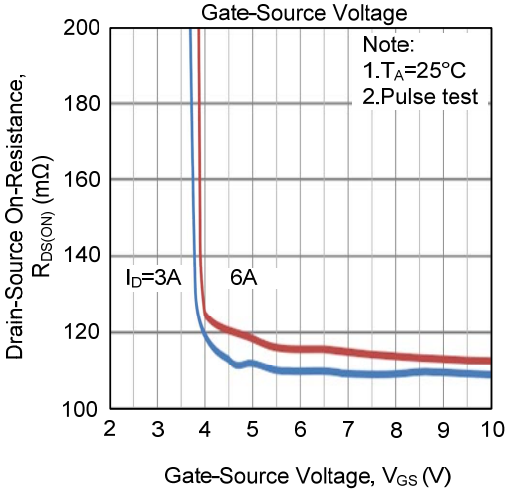
■ TYPICAL CHARACTERISTICS

N-CHANNEL

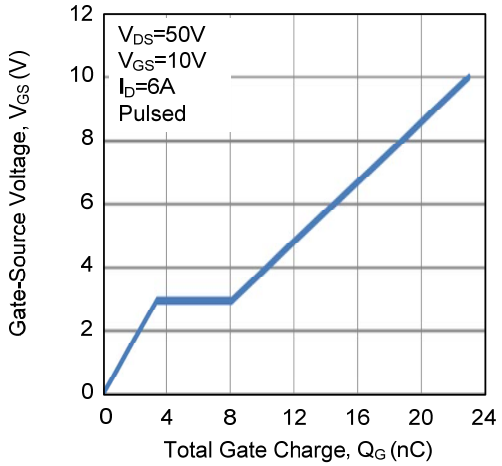
Drain Current vs. Drain-Source Voltage



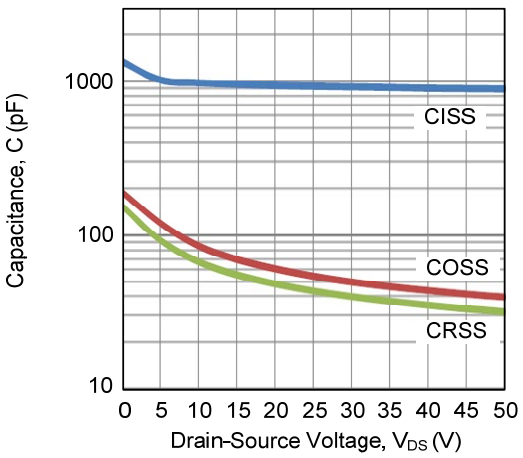
Drain-Source On-Resistance vs. Gate-Source Voltage



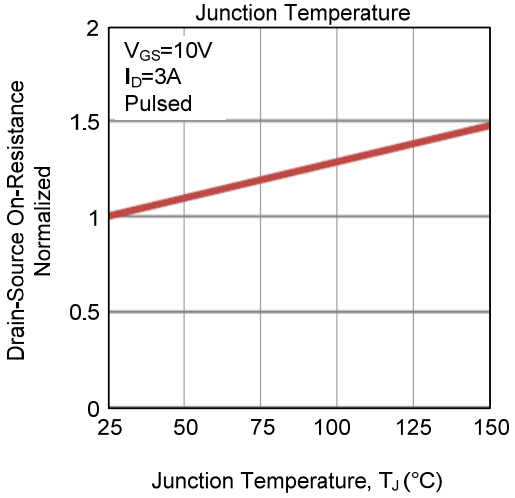
Gate Charge Characteristics



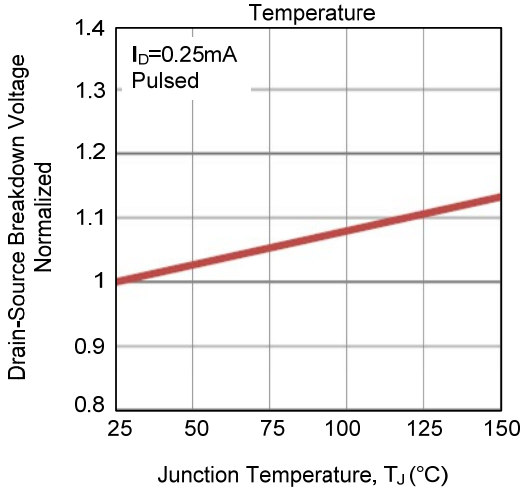
Capacitance Characteristics



Drain-Source On-Resistance vs. Junction Temperature



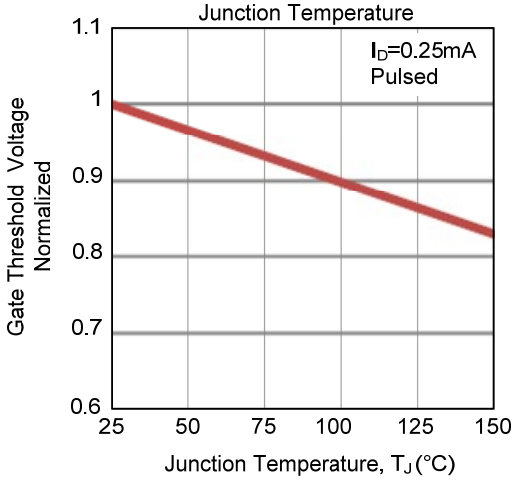
Breakdown Voltage vs. Junction Temperature



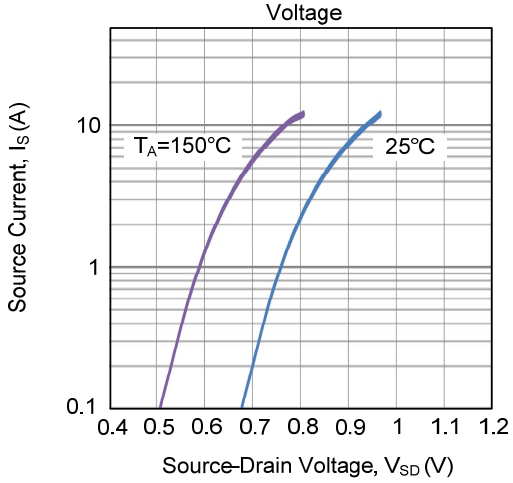
■ TYPICAL CHARACTERISTICS (Cont.)

N-CHANNEL

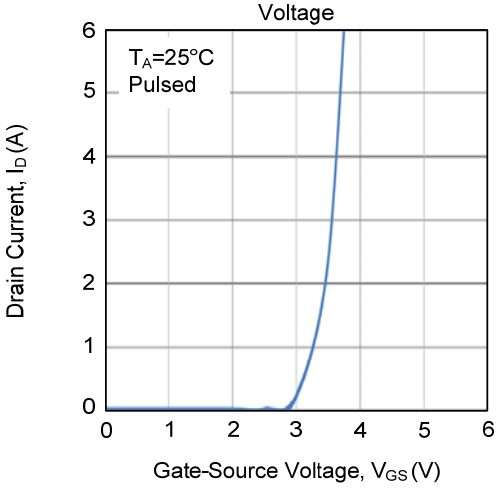
Gate Threshold Voltage vs. Junction Temperature



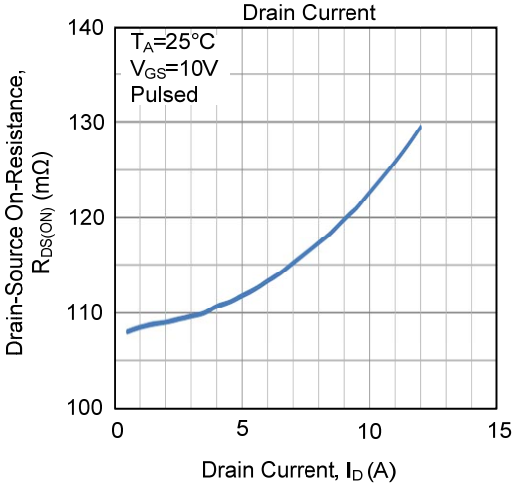
Source Current vs. Source-Drain Voltage



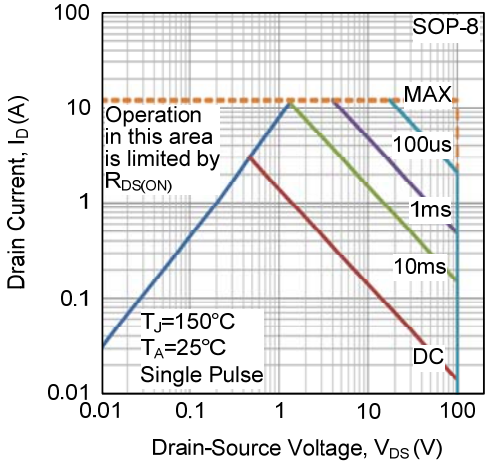
Drain Current vs. Gate-Source Voltage



Drain-Source On-Resistance vs. Drain Current



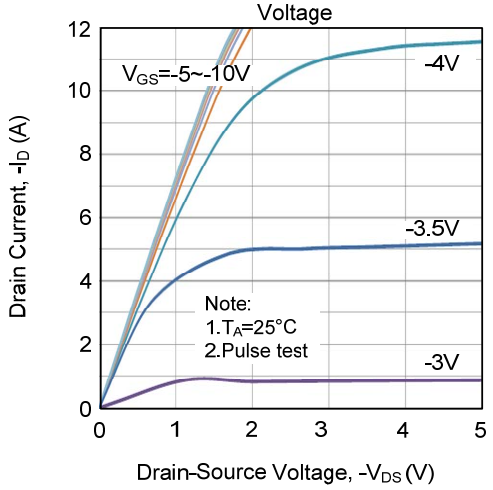
Safe Operating Area



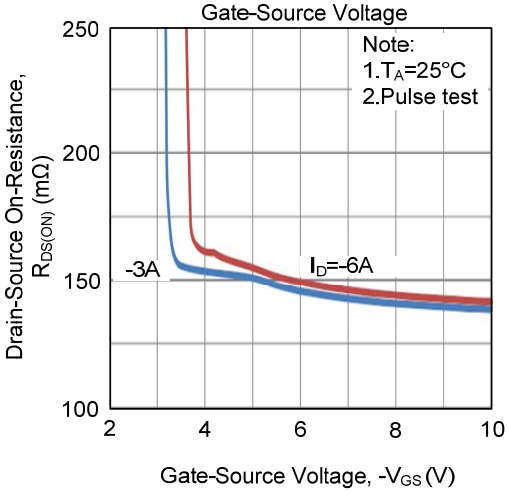
■ TYPICAL CHARACTERISTICS (Cont.)

P-CHANNEL

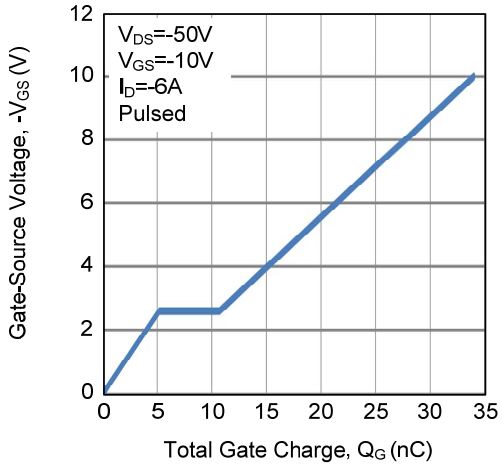
Drain Current vs. Drain-Source Voltage



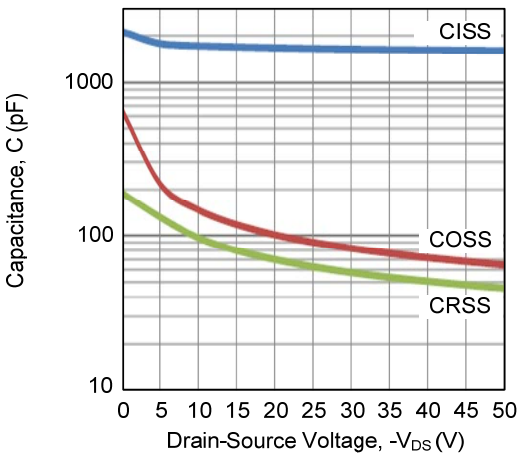
Drain-Source On-Resistance vs. Gate-Source Voltage



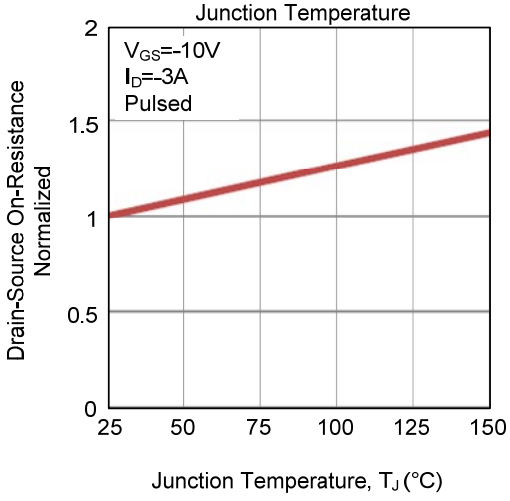
Gate Charge Characteristics



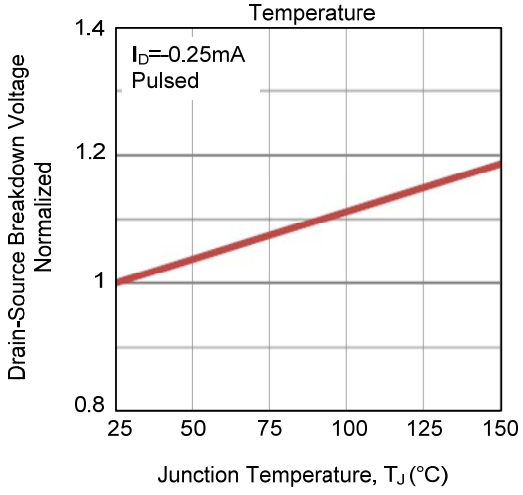
Capacitance Characteristics



Drain-Source On-Resistance vs. Junction Temperature



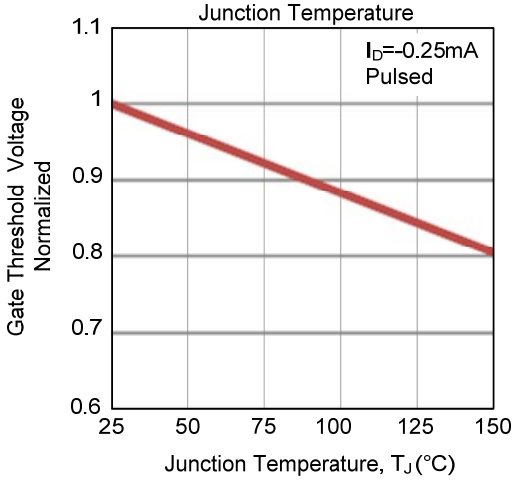
Breakdown Voltage vs. Junction Temperature



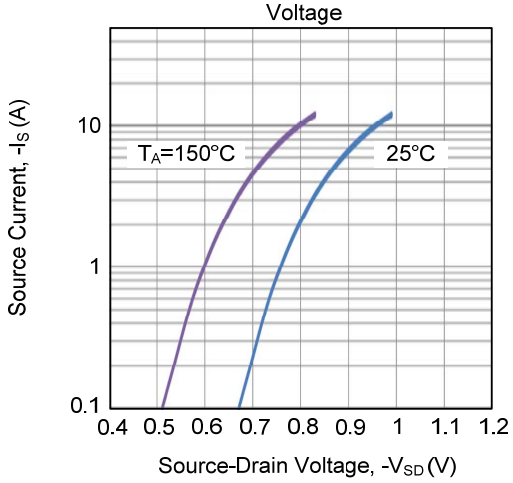
■ TYPICAL CHARACTERISTICS (Cont.)

P-CHANNEL

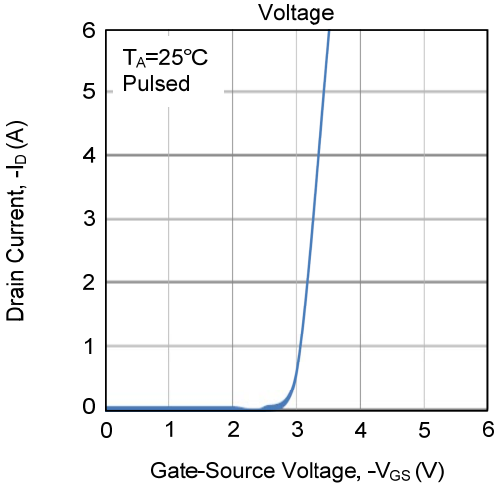
Gate Threshold Voltage vs. Junction Temperature



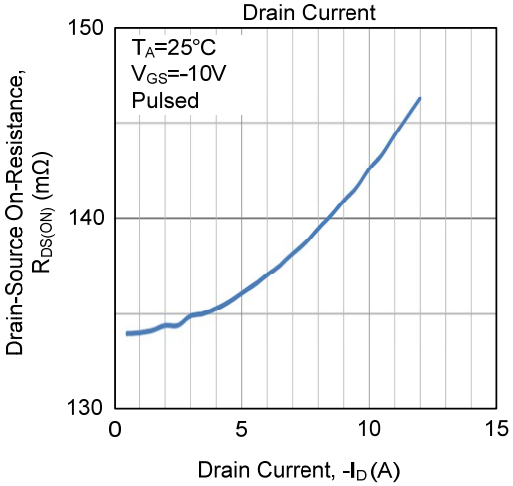
Source Current vs. Source-Drain Voltage



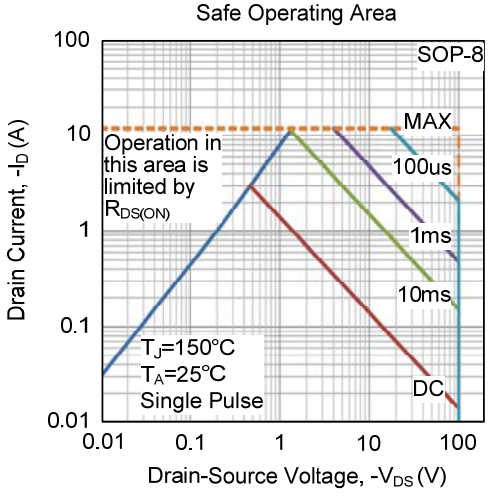
Drain Current vs. Gate-Source Voltage



Drain-Source On-Resistance vs. Drain Current



Safe Operating Area



■ TYPICAL CHARACTERISTICS (Cont.)