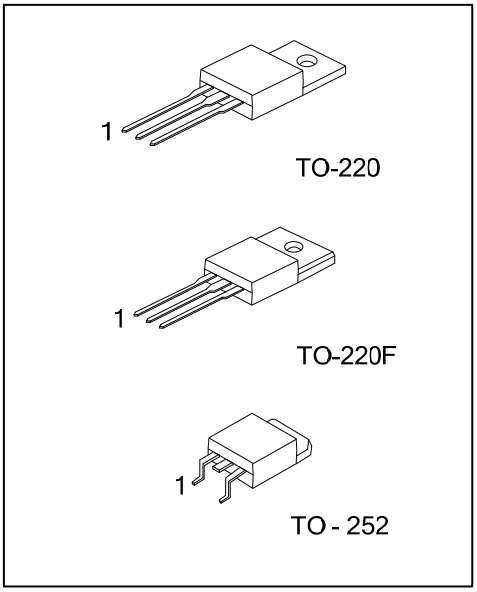
UTT75N75

Power MOSFET

75A, 75V N-CHANNEL POWER MOSFET



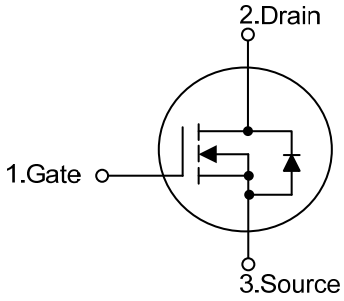
■ DESCRIPTION

The UTC **UTT75N75** is n-channel enhancement mode power field effect transistors with stable off-state characteristics including fast switching speed and low thermal resistance. It is usually used in the telecom and computer applications.

■ FEATURES

* $R_{DS(ON)} \leq 10\ m\Omega$ @ V_{GS}=10V, I_D=37.5A
  $R_{DS(ON)} \leq 20\ m\Omega$ @ V_{GS}=4.5V, I_D=37.5A
* Fast switching capability
* Avalanche energy Specified
* Improved dv/dt capability, high ruggedness

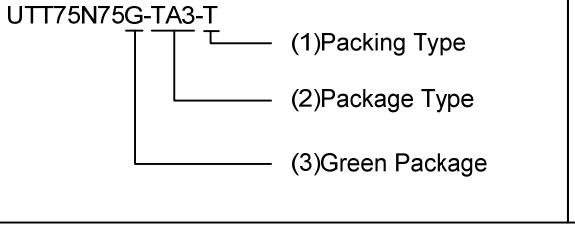
■ SYMBOL



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTT75N75L-TA3-T	UTT75N75G-TA3-T	TO-220	G	D	S	Tube
UTT75N75L-TF3-T	UTT75N75G-TF3-T	TO-220F	G	D	S	Tube
UTT75N75L-TN3-R	UTT75N75G-TN3-R	TO-252	G	D	S	Tape Reel

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

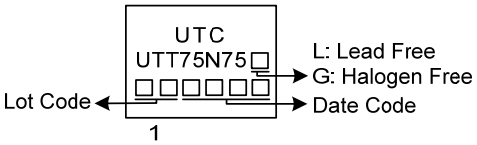


(1) T: Tube, R: Tape Reel

(2) TA3: TO-220, TF3: TO-220F, TN3: TO-252

(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	75	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current	Continuous (T_C = 25°C)	I_D	75	A
	Pulsed (Note 2)	I_{DM}	150	A
Single Pulsed Avalanche Energy (Note 3)		E_{AS}	140	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	1.1	V/ns
Power Dissipation	TO-220	P_D	180	W
	TO-220F		45	W
	TO-252		64	W
Junction Temperature		T_J	+150	°C
Storage Temperature Range		T_{STG}	-55~+150	°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. Repetitive Rating: Pulse width limited by maximum junction temperature.
3. L=0.1mH, I_{AS}=53A, V_{DD}=50V, R_G=25 Ω, Starting T_J = 25°C
4. I_{SD} ≤ 75A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

■ THERMAL DATA

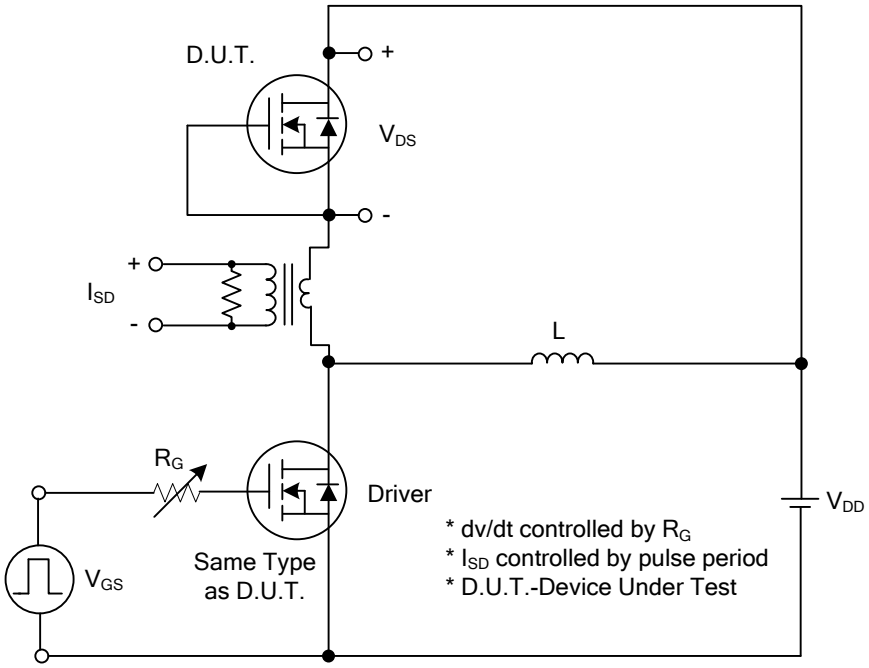
PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220 TO-220F	θ_{JA}	62.5	°C/W
	TO-252		110	°C/W
Junction to Case	TO-220	θ_{JC}	0.69	°C/W
	TO-220F		2.7	°C/W
	TO-252		1.95	°C/W

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

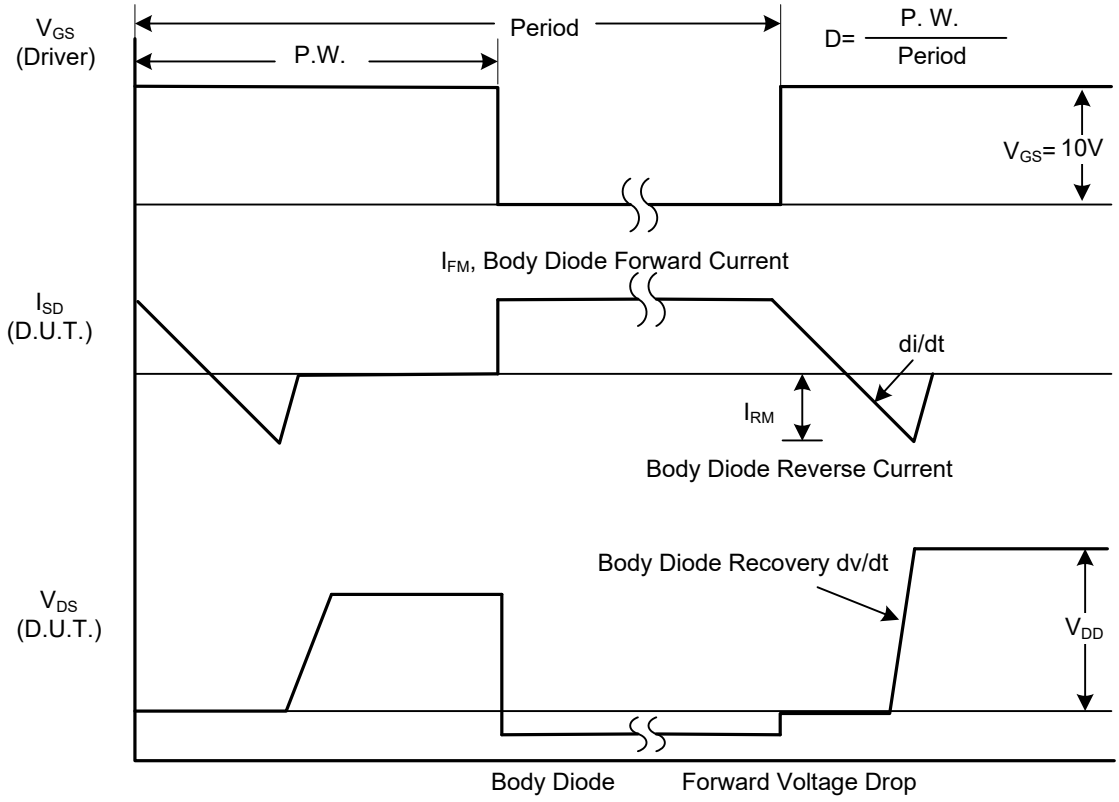
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V, I_D=250μA	75			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=75V, V_{GS}=0V			1	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=20V, V_{DS}=0V			100	nA
	Reverse		V_{GS}=-20V, V_{DS}=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		$R_{DS(ON)}$	V_{GS}=10V, I_D=37.5A			10	mΩ
			V_{GS}=4.5V, I_D=37.5A			20	mΩ
DYNAMIC CHARACTERISTICS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=25V, f=1MHz		3520		pF
Output Capacitance		C_{OSS}			370		pF
Reverse Transfer Capacitance		C_{RSS}			308		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge		Q_G	V_{DS}=60V, V_{GS}=10V, I_D=75A, (Note 1, 2)		94		nC
Gate-Source Charge		Q_{GS}			16		nC
Gate-Drain Charge		Q_{GD}			28		nC
Turn-On Delay Time		$t_{D(ON)}$	V_{DD}=37.5V, V_{GS}=10V, I_D=75A, R_G=3.3Ω (Note 1, 2)		16		ns
Turn-On Rise Time		t_R			21		ns
Turn-Off Delay Time		$t_{D(OFF)}$			58		ns
Turn-Off Fall Time		t_F			28		ns
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS							
Continuous Source Current		I_S				75	A
Pulsed Source Current (Note 1)		I_{SM}				150	A
Drain-Source Diode Forward Voltage (Note 2)		V_{SD}	I_S=-75A, V_{GS}=0V			1.5	V
Body Diode Reverse Recovery Time		t_{rr}	I_S=-30A, V_{GS}=0V, dI_F/dt=100A/μs		64		nS
Body Diode Reverse Recovery Charge		Q_{rr}			75		nC

Notes: 1. Pulse width limited by safe operating area
2. Pulsed: pulse duration=300μs, duty cycle 1.5%

■ TEST CIRCUITS AND WAVEFORMS

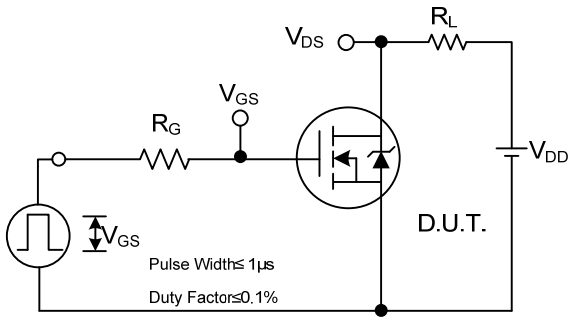


Peak Diode Recovery dv/dt Test Circuit

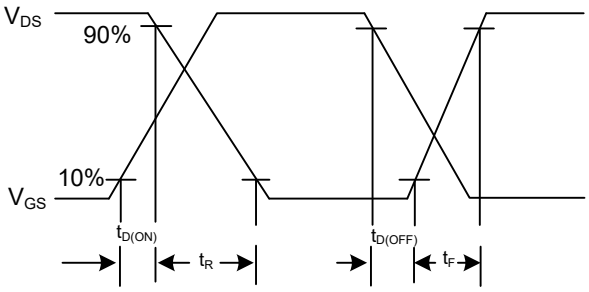


Peak Diode Recovery dv/dt Waveforms

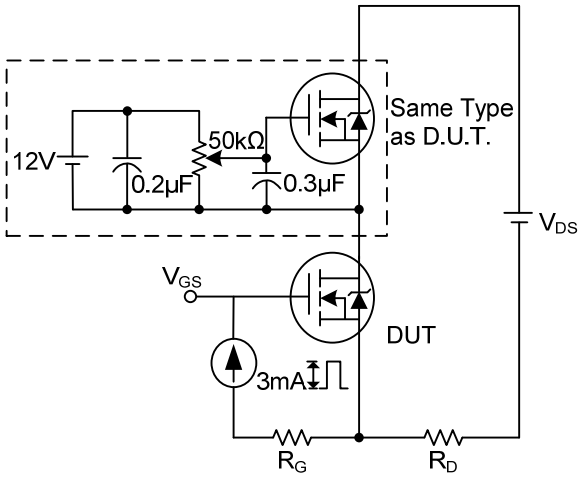
■ TEST CIRCUITS AND WAVEFORMS



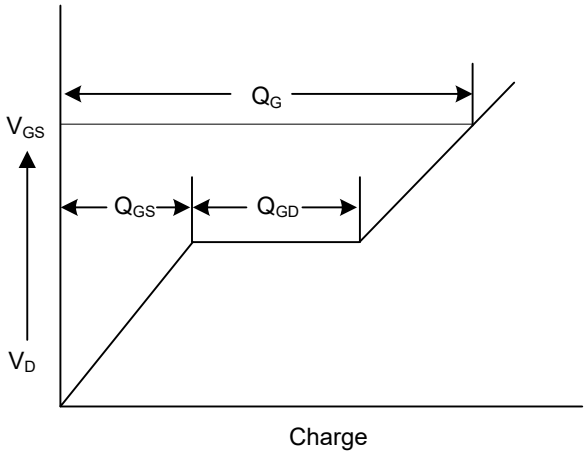
Switching Test Circuit



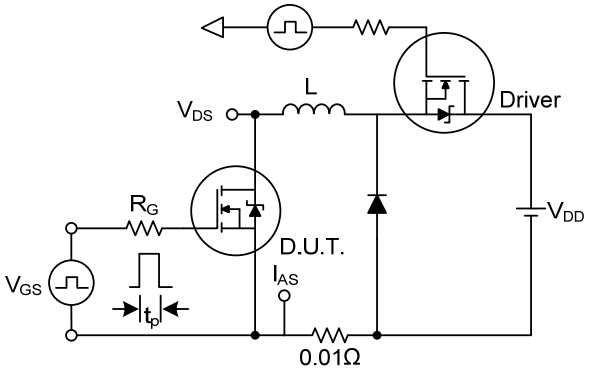
Switching Waveforms



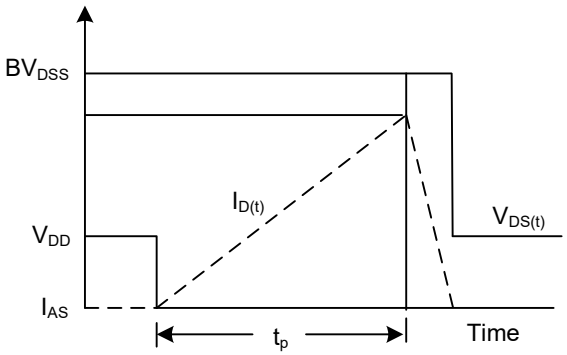
Gate Charge Test Circuit



Gate Charge Waveform



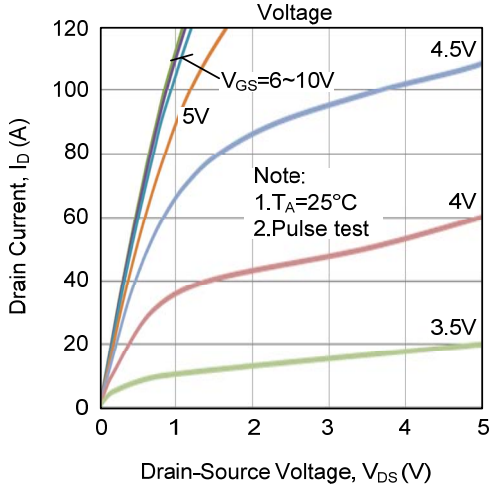
Unclamped Inductive Switching Test Circuit



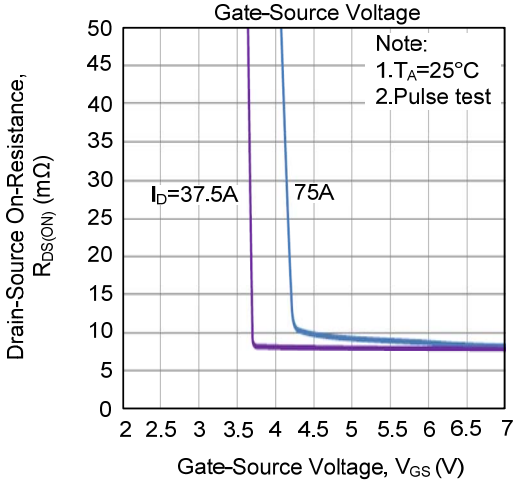
Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS

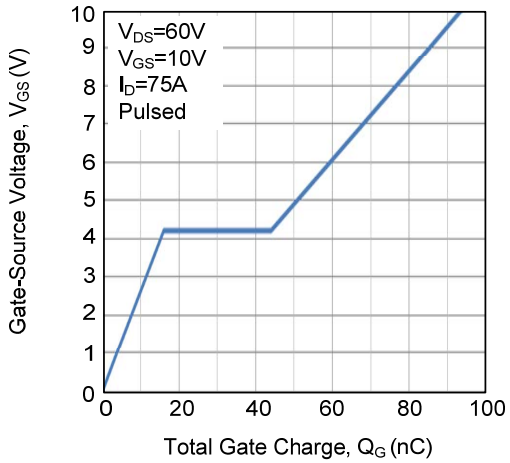
Drain Current vs. Drain-Source Voltage



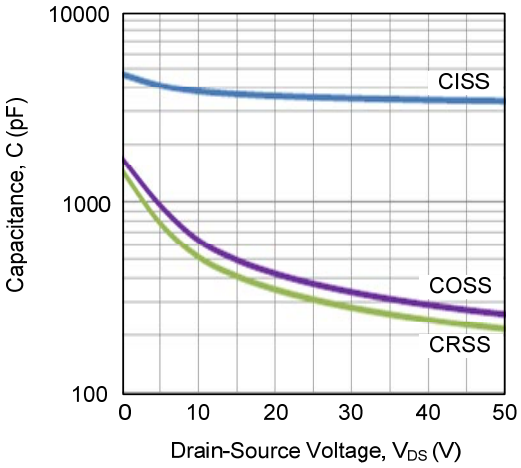
Drain-Source On-Resistance vs. Gate-Source Voltage



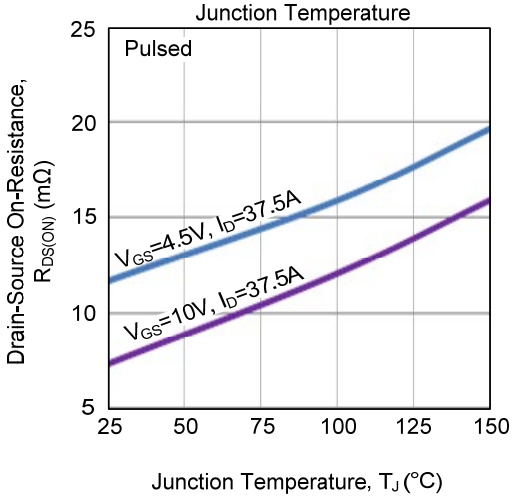
Gate Charge Characteristics



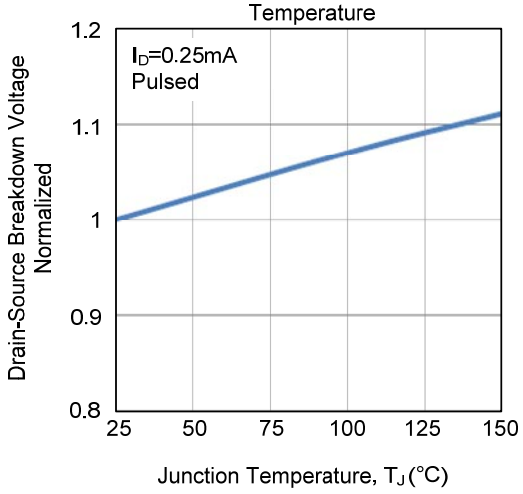
Capacitance Characteristics



Drain-Source On-Resistance vs. Junction Temperature

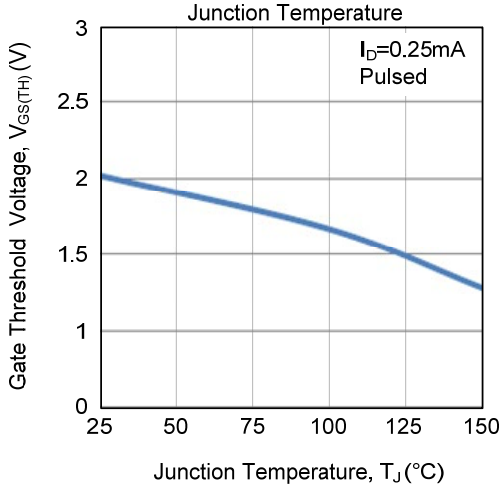


Breakdown Voltage vs. Junction Temperature

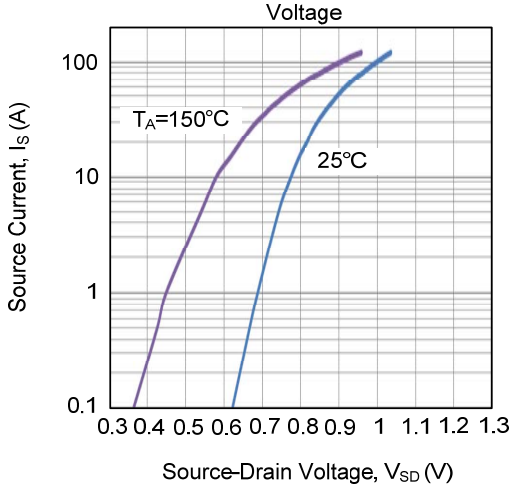


■ TYPICAL CHARACTERISTICS (Cont.)

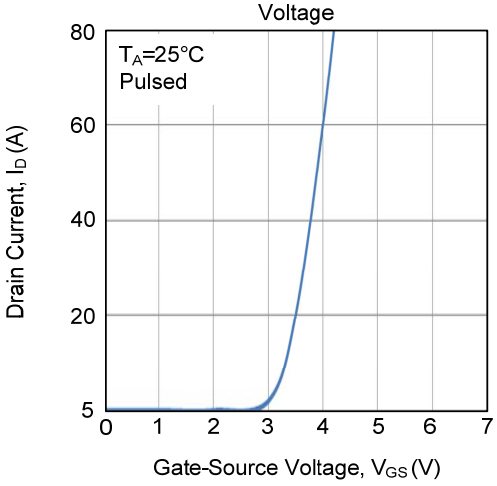
Gate Threshold Voltage vs. Junction Temperature



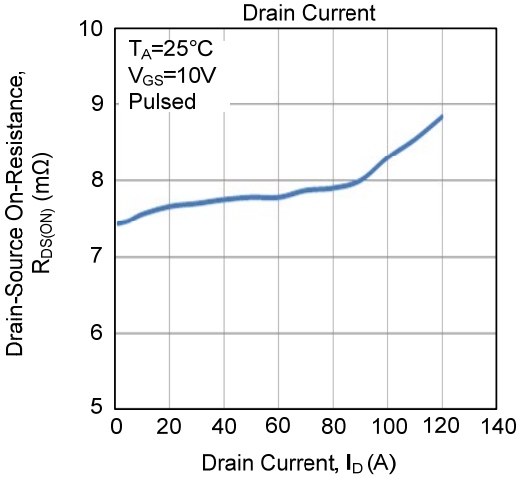
Source Current vs. Source-Drain Voltage



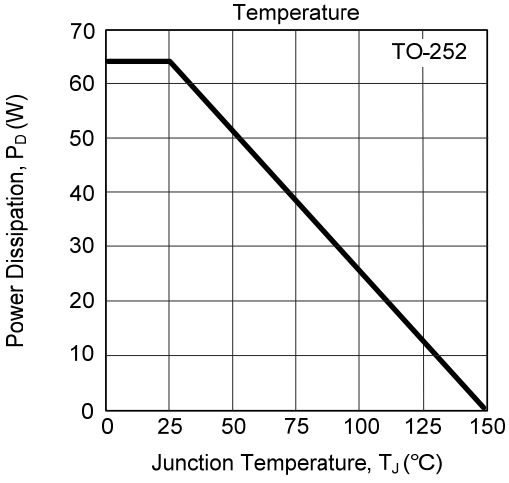
Drain Current vs. Gate-Source Voltage



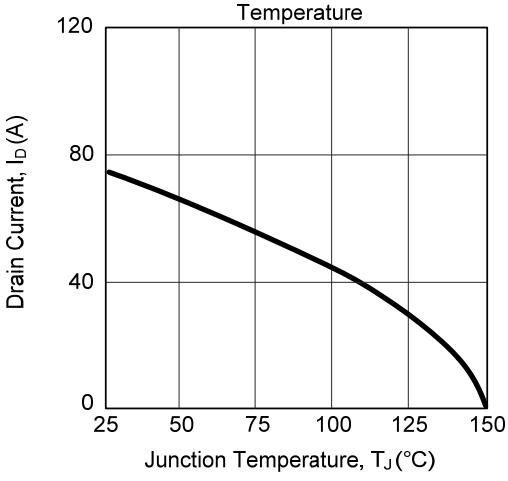
Drain-Source On-Resistance vs. Drain Current



Power Dissipation vs. Junction Temperature



Drain Current vs. Junction Temperature



■ TYPICAL CHARACTERISTICS (Cont.)