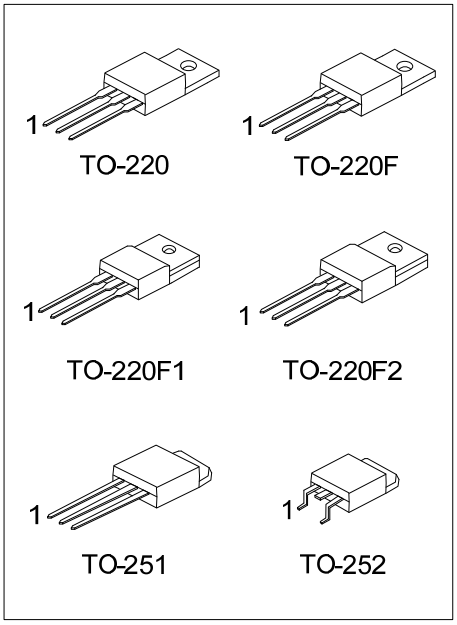
25N10 **Power MOSFET**

N-CHANNEL ENHANCEMENT MODE POWER MOSFET



■ DESCRIPTION

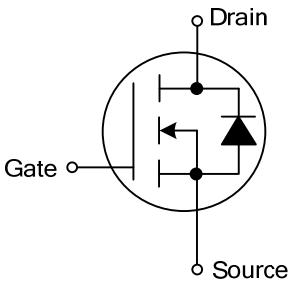
The UTC **25N10** is an N-channel enhancement mode power MOSFET and it uses UTC's perfect technology to provide designers with fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

It is generally suitable for all commercial-industrial applications and DC/DC converters requiring low voltage.

■ FEATURES

* Single Drive Requirement
* Low Gate Charge
* RoHS Compliant

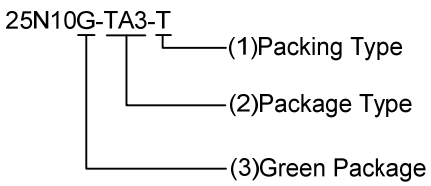
■ SYMBOL



■ ORDERING INFORMATION

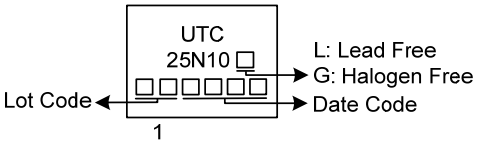
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
25N10L-TA3-T	25N10G-TA3-T	TO-220	G	D	S	Tube
25N10L-TF1-T	25N10G-TF1-T	TO-220F1	G	D	S	Tube
25N10L-TF2-T	25N10G-TF2-T	TO-220F2	G	D	S	Tube
25N10L-TF3-T	25N10G-TF3-T	TO-220F	G	D	S	Tube
25N10L-TM3-T	25N10G-TM3-T	TO-251	G	D	S	Tube
25N10L-TN3-R	25N10G-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, TF1: TO-220F1, TF2: TO-220F2, TF3: TO-220F, TM3: TO-251, TN3: TO-252
(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain Source Voltage		V_{DSS}	100	V
Gate Source Voltage		V_{GSS}	±20	V
Continuous Drain Current (V_{GS}=10V)	T_C=25°C	I_D	23	A
	T_C=100°C	I_D	14.6	A
Pulsed Drain Current (Note 2)		I_{DM}	80	A
Single Pulsed Avalanche Energy (Note 3)		E_{AS}	480	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.58	V/ns
Power Dissipation	TO-220	P_D	125	W
	TO-220F/TO-220F1 TO-220F2		41	
	TO-251/TO-252		50	
Operating Junction Temperature		T_J	-55 ~ +150	°C
Storage Temperature		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=10mH, I_{AS}=9.8A, V_{DD}=50V, R_G=25 Ω, Starting T_J = 25°C
4. I_{SD}≤ 25A, 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 TO-220F1/TO-220F2	θ_{JA}	62.5	°C/W
	TO-251/TO-252		100	
Junction to Case	TO-220	θ_{JC}	1	°C/W
	TO-220F/TO-220F1 TO-220F2		3.04	
	TO-251/TO-252		2.5 (Note)	

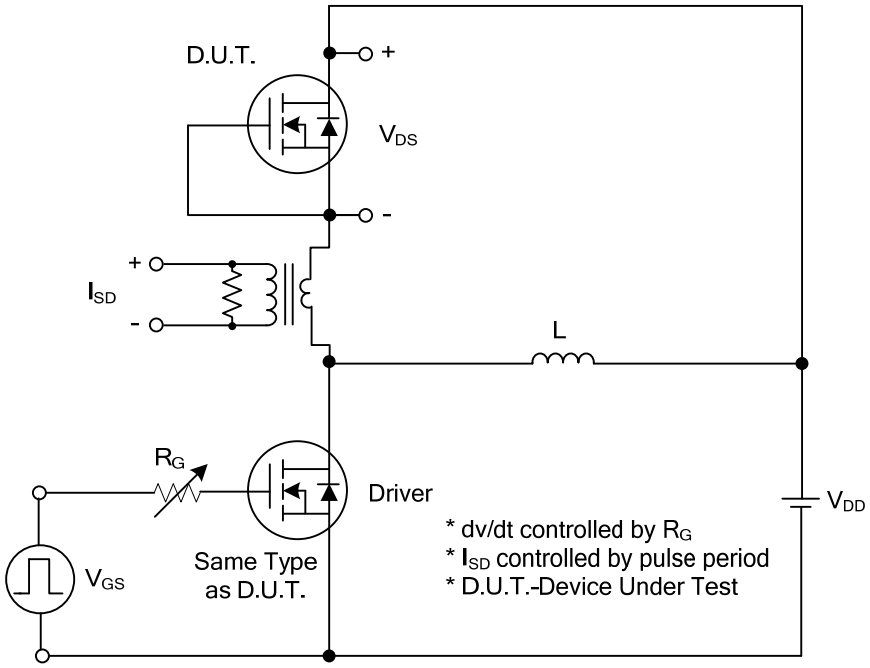
Note: The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.

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

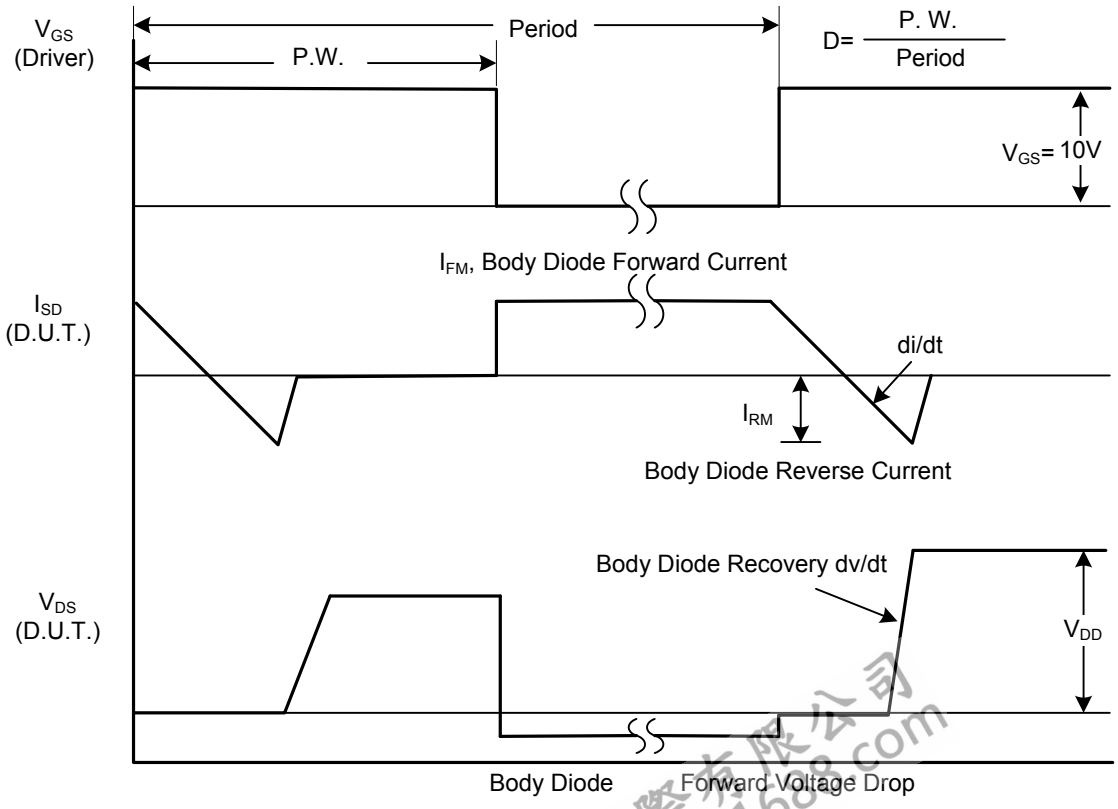
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} =0V, I_D =1mA	100			V
Drain-Source Leakage Current	I_{DSS}	V_{DS} =100V, V_{GS} =0V, T_J=25°C			25	μA
		V_{DS} =80V, V_{GS} =0V,T_J =150°C			100	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS} =±20V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS} =V_{GS}, I_D =250μA	2.0		4.0	V
Static Drain-Source On-Resistance (Note)	$R_{DS(ON)}$	V_{GS} =10V, I_D =16A			80	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{DS} =25V, V_{GS}=0V, f=1.0MHz		762		pF
Output Capacitance	C_{OSS}			196		pF
Reverse Transfer Capacitance	C_{RSS}			22		pF
Gate Resistance	R_G	f=1.0MHz		1.5	2.3	Ω
SWITCHING PARAMETERS						
Total Gate Charge (Note)	Q_G	V_{GS}=10V, V_{DS}=100V, I_D=25A		28.5		nC
Gate Source Charge	Q_{GS}			6.0		nC
Gate Drain Charge	Q_{GD}			7.5		nC
Turn-ON Delay Time[1]	$t_{D(ON)}$	V_{DD}=100V, I_D=25A, R_G=25Ω, V_{GS}=10V, R_D=4.0Ω		16		ns
Turn-ON Rise Time	t_R			26		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			34		ns
Turn-OFF Fall-Time	t_F			19		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I_S				25	A
Maximum Body-Diode Pulsed Current	I_{SM}				50	A
Drain-Source Diode Forward Voltage (Note)	V_{SD}	I_S =25A, V_{GS} =0V			1.3	V
Reverse Recovery Time	t_{rr}	I_S =25A,V_{GS} =0V, dI/dt=100A/μs		96		ns
Reverse Recovery Charge	Q_{rr}			342		nC

Notes: 1. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating ambient temperature.

■ TEST CIRCUITS AND WAVEFORMS

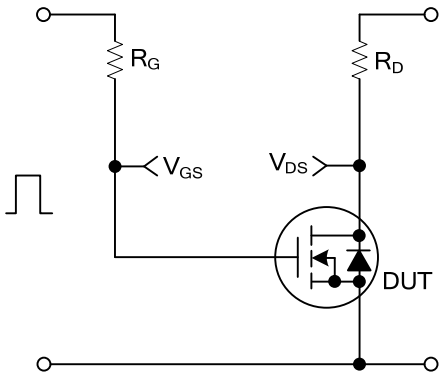


Peak Diode Recovery dv/dt Test Circuit

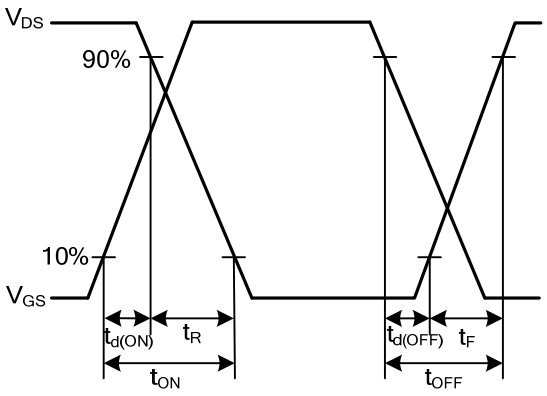


Peak Diode Recovery dv/dt Waveforms

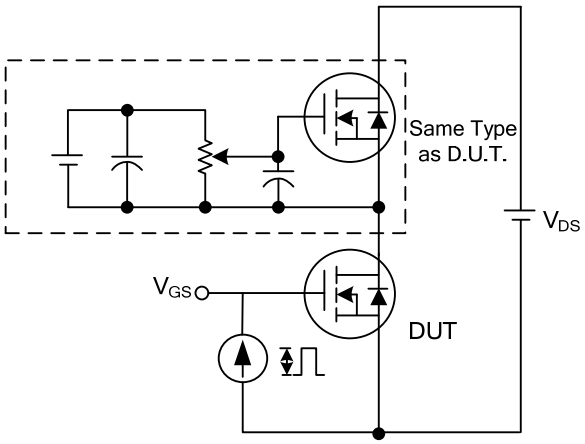
■ TEST CIRCUITS AND WAVEFORMS



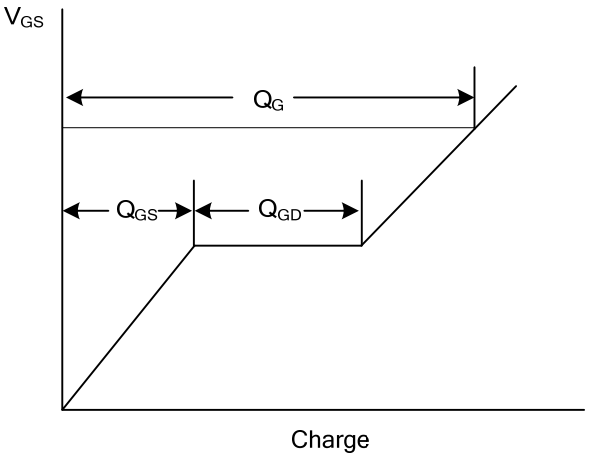
itching Test Circuit



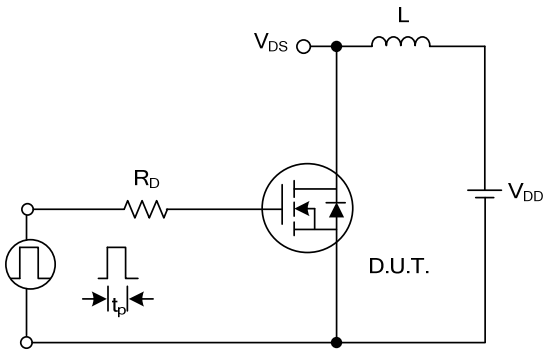
Switching Waveforms



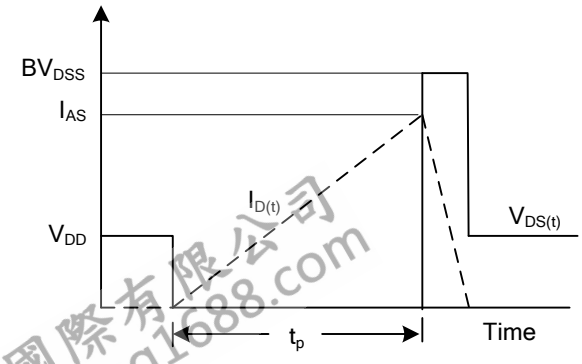
Gate Charge Test Circuit



Gate Charge Waveform



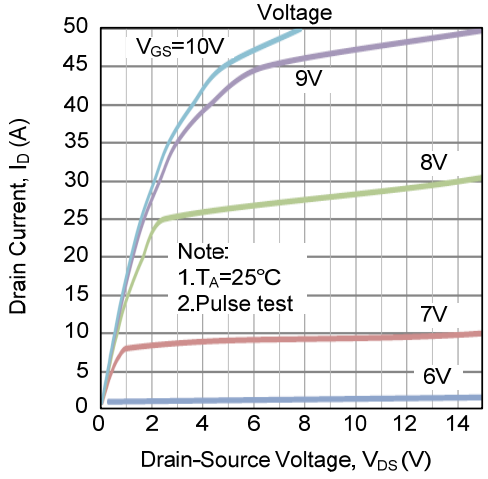
Unclamped Inductive Switching Test Circuit



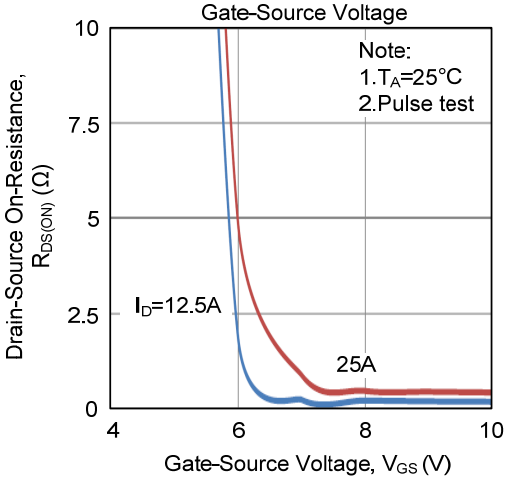
Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS

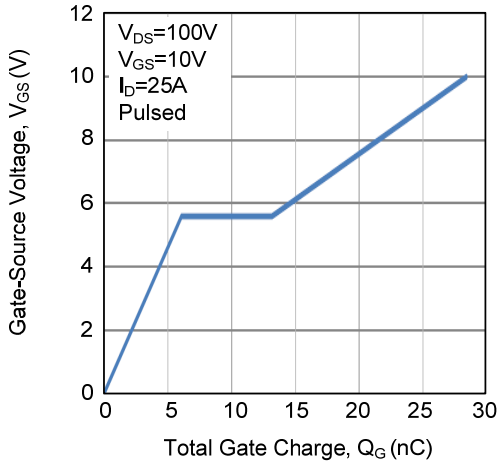
Drain Current vs. Drain-Source Voltage



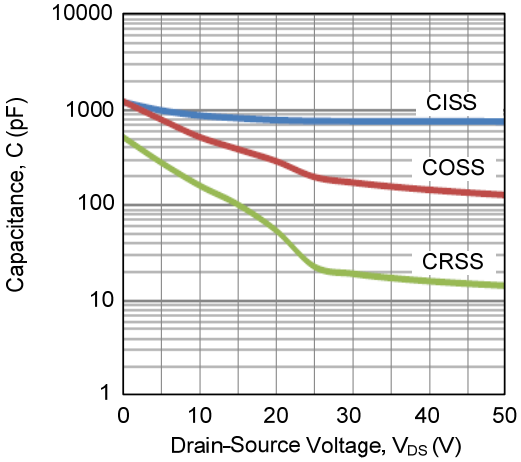
Drain-Source On-Resistance vs. Gate-Source Voltage



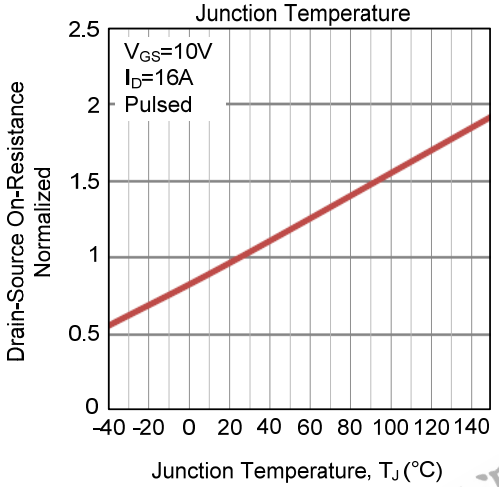
Gate Charge Characteristics



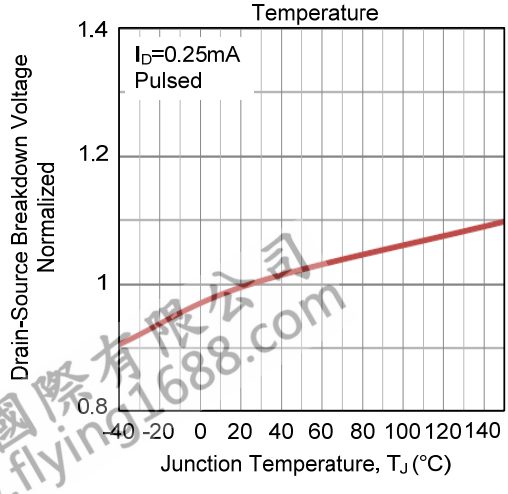
Capacitance Characteristics



Drain-Source On-Resistance vs. Junction Temperature

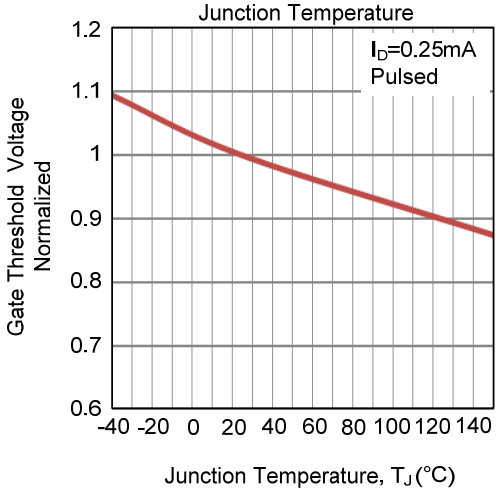


Breakdown Voltage vs. Junction Temperature

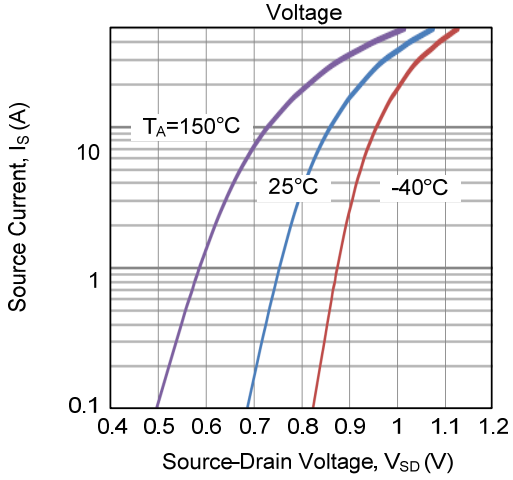


■ TYPICAL CHARACTERISTICS (Cont.)

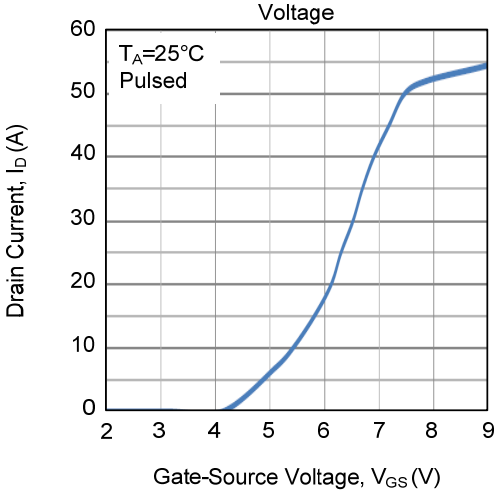
Gate Threshold Voltage vs. Junction Temperature



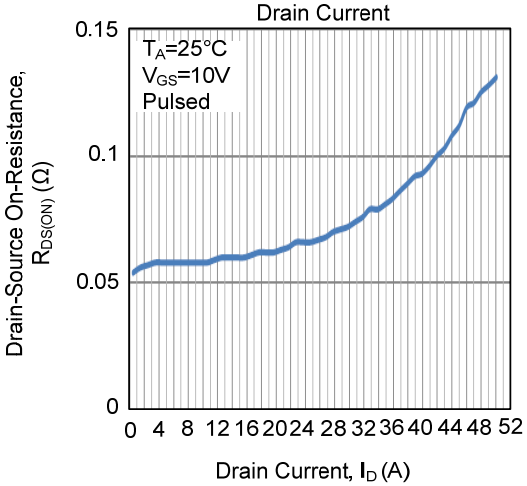
Source Current vs. Source-Drain Voltage



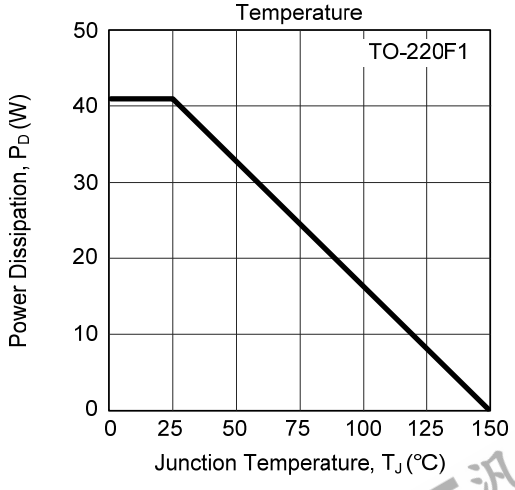
Drain Current vs. Gate-Source Voltage



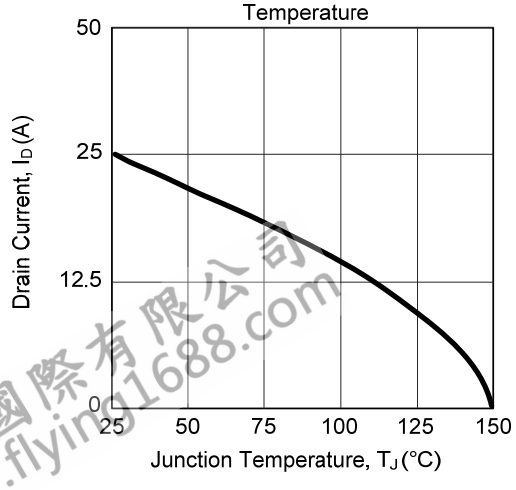
Drain-Source On-Resistance vs. Drain Current



Power Dissipation vs. Junction Temperature



Drain Current vs. Junction Temperature



■ TYPICAL CHARACTERISTICS (Cont.)