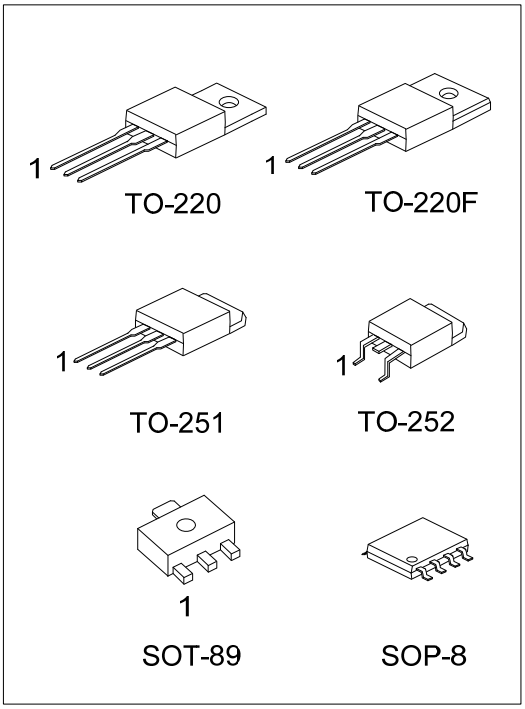
UTT15P06

Power MOSFET

-15A, -60V P-CHANNEL POWER MOSFET



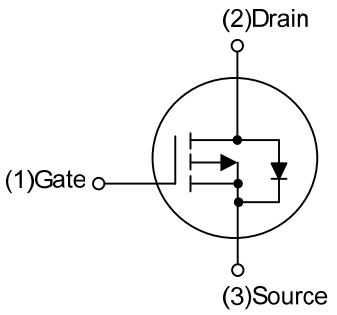
■ DESCRIPTION

The UTC **UTT15P06** is a P-channel power MOSFET using UTC's advanced technology to provide the customers with high switching speed, cost-effectiveness and minimum on-state resistance. It can also withstand high energy in the avalanche.

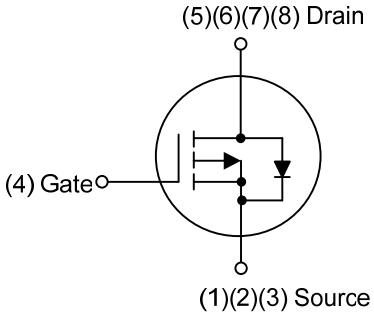
■ FEATURES

* $R_{DS(ON)} \leq 75\ m\Omega$ @ V_{GS}=-10V, I_D=-15A
  $R_{DS(ON)} \leq 120\ m\Omega$ @ V_{GS}=-4.5V, I_D=-7.5A
* High Switching Speed

■ SYMBOL



SOT-89 / TO-220
TO-220F / TO-251 / TO-252

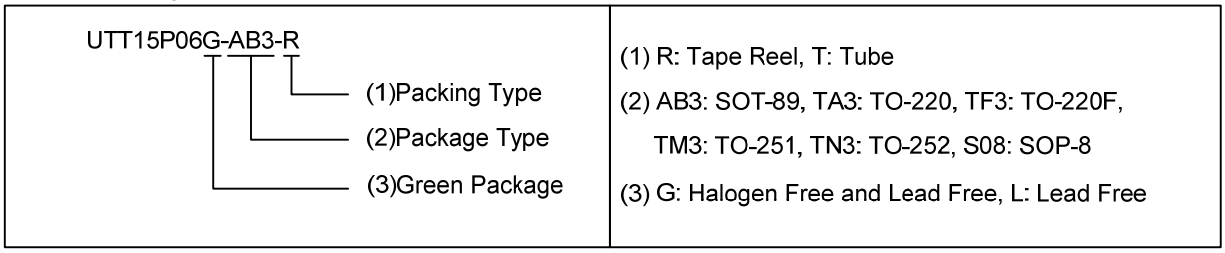


SOP-8

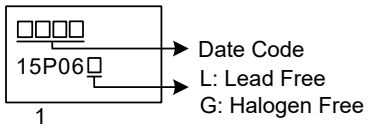
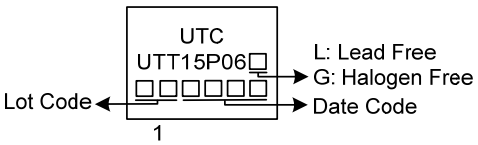
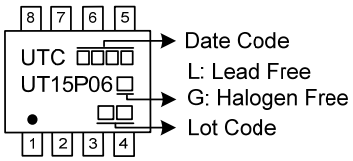
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UTT15P06L-AB3-R	UTT15P06G-AB3-R	SOT-89	G	D	S	-	-	-	-	-	Tape Reel
UTT15P06L-TA3-T	UTT15P06G-TA3-T	TO-220	G	D	S	-	-	-	-	-	Tube
UTT15P06L-TF3-T	UTT15P06G-TF3-T	TO-220F	G	D	S	-	-	-	-	-	Tube
UTT15P06L-TM3-T	UTT15P06G-TM3-T	TO-251	G	D	S	-	-	-	-	-	Tube
UTT15P06L-TN3-R	UTT15P06G-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
UTT15P06L-S08-R	UTT15P06G-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel

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



■ MARKING

PACKAGE	MARKING
SOT-89	
TO-220 / TO-220F TO-251 / TO-252	
SOP-8	

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	-60	V
Gate-Source Voltage		V_{GSS}	±25	V
Drain Current	Continuous	I_D	-15	A
	Pulsed	I_{DM}	-30	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	16.2	mJ
Power Dissipation	SOT-89	P_D	4.3	W
	TO-220		79	W
	TO-220F		37	W
	TO-251/TO-252		39	W
	SOP-8		3	W
Junction Temperature		T_J	+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 = 0.1mH, I_{AS} = -18A, V_{DD} = -30V, R_G = 25 Ω, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient (Steady state)	SOT-89	θ_{JA}	180	°C/W
	TO-220/TO-220F		62	°C/W
	TO-251/TO-252		110	°C/W
	SOT-8		125	°C/W
Junction to Case	SOT-89	θ_{JC}	29	°C/W
	TO-220		1.58	°C/W
	TO-220F		3.3	°C/W
	TO-251/TO-252		3.2 (Note)	°C/W
	SOT-8		41.67 (Note)	°C/W

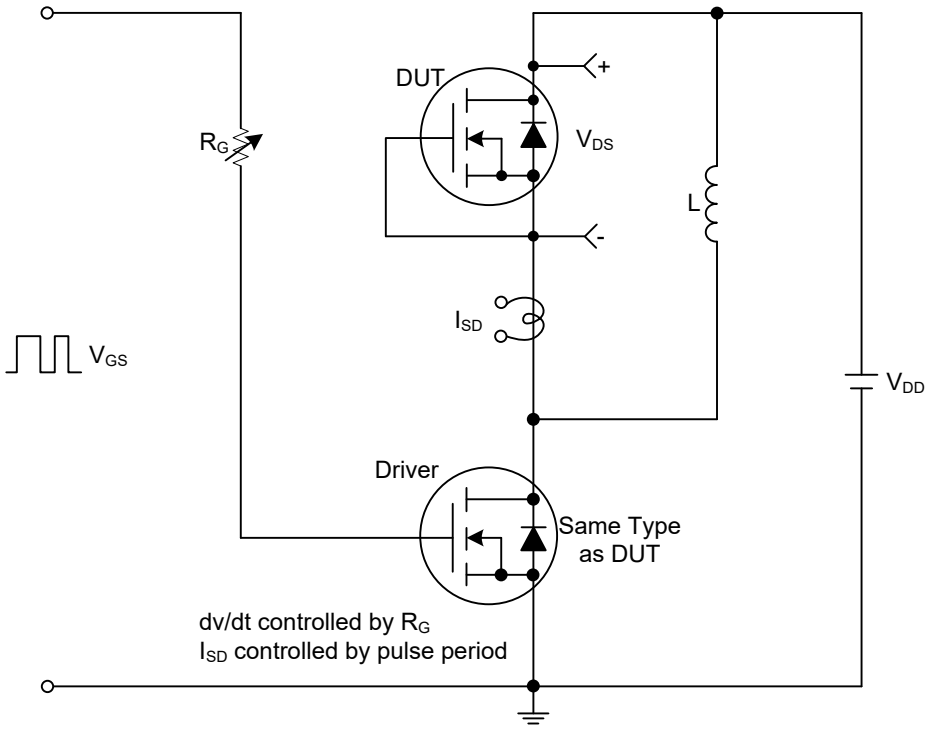
Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

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

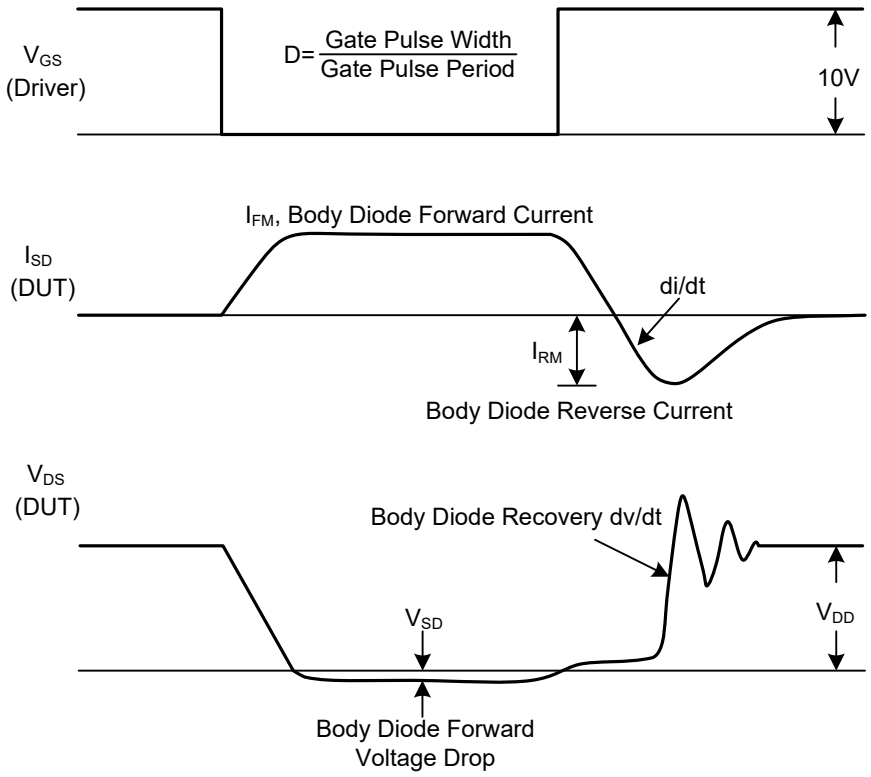
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=-250μA, V_{GS}=0V	-60			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=-60V, V_{GS}=0V			-1	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=+25V, V_{DS}=0V			+100	nA
	Reverse		V_{GS}=-25V, 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=-15A			75	mΩ
			V_{GS}=-4.5V, I_D=-7.5A			120	mΩ
DYNAMIC PARAMETERS (Note 2)							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=-25V, f=1.0MHz		1086		pF
Output Capacitance		C_{OSS}			97		pF
Reverse Transfer Capacitance		C_{RSS}			61.6		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q_G	V_{DS}=-30V, V_{GS}=-10V, I_D=-15A I_G=-1mA (Note 1, 2)		22		nC
Gate to Source Charge		Q_{GS}			5		nC
Gate to Drain Charge		Q_{GD}			3		nC
Turn-ON Delay Time		$t_{D(ON)}$	V_{DD}=-30V, V_{GS}=-10V, I_D=-15A, R_G=3.3Ω (Note 1, 2)		6		ns
Rise Time		t_R			16		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			30		ns
Fall-Time		t_F			20		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS (T_C=25°C) (Note 2)							
Maximum Body-Diode Continuous Current		I_S				-15	A
Maximum Body-Diode Pulsed Current		I_{SM}				-30	A
Drain-Source Diode Forward Voltage		V_{SD}	I_F=-15A, V_{GS}=0V (Note 1)		-1.0	-1.5	V
Body Diode Reverse Recovery Time		t_{rr}	I_S=-15A, V_{GS}=0V, dI_F/dt=100A/μs (Note 2)		40		ns
Body Diode Reverse Recovery Charge		Q_{rr}			35		nC

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

■ TEST CIRCUITS AND WAVEFORMS



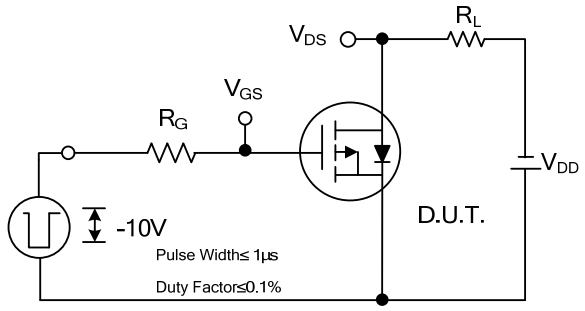
Peak Diode Recovery dv/dt Test Circuit



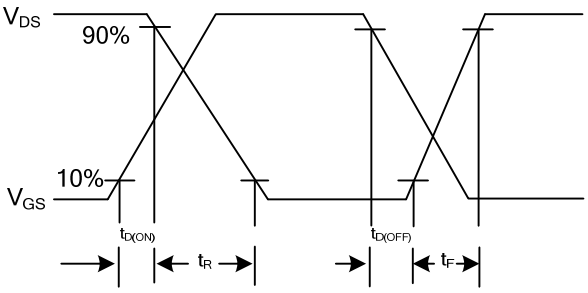
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

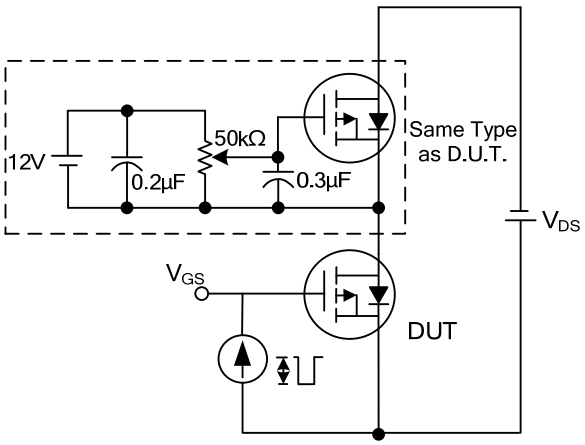
■ TEST CIRCUITS AND WAVEFORMS



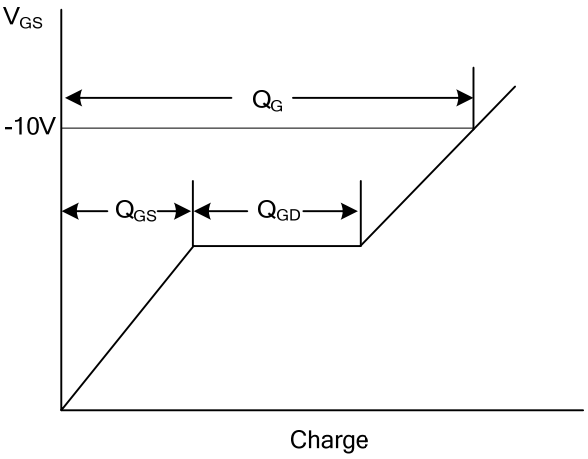
Switching Test Circuit



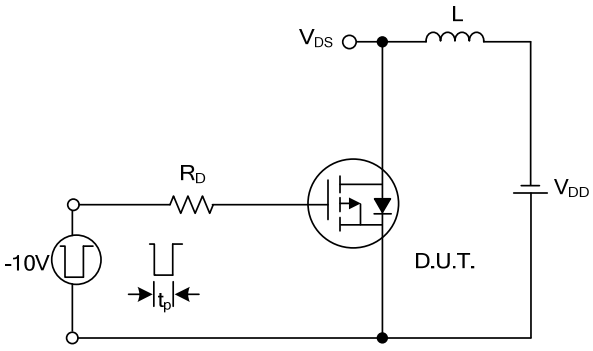
Switching Waveforms



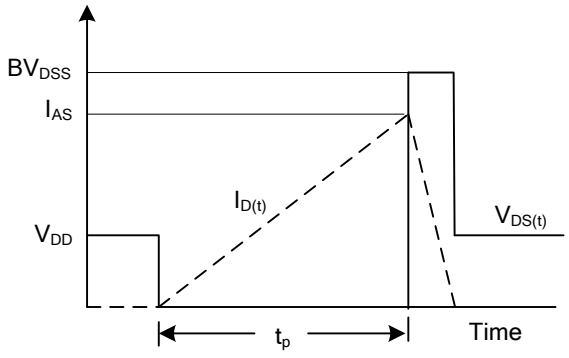
Gate Charge Test Circuit



Gate Charge Waveform

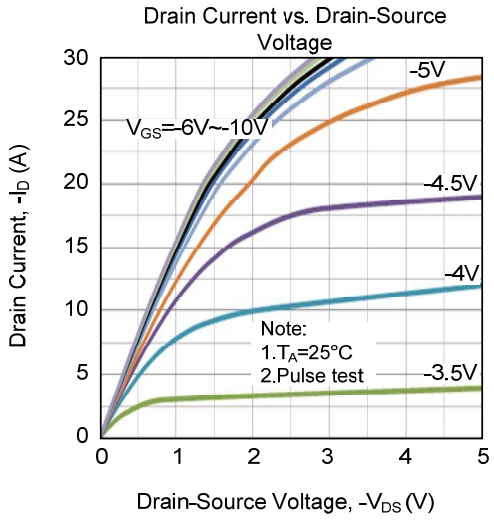


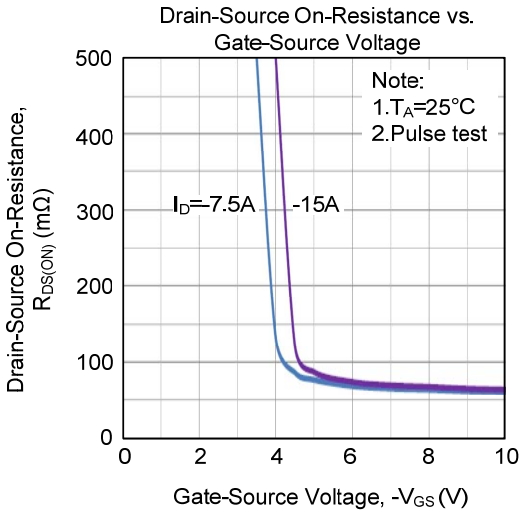
Unclamped Inductive Switching Test Circuit

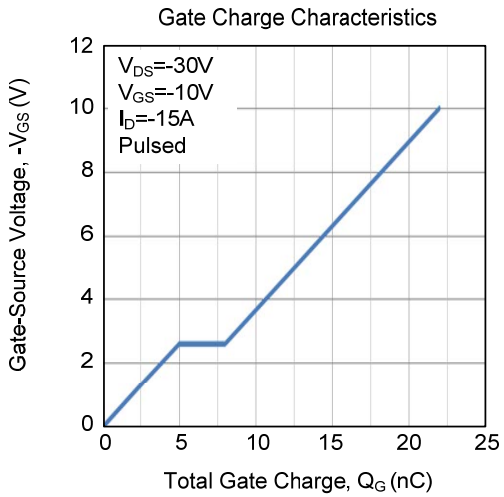


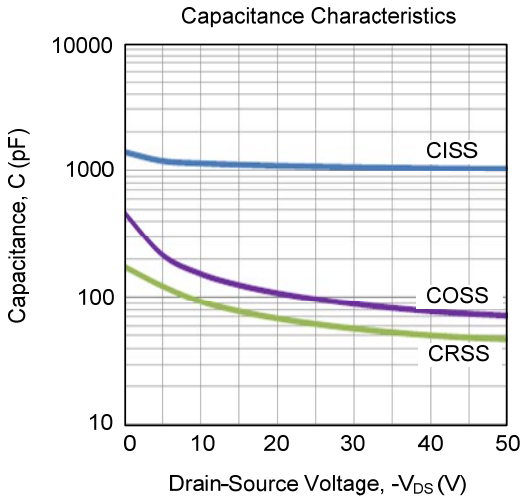
Unclamped Inductive Switching Waveforms

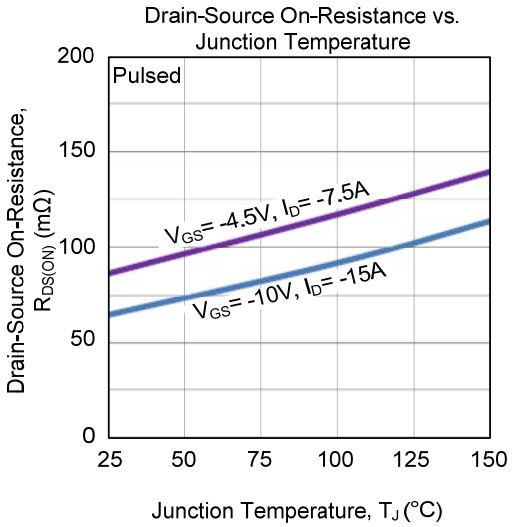
■ TYPICAL CHARACTERISTICS

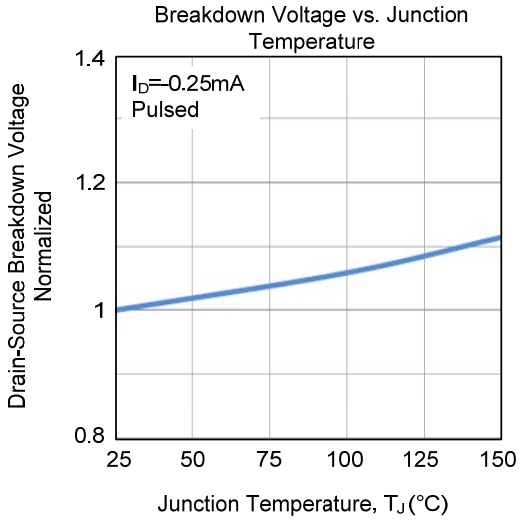






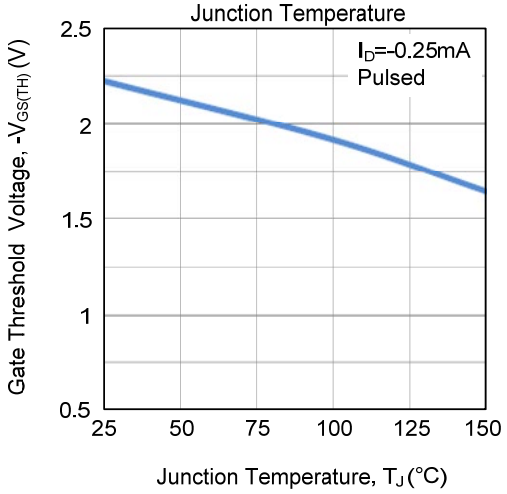




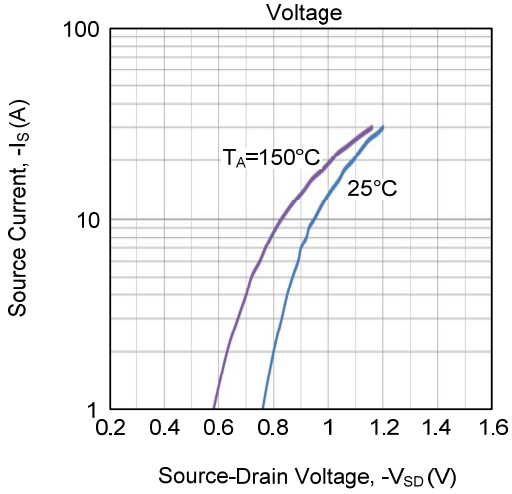


■ TYPICAL CHARACTERISTICS (Cont.)

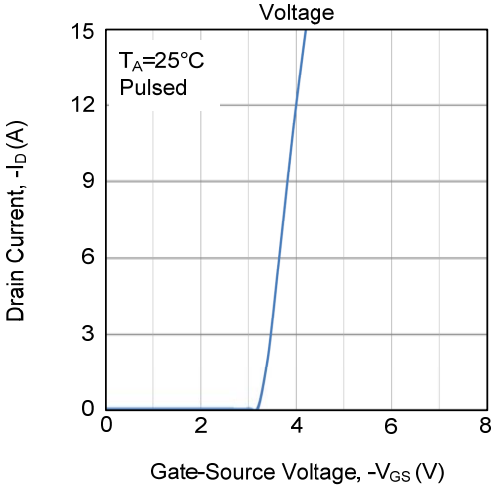
Gate Threshold Voltage vs. Junction Temperature



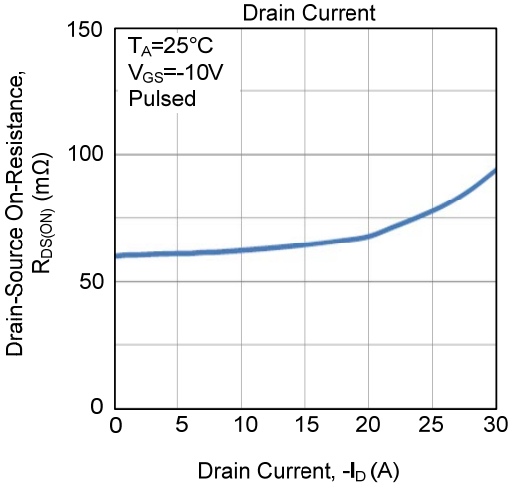
Source Current vs. Source-Drain Voltage



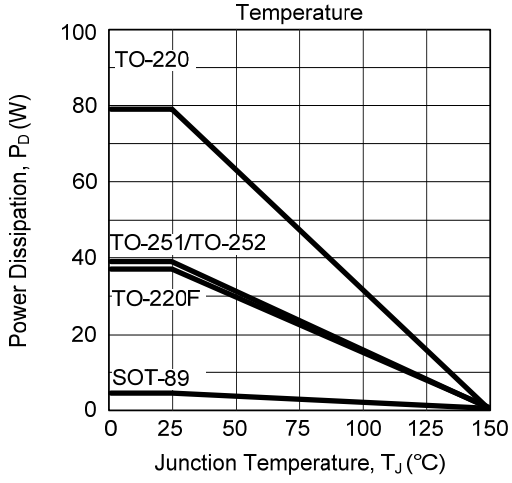
Drain Current vs. Gate-Source Voltage



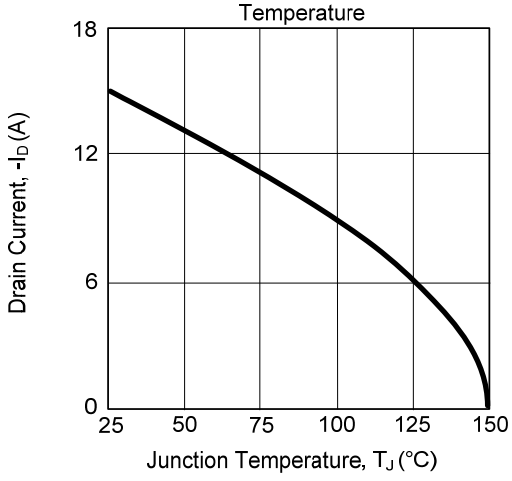
Drain-Source On-Resistance vs. Drain Current



Power Dissipation vs. Junction Temperature

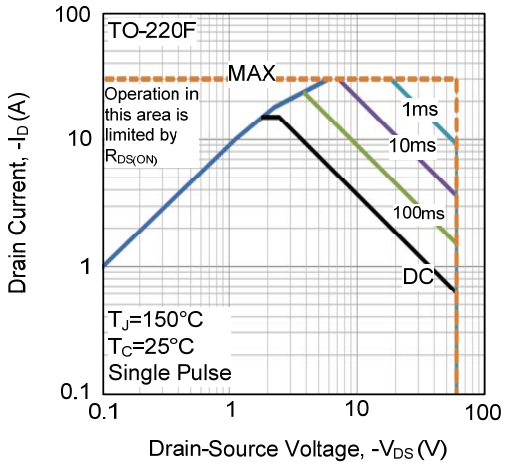


Drain Current vs. Junction Temperature

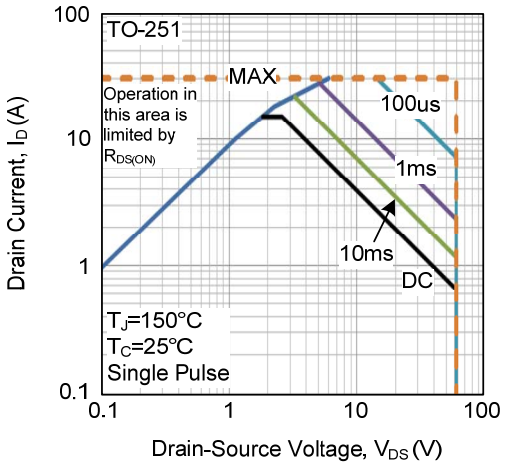


■ TYPICAL CHARACTERISTICS (Cont.)

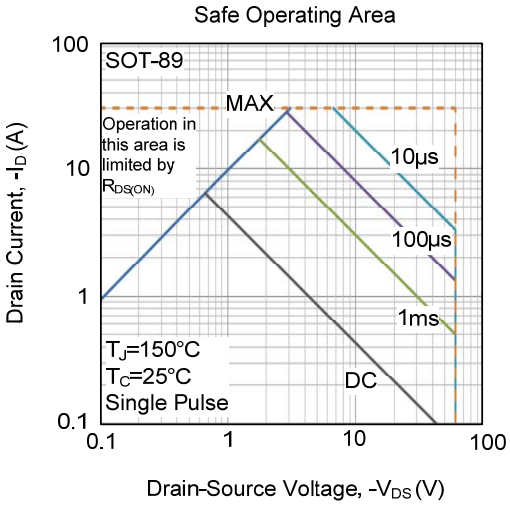
Safe Operating Area



Safe Operating Area



Safe Operating Area



Maximum Effective Transient Thermal Impedance, Junction to Case