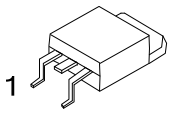
UP9T15G

Power MOSFET

N-CHANNEL ENHANCEMENT MODE POWER MOSFET



TO-252

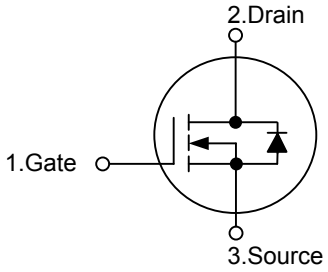
■ DESCRIPTION

The **UP9T15G** uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with low gate voltages. This device is suitable for use as a load switch or in PWM applications.

■ FEATURES

* V_{DS}(V)=20V
* I_D=12 .5A (V_{GS}=4.5V)
* $R_{DS(ON)}$ < 50mΩ @ V_{GS} =4.5 V, I_D =6 A
* $R_{DS(ON)}$ < 80mΩ @ V_{GS} =2.5 V, I_D =5.2 A

■ SYMBOL



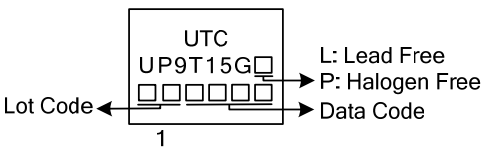
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UP9T15GL-TN3-R	UP9T15GP-TN3-R	TO-252	G	D	S	Tape Reel

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

UP9T15GL-TN3-R (1)Packing Type	(1) R: Tape Reel
(2)Package Type	(2) TN3: TO-252
(3)Green Package	(3) L: Lead Free, P: Halogen Free and Lead Free

■ MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	20	V
Gate-Source Voltage		V_{GSS}	±12	V
Continuous Drain Current , @ V_{GS}= 4.5V	T_C=25°C	I_D	12.5	A
Pulsed Drain Current		I_{DM}	60	A
Power Dissipation	T_C=25°C	P_D	12.5	W
Linear Derating Factor			0.1	W/°C
Junction Temperature		T_J	+150	°C
Strong Temperature		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	MIN	TYP	MAX	UNIT
Junction-to-Ambient	θ_{JA}			110	°C/W
Junction-to-Case	θ_{JC}			10	°C/W

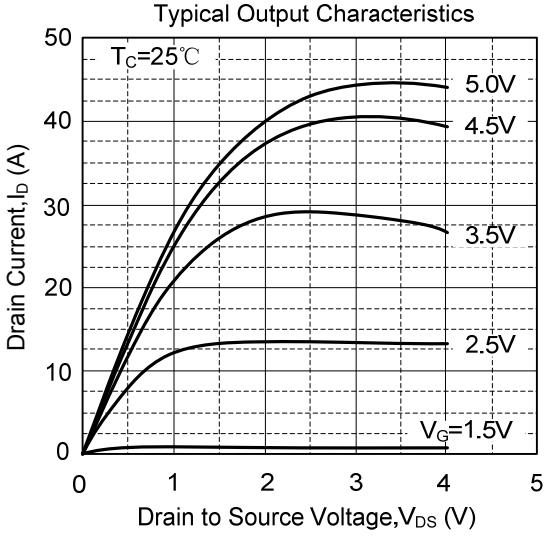
■ ELECTRICAL CHARACTERISTICS (T_J =25°C, unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} =0 V, I_D =250 μA	20			V
Drain-Source Leakage Current	I_{DSS}	V_{DS} =20 V, V_{GS} =0 V			1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS} = ±12 V			±100	nA
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	25℃, I_D=1mA		0.02		V/℃
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS} =V_{GS}, I_D =250 μA	0.5		1.5	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS} =4.5 V, I_D =6 A			50	mΩ
		V_{GS} =2.5 V, I_D =5.2 A			80	
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{DS} =20 V, V_{GS} =0 V, f=1.0MHz		360	580	pF
Output Capacitance	C_{OSS}			70		pF
Reverse Transfer Capacitance	C_{RSS}			50		pF
SWITCHING PARAMETERS						
Total Gate Charge(Note2)	Q_G	V_{DS} =16 V, V_{GS} =4.5 V, I_D =10 A		5	8	nC
Gate Source Charge	Q_{GS}			1		nC
Gate Drain Charge	Q_{GD}			2		nC
Turn-ON Delay Time(Note2)	$t_{D(ON)}$	V_{GS}=5 V, V_{DS}=10V,R_D=1 Ω, I_D =10 A , R_G =3.3 Ω		8		ns
Turn-ON Rise Time	t_R			55		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			10		ns
Turn-OFF Fall-Time	t_F			3		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Forward On Voltage(Note2)	V_{SD}	I_S=10 A,V_{GS}=0V			1.3	V
Reverse Recovery Time(Note2)	t_{RR}	I_S=10 A, V_{GS}=0 V,dI/dt=100 A/μs		17		ns
Reverse Recovery Charge	Q_{RR}			9		nC

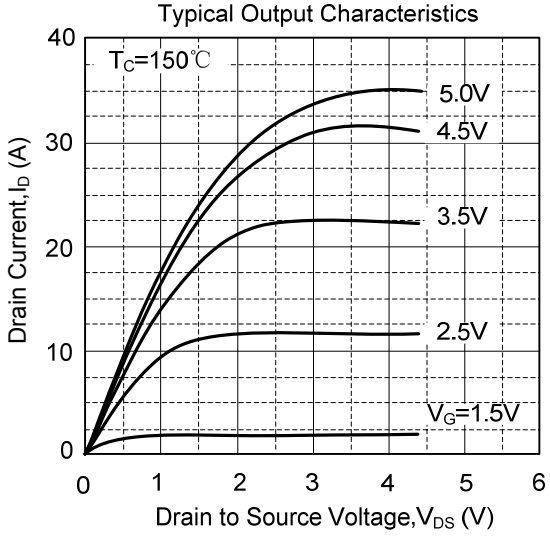
Notes: 1. Pulse width limited by safe operating area.
2. Pulse width ≤ 300us , duty cycle ≤ 2%.

■ TYPICAL CHARACTERISTICS

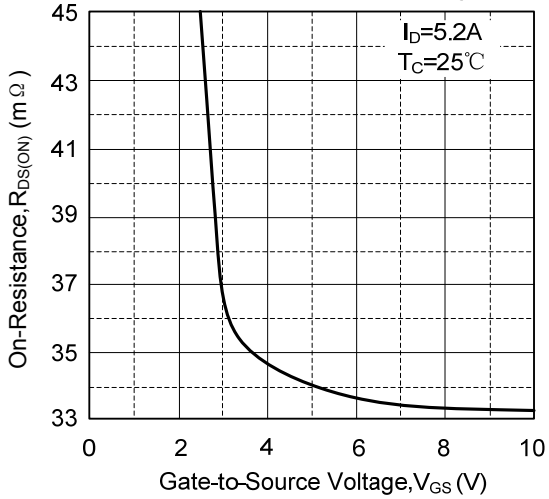
Typical Output Characteristics



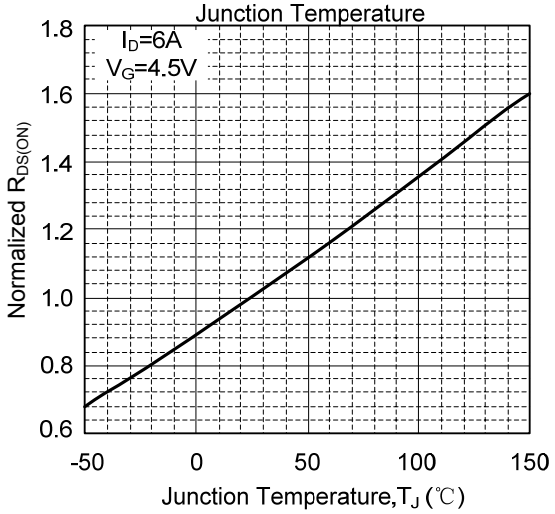
Typical Output Characteristics



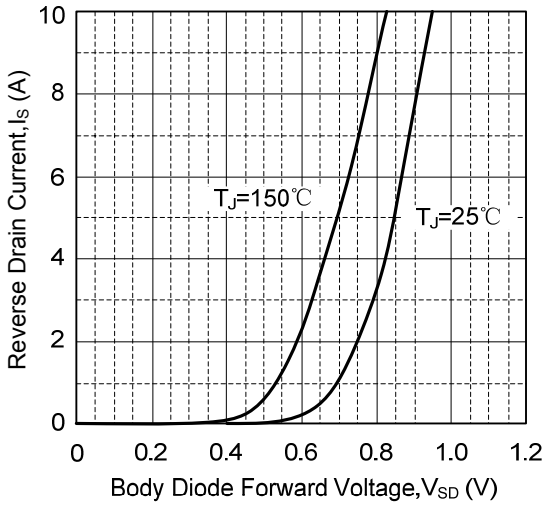
On-Resistance vs. Gate Voltage



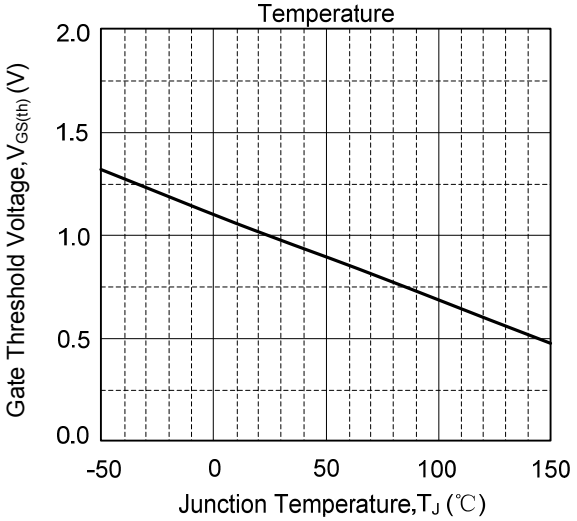
Normalized On-Resistance vs. Junction Temperature



Forward Characteristics of Reverse Diode



Gate Threshold Voltage vs. Junction Temperature



■ TYPICAL CHARACTERISTICS(Cont.)