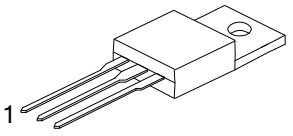
35A, 60V N-CHANNEL ENHANCEMENT MODE TRENCH POWER MOSFET



TO-220

■ DESCRIPTION

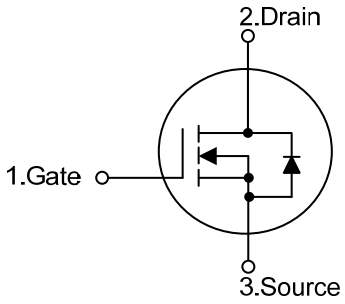
The UTC **UNA06R180M** is an N-channel Power MOSFET, it uses UTC's advanced technology to provide the customers with high switching speed and low on-state resistance, etc.

The UTC **UNA06R180M** is suitable for boost converters and synchronous rectifiers for consumer, telecom, industrial power supplies and LED, etc.

■ FEATURES

* $R_{DS(ON)}$ < 18mΩ @ V_{GS}=10V, I_D=30A
* High power and current handling capability
* High speed switching
* Low gate charge

■ SYMBOL



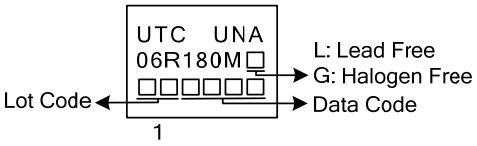
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UNA06R180ML-TA3-T	UNA06R180MG-TA3-T	TO-220	G	D	S	Tube

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

UNA06R180ML-TA3-R (1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) TA3: TO-220 (3) L: Lead Free, G: Halogen Free and Lead Free

■ MARKING



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

PARAMETER			SYMBOL	RATINGS	UNIT
Drain-Source Voltage			V_{DSS}	60	V
Gate-Source Voltage			V_{GSS}	±20	V
Drain Current	Continuous (Note 2)	T_C=25°C	I_D	35	A
		T_C=100°C		27	A
		T_A=25°C		7	A
		T_A=70°C		6	A
	Pulsed(Note 3)		I_{DM}	120	A
Avalanche Current			I_{AS}	26	A
Avalanche Energy (Note4)			E_{AS}	101	mJ
Power Dissipation		T_C=25°C	P_D	100	W
		T_C=100°C		50	W
		T_A=25°C		2.1	W
		T_A=70°C		1.3	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. Current limited by bond wire.
3. Repetitive rating: Pulse width limited by maximum junction temperature.
4. L=0.3mH, I_{AS}=26A, V_{DD}=50V, R_G=25Ω, Starting T_J = 25°C
5. I_{SD} ≤ 26A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 175°C

■ THERMAL RESISTANCES CHARACTERISTICS

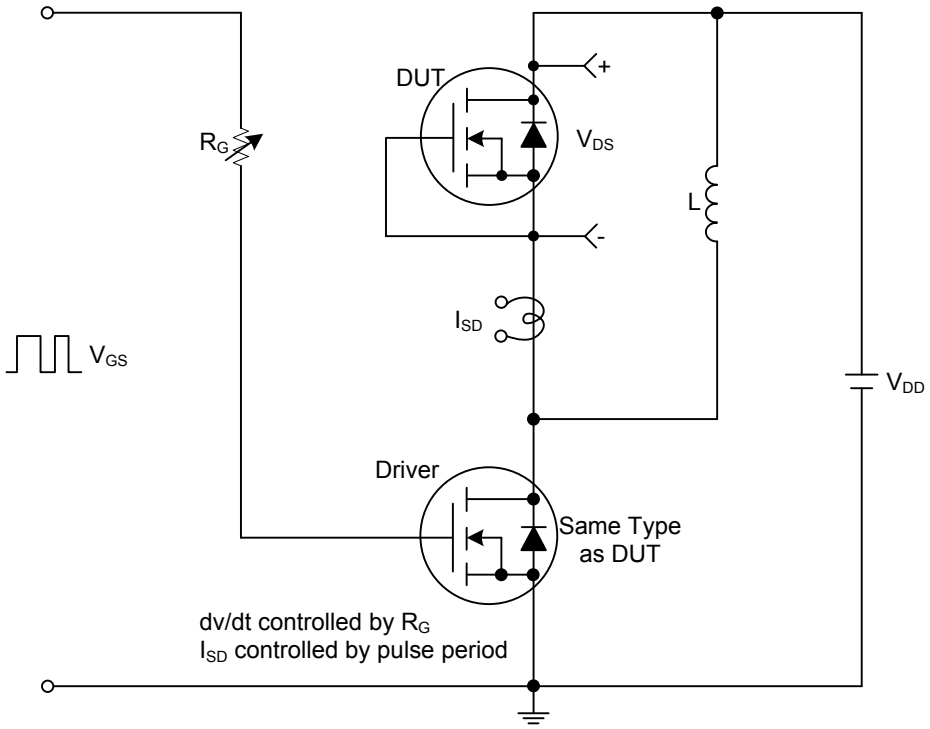
PARAMETER		SYMBOL	RATINGS	UNIT
Junction to ambient	steady state	θ_{JA}	60	°C/W
Junction to Case	steady state	θ_{JC}	1.5	°C/W

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

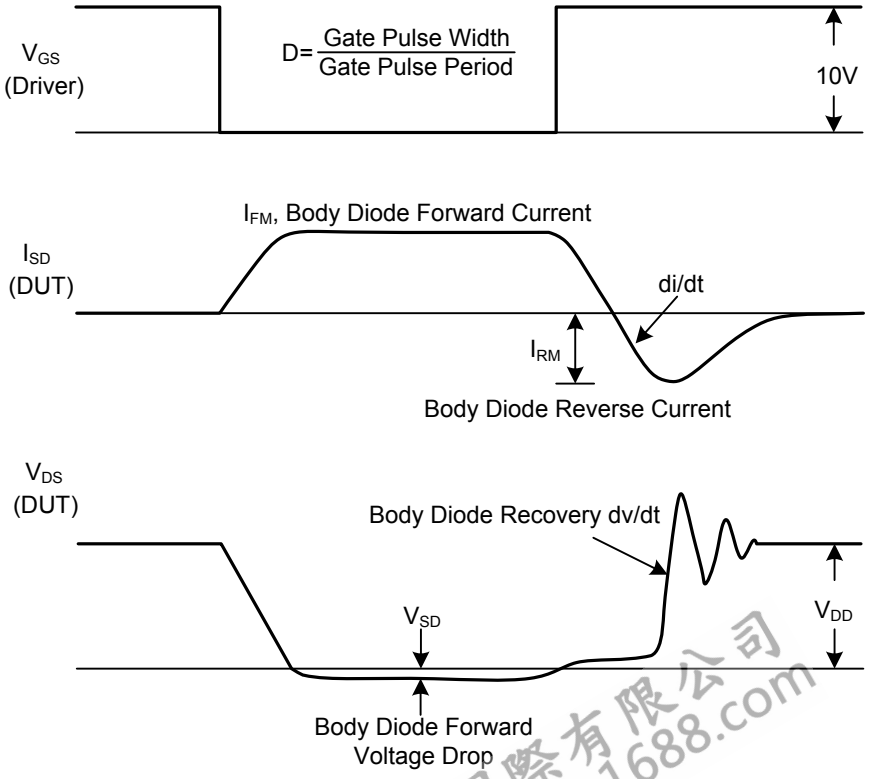
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=250μA, V_{GS}=0V	60			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=60V, V_{GS}=0V			1	μA
			V_{DS}=60V, T_J=55°C			5	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=+20V, 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 (Note 1)		$R_{DS(ON)}$	V_{GS}=10V, I_D=30A		15	18	mΩ
Forward Transconductance(Note 1)		g_{FS}	V_{DD}=5V, I_D=30A		50		S
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=30V, f=1.0MHz		1840		pF
Output Capacitance		C_{OSS}			185		pF
Reverse Transfer Capacitance		C_{RSS}			80		pF
Gate resistance		Rg	V_{GS}=0V, V_{DS}=0V, f=1MHz		3	5	Ω
SWITCHING PARAMETERS							
Total Gate Charge		Q_G	V_{DS}=50V, V_{GS}=10V, I_D=1.3A (Note 1, 2)		27.5		nC
Gate to Source Charge		Q_{GS}			10		nC
Gate to Drain Charge		Q_{GD}			6.5		nC
Turn-on Delay Time		$t_{D(ON)}$	V_{DD} =30V, I_D =0.5A, R_G=25Ω (Note 1, 2)		12		ns
Rise Time		t_R			5.2		ns
Turn-off Delay Time		$t_{D(OFF)}$			38		ns
Fall-Time		t_F			27		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I_S	Integral p-n diode in MOSFET			35	A
Maximum Body-Diode Pulsed Current		I_{SM}				140	A
Drain-Source Diode Forward Voltage		V_{SD}	I_S=1A, V_{GS}=0V		0.75	1.0	V
Body Diode Reverse Recovery Time		t_{RR}	I_S=30A, dI_S/dt=100A/μs		35		ns
Body Diode Reverse Recovery Charge		Q_{RR}			47		nC

Notes: 1. Pulse test: pulse width ≤ 300us, duty cycle ≤ 2%.
2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS



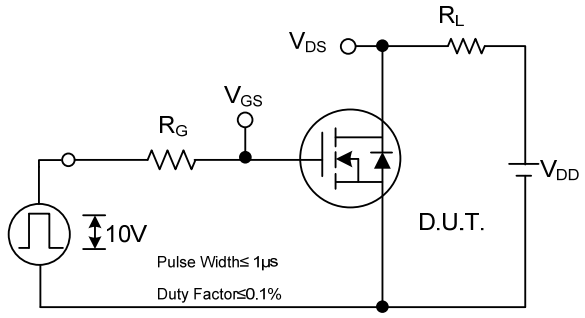
Peak Diode Recovery dv/dt Test Circuit



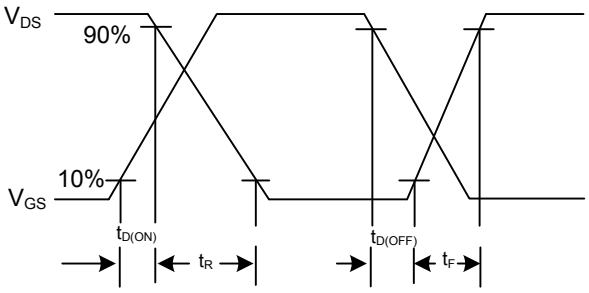
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

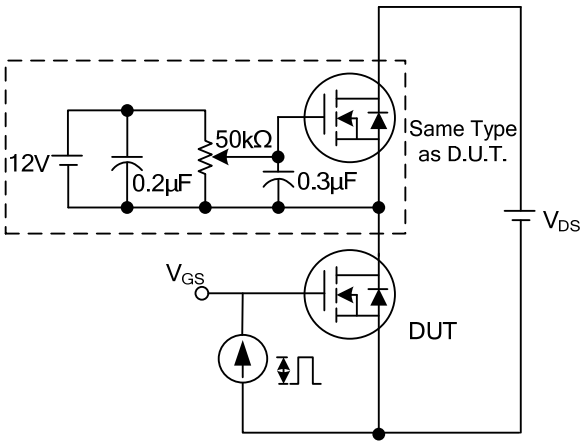
■ TEST CIRCUITS AND WAVEFORMS



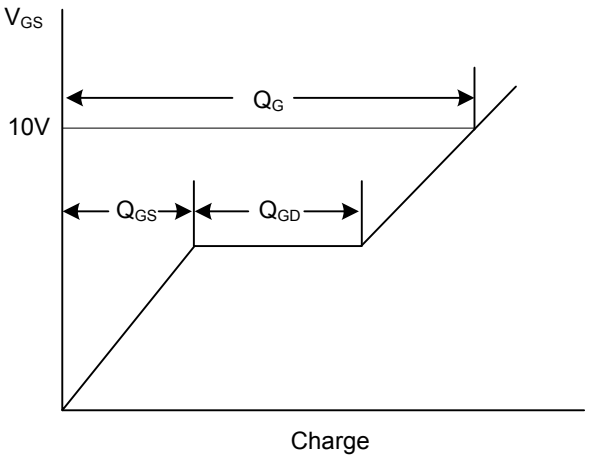
Switching Test Circuit



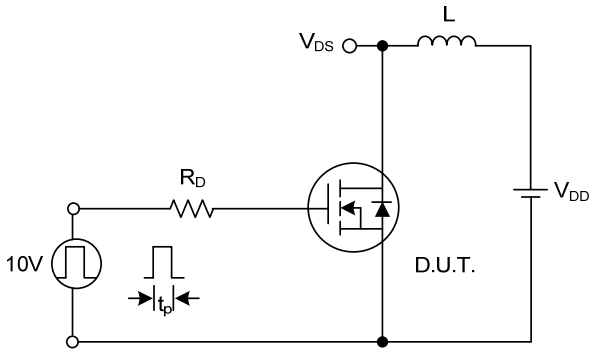
Switching Waveforms



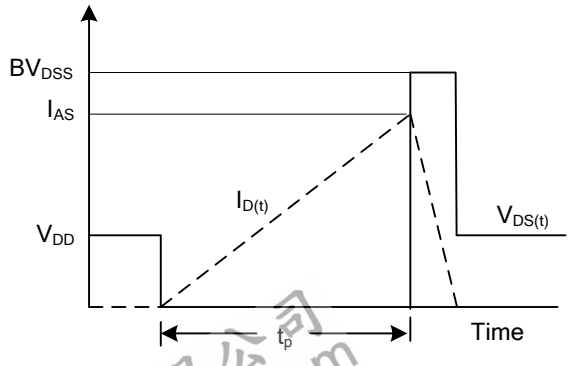
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms