



6.3A, 60V N-CHANNEL FAST SWITCHING MOSFET

DESCRIPTION

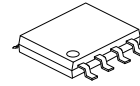
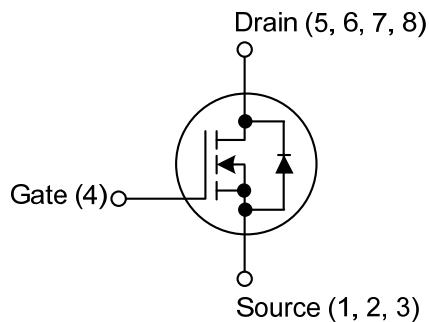
The UTC **UTM6006** is an N-Channel MOSFET, it uses UTC's advanced technology to provide customers with a minimum on-state resistance, high switching speed and low gate charge.

The UTC **UTM6006** is suitable for application in networking DC-DC power system and LCD/LED back light, etc.

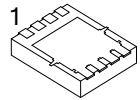
FEATURES

- * $R_{DS(ON)} < 18\text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=6\text{A}$
- * $R_{DS(ON)} < 20\text{ m}\Omega$ @ $V_{GS}=4.5\text{V}$, $I_D=4\text{A}$
- * Low gate charge
- * Excellent CdV/dt effect decline
- * High switching speed

SYMBOL



SOP-8



DFN-8(5x6)

ORDERING INFORMATION

Ordering Number	Package	Pin Assignment								Packing
		1	2	3	4	5	6	7	8	
UTM6006G-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel
UTM6006G-K08-5060-R	DFN-8(5x6)	S	S	S	G	D	D	D	D	Tape Reel

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

UTM6006G-S08-R (1) Packing Type (2) Package Type (3) Green Package	(1) R: Tape Reel (2) S08: SOP-8, K08-5060: DFN-8(5x6) (3) G: Halogen Free and Lead Free
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MARKING

SOP-8	DFN-8(5x6)
Date Code Lot Code	Lot Code Date Code

■ ABSOLUTE MAXIMUM RATINGS

PARAMETER			SYMBOL	RATINGS	UNIT
Drain-Source Voltage			V _{DSS}	60	V
Gate-Source Voltage			V _{GSS}	±20	V
Drain Current	Continuous	T _A =25°C	I _D	6.3	A
	V _{GS} @ 10V (Note 1)	T _A =70°C		5.0	A
	Pulsed (Note 2)		I _{DM}	32	A
Avalanche Current			I _{AS}	28	A
Single Pulse Avalanche Energy (Note 3)			E _{AS}	67	mJ
Power Dissipation (T _A =25°C) (Note 4)		SOP-8	P _D	1.5	W
		DFN-8(5×6)		1.92	
Junction Temperature			T _J	-55~+150	°C
Storage Temperature Range			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 CHARACTERISTICS (Note 1)

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOP-8	θ_{JA}	85	$^{\circ}\text{C/W}$
	DFN-8(5×6)		65	
Junction to Case	SOP-8	θ_{JC}	24	$^{\circ}\text{C/W}$
	DFN-8(5×6)		12	

Notes: 1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.

2. The data tested by pulsed, pulse width ≤ 300μs, duty cycle ≤ 2%.

3. The EAS data shows Max. rating. The test condition is $V_{DD}=25\text{V}$, $V_{GS}=10\text{V}$, $L=0.1\text{mH}$, $I_{AS}=30\text{A}$.

4. The power dissipation is limited by 150 $^{\circ}\text{C}$ junction temperature.

■ **ELECTRICAL CHARACTERISTICS** ($T_J=25^\circ\text{C}$, unless otherwise noted)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{GS} =0V	60			V
BV _{DSS} Temperature Coefficient		ΔBV _{DSS} /ΔT _J	Reference to 25°C , I _D =1mA		0.057		V/°C
Drain-Source Leakage Current		I _{DSS}	V _{DS} =48V, V _{GS} =0V, T _J =25°C			1	μA
			V _{DS} =48V, V _{GS} =0V, 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	1.2		2.5	V
V _{GS(TH)} Temperature Coefficient		ΔV _{GS(TH)}			-5.68		mV/°C
Static Drain-Source On-State Resistance (Note 2)		R _{DS(ON)}	V _{GS} =10V, I _D =6A		14	18	mΩ
			V _{GS} =4.5V, I _D =4A		16	20	mΩ
Forward Transconductance		g _{FS}	V _{DS} =5V, I _D =6A		40		S
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		1070	1200	pF
Output Capacitance		C _{OSS}			200	220	pF
Reverse Transfer Capacitance		C _{RSS}			190	210	pF
SWITCHING PARAMETERS (Note 2)							
Total Gate Charge (4.5V)		Q _G	V _{GS} =10V, V _{DS} =48V, I _D =1A		290	310	nC
Gate to Source Charge		Q _{GS}			10.7	15	nC
Gate to Drain Charge		Q _{GD}			30	45	nC
Turn-ON Delay Time		t _{D(ON)}	V _{GS} =10V, V _{DD} =30V, R _G =3.3Ω, I _D =2A		55	70	ns
Rise Time		t _R			100	120	ns
Turn-OFF Delay Time		t _{D(OFF)}			580	620	ns
Fall-Time		t _F			190	210	ns
GUARANTEED AVALANCHE CHARACTERISTICS							
Single Pulse Avalanche Energy (Note 5)		E _{AS}	V _{DD} =25V, L=0.1mH, I _{AS} =15A	19			mJ
DIODE CHARACTERISTICS							
Continuous Source Current (Note 1, 6)		I _S	V _G =V _D =0V , Force Current			6.3	A
Pulsed Source Current (Note 2, 6)		I _{SM}				32	A
Diode Forward Voltage (Note 2)		V _{SD}	V _{GS} =0V , I _S =6.3A , T _J =25°C			1	V
Reverse Recovery Time		t _{rr}	I _F =6A, dI/dt=100A/μs, T _J =25°C		15		nS
Reverse Recovery Charge		Q _{rr}			10.4		nC

Notes: 1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.

2. The data tested by pulsed, pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.

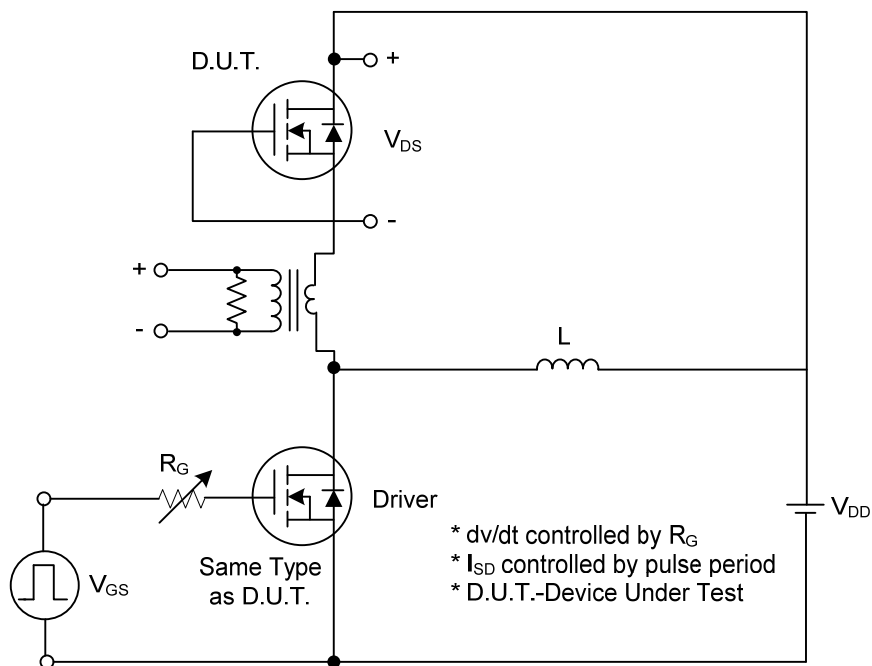
3. The EAS data shows Max. rating. The test condition is $V_{DD}=25\text{V}$, $V_{GS}=10\text{V}$, $L=0.1\text{mH}$, $I_{AS}=30\text{A}$.

4. The power dissipation is limited by 150°C junction temperature.

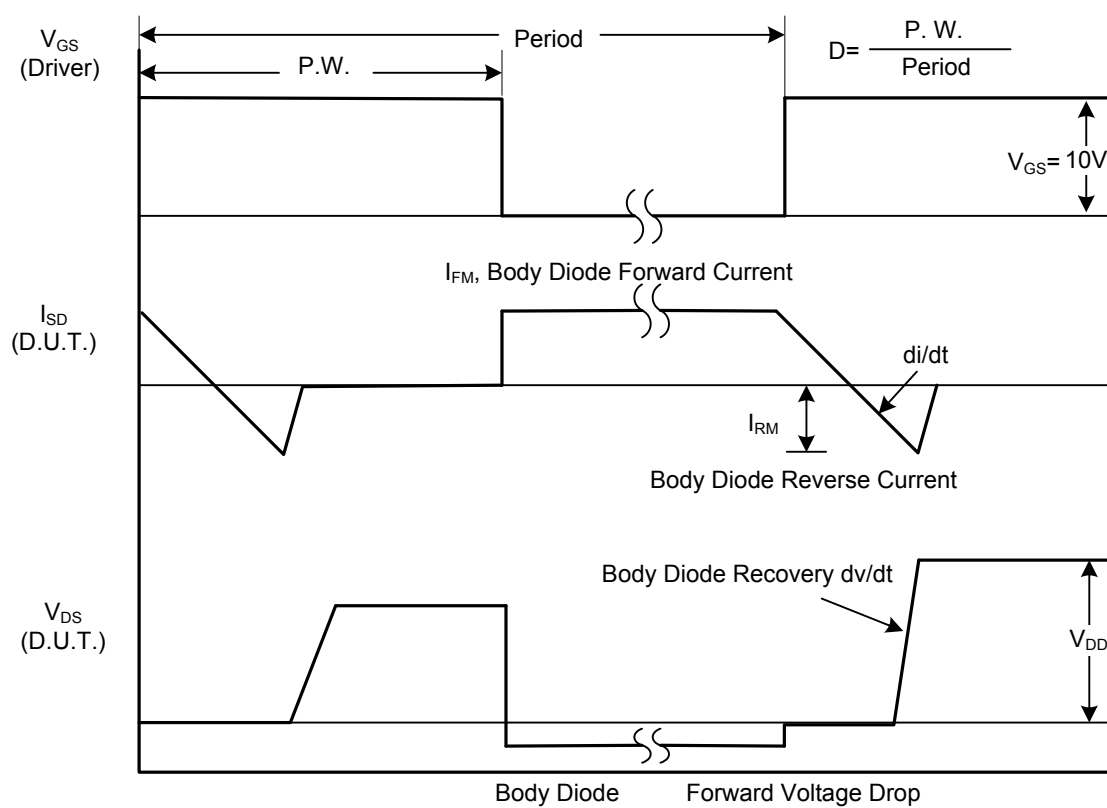
5. The Min. value is 100% EAS tested guarantee.

6. The data is theoretically the same as I_D and I_{DM} , in real applications, should be limited by total power dissipation.

■ TEST CIRCUITS AND WAVEFORMS

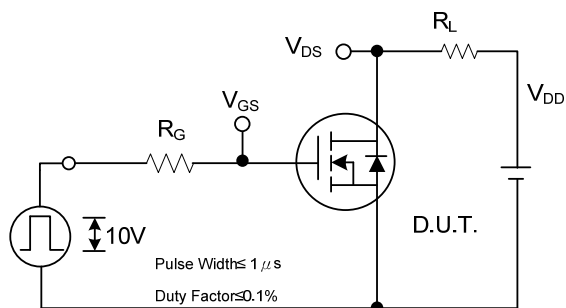


Peak Diode Recovery dv/dt Test Circuit

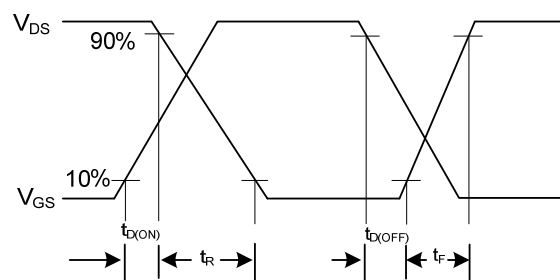


Peak Diode Recovery dv/dt Waveforms

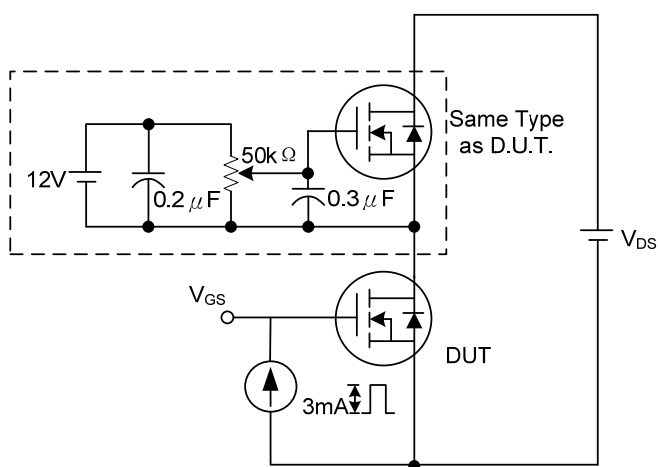
■ TEST CIRCUITS AND WAVEFORMS (Cont.)



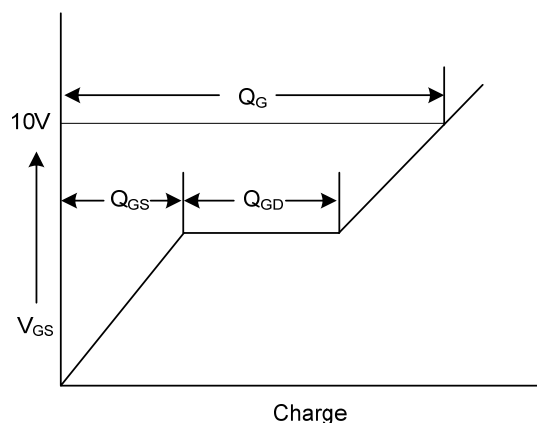
Switching Test Circuit



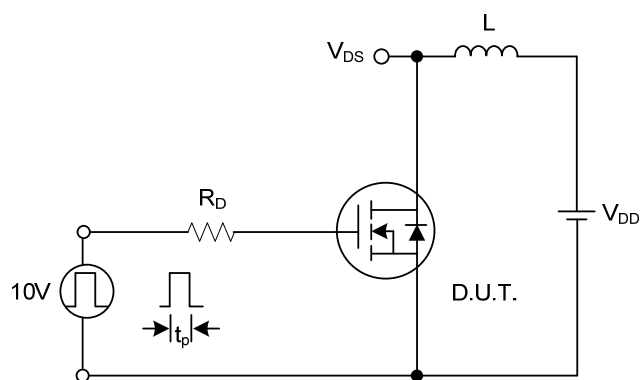
Switching Waveforms



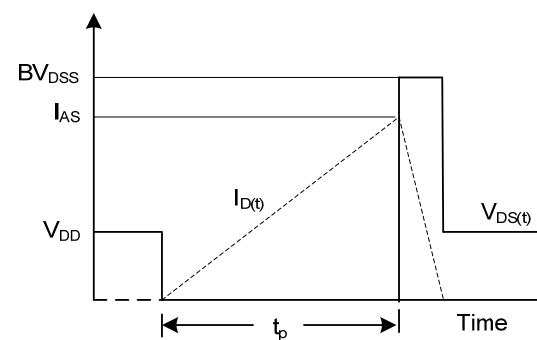
Gate Charge Test Circuit



Gate Charge Waveform

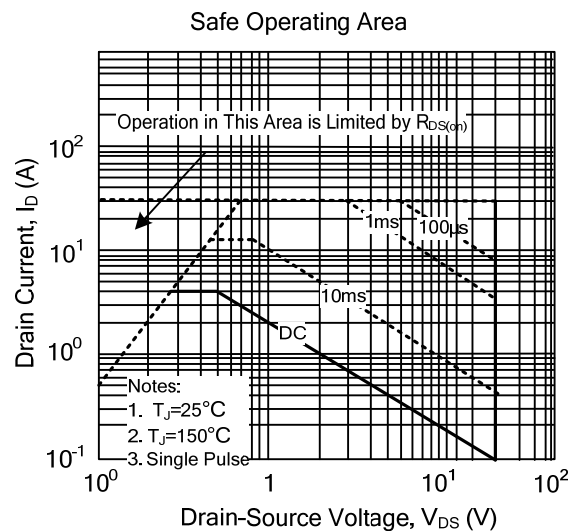
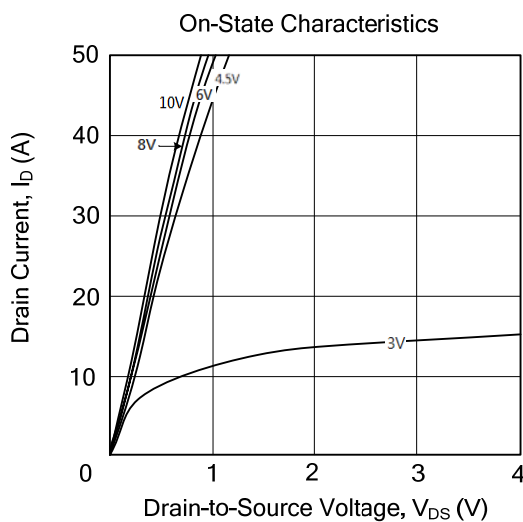
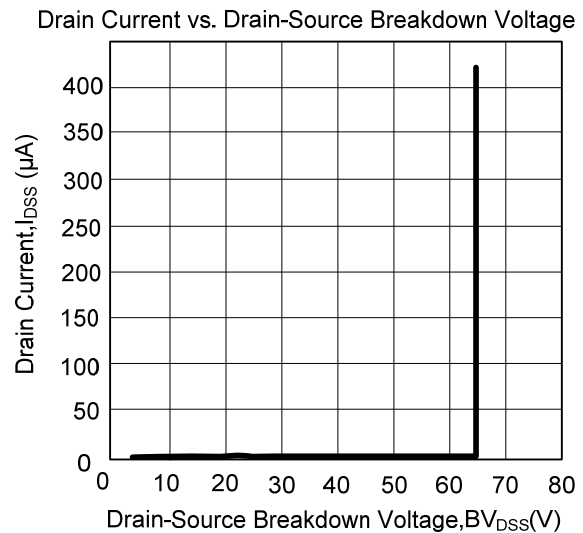
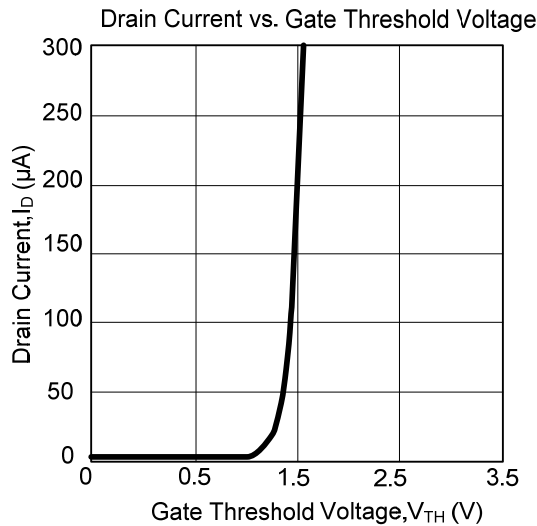
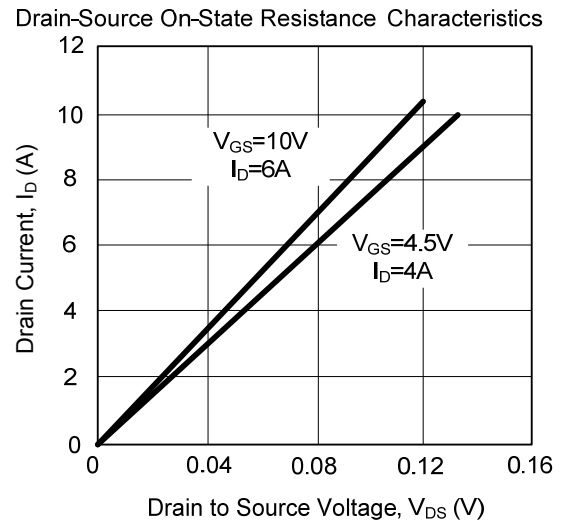
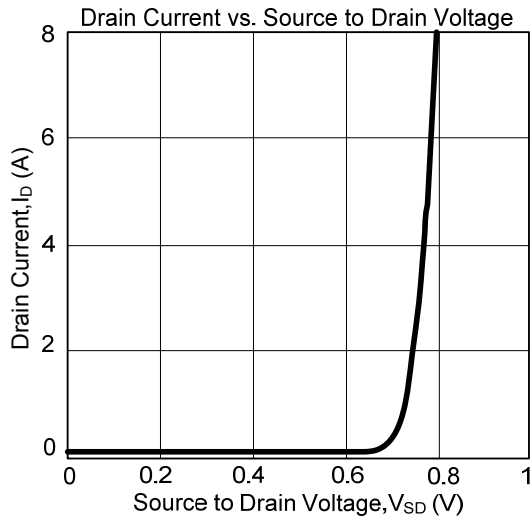


Unclamped Inductive Switching Test Circuit

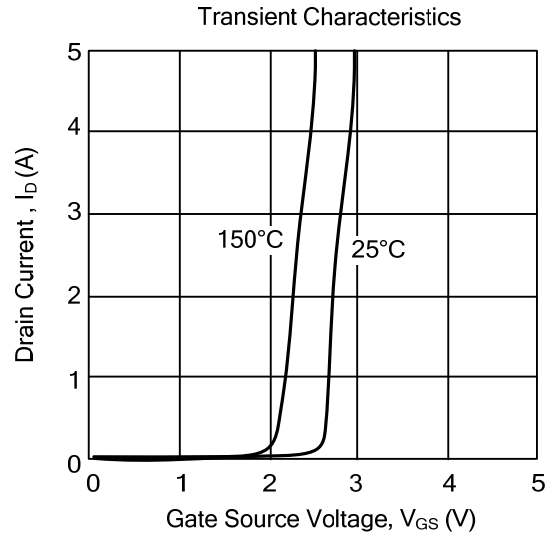
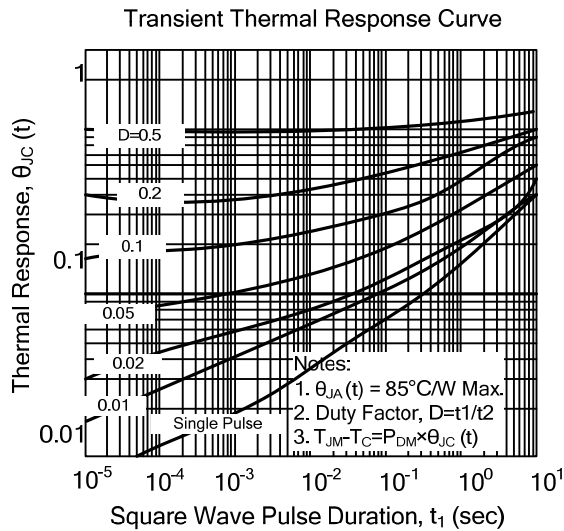


Unclamped Inductive Switching Waveforms

TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



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