



UPG10N60E

Insulated Gate Bipolar Transistor

600V, SMPS N-CHANNEL IGBT

DESCRIPTION

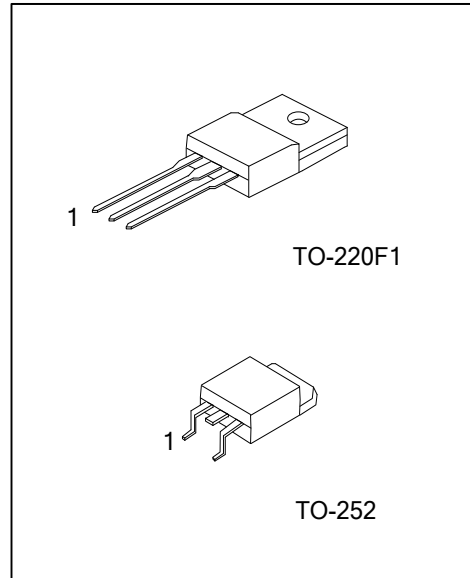
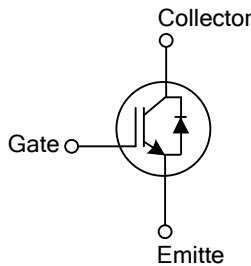
The UTC **UPG10N60E** is a N-channel IGBT. it uses UTC's advanced technology to provide customers with high input impedance, high switching speed and low conduction loss, etc.

The UTC **UPG10N60E** is suitable for high voltage switching, high frequency switch mode power supplies.

FEATURES

- * $V_{CE(SAT)} \leq 1.95V @ I_C=20A, V_{GE}=15V$
- * High switching speed
- * High input impedance
- * Low conduction loss

SYMBOL



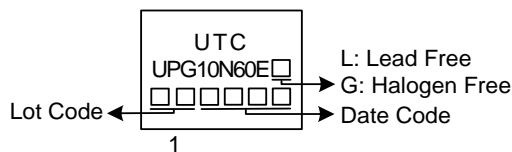
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UPG10N60EL-TF1-T	UPG10N60EG-TF1-T	TO-220F1	G	C	E	Tube
UPG10N60EL-TN3-R	UPG10N60EG-TN3-R	TO-252	G	C	E	Tape Reel

Note: Pin Assignment: G: Gate C: Collector E: Emitter

<p>UPG10N60EG-TF1-T</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Green Package</p>	<p>(1) T: Tube, R: Tape Reel</p> <p>(2) TF1: TO-220F1, TN3: TO-252</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING



UPG10N60E

Insulated Gate Bipolar Transistor

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

PARAMETER	SYMBOL	RATINGS	UNIT
Collector-Emitter Voltage	V _{CES}	600	V
Gate to Emitter Voltage Continuous	V _{GES}	±20	V
Continuous Collector Current	I _C	T _C =25°C	20
		T _C =100°C	10
Collector Current Pulsed (Note 2)	I _{CM}	30	A
Continuous Forward Current	I _F	T _C =25°C	10
		T _C =100°C	5
Forward Current Pulsed	I _{FM}	80	A
Peak Diode Recovery dv/dt (Note 3)	dv/dt	6.8	V/ns
Power Dissipation	P _D	TO-220F1	28
		TO-252	40
Junction Temperature	T _J	-55 ~ +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. Repetitive Rating: Pulse width limited by maximum junction temperature.

3. I_F ≤ 10A, di/dt ≤ 200A/μs, V_{CC} ≤ BV_{CES}, Starting T_J=25°C

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Case	θ _{JC}	TO-220F1	4.46
		TO-252	3.12

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Collector-Emitter Breakdown Voltage	BV _{CES}	I _C =250μA, V _{GE} =0V	600			V
Collector-Emitter Leakage Current	I _{CES}	V _{CE} =600V, V _{GE} =0V			10	μA
Gate to Emitter Leakage Current	I _{GES}	V _{CE} =0V, V _{GE} =±20V			±400	nA
ON CHARACTERISTICS						
Collector-Emitter Saturation Voltage	V _{CE(SAT)}	I _C =10A, V _{GE} =15V	T _J =25°C	1.6	1.95	V
			T _J =150°C	1.7		V
Gate to Emitter Threshold Voltage	V _{GE(TH)}	I _C =250μA, V _{CE} =V _{GE}	4.0		6.5	V
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{IES}	V _{CE} =30V, V _{GE} =0V, f=1MHz		418		pF
Output Capacitance	C _{OES}			53		pF
Reverse Transfer Capacitance	C _{RES}			8.9		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge	Q _G	I _C =10A, V _{CE} =100V, V _{GE} =10V		15		nC
Gate-Emitter Charge	Q _{GE}			4.5		nC
Gate-Collector Charge	Q _{GC}			6		nC
Current Turn-On Delay Time	t _{D(ON)}	I _C =10A, V _{CE} =50V, V _{GE} =15V, R _G =10Ω		64		ns
Current Rise Time	t _R			46		ns
Current Turn-Off Delay Time	t _{D(OFF)}			56		ns
Current Fall Time	t _F			45		ns
DRAIN-SOURCE DIODE CHARACTERISTICS						
Forward Voltage Drop	V _{FM}	I _F =4A			2.6	V
Reverse Recovery Time	t _{rr}	I _F =4A, di/dt=100A/μS, V _{CC} =400V		66		ns
Reverse Recovery Charge	Q _{rr}			140		nC

Note: Pulse Test: Pulse width ≤ 50μs.

■ TEST CIRCUIT AND WAVEFORMS

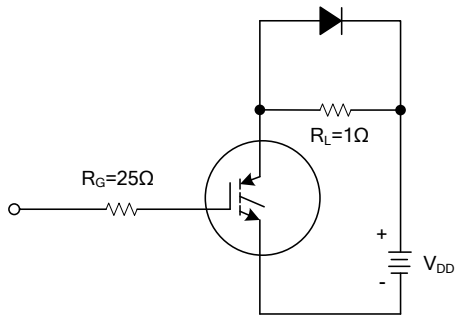


Fig 1. INDUCTIVE SWITCHING TEST CIRCUIT

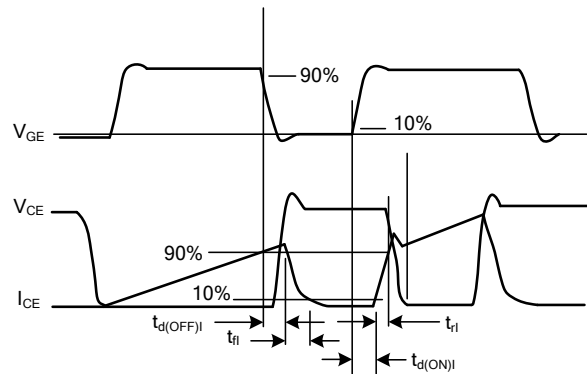
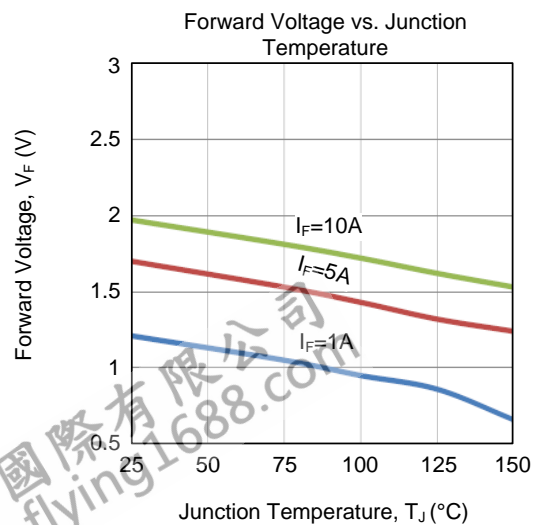
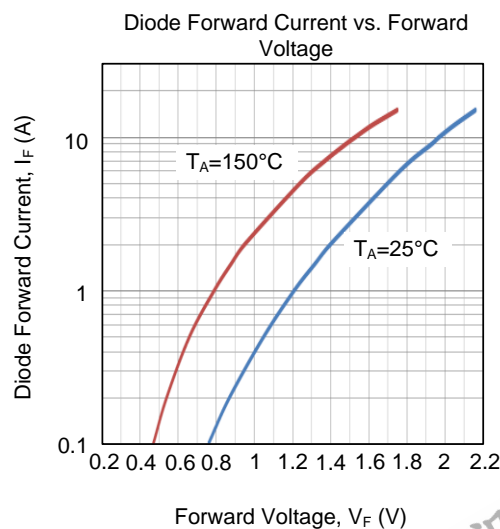
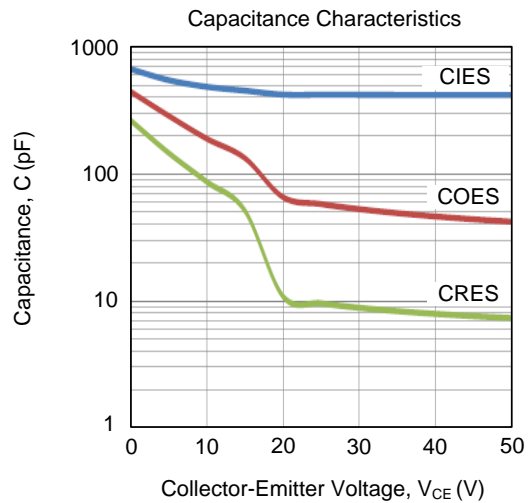
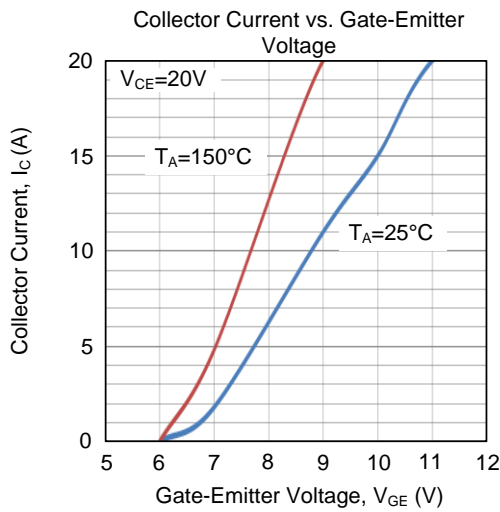
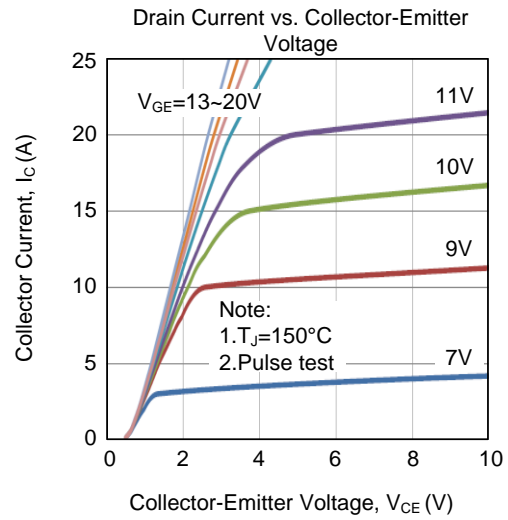
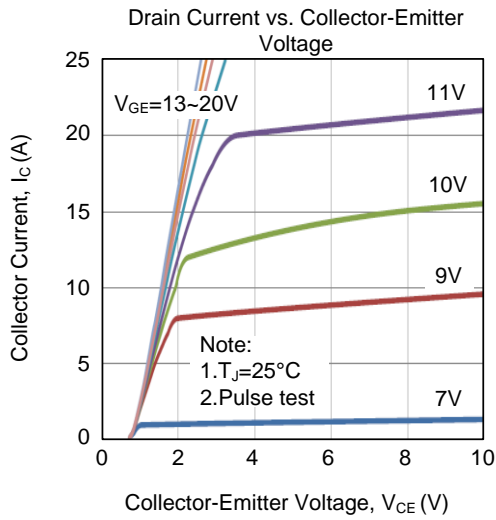
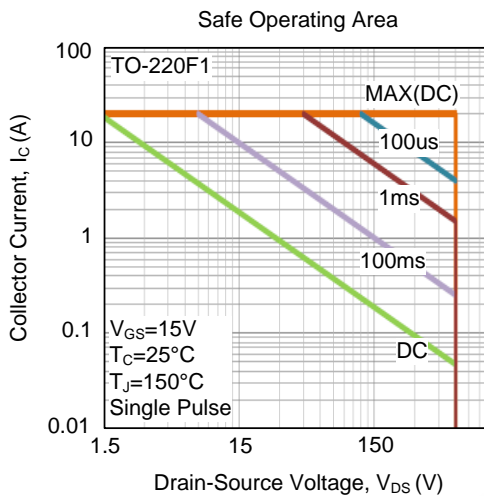
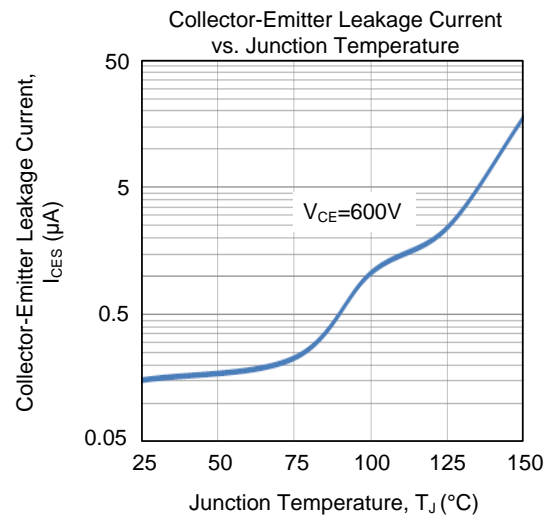
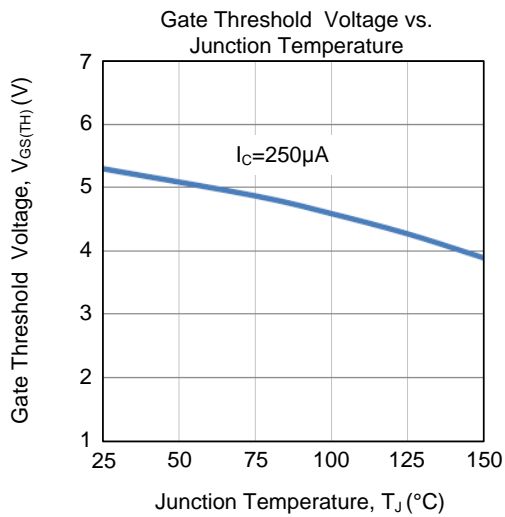
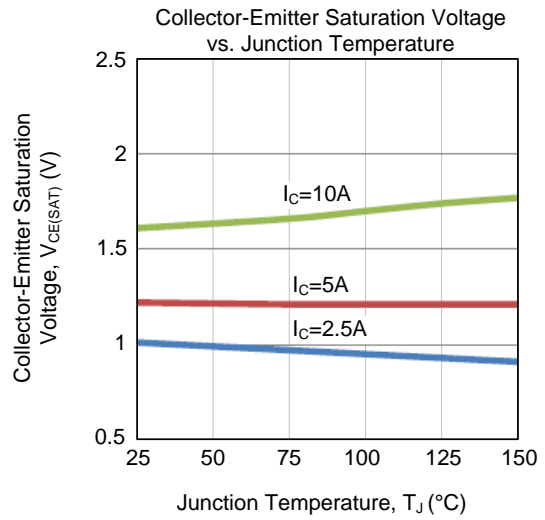
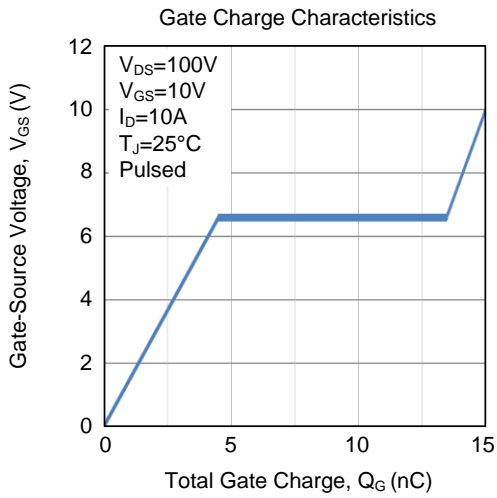


Fig 2. SWITCHING TEST WAVEFORMS

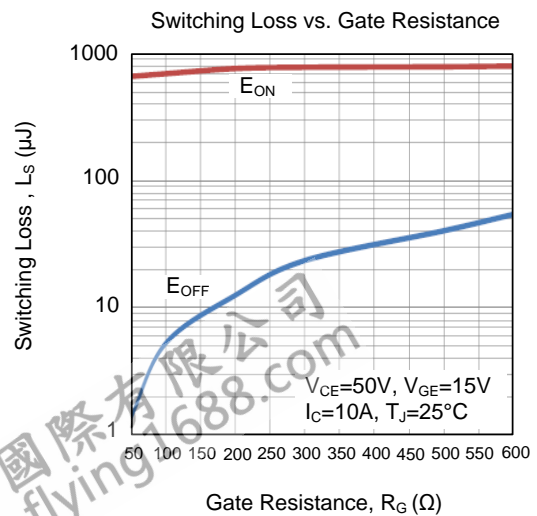
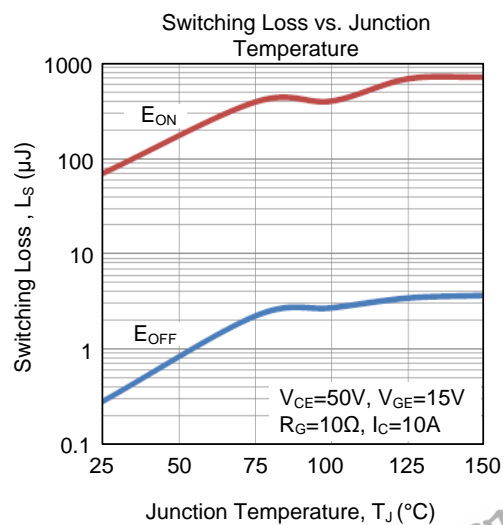
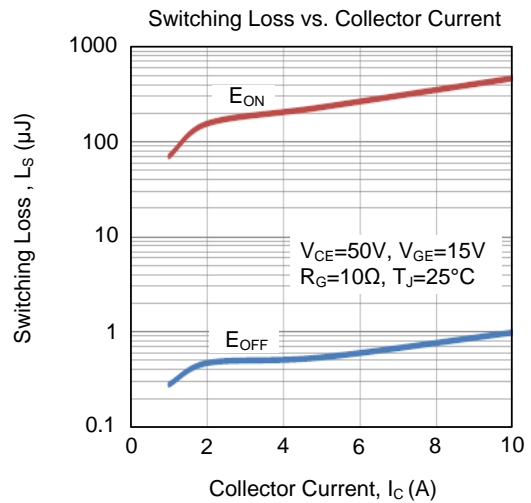
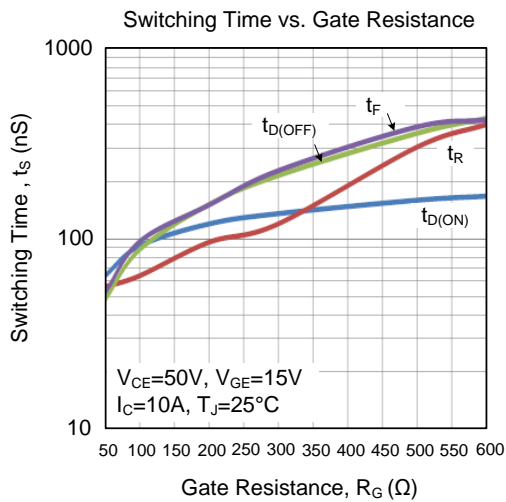
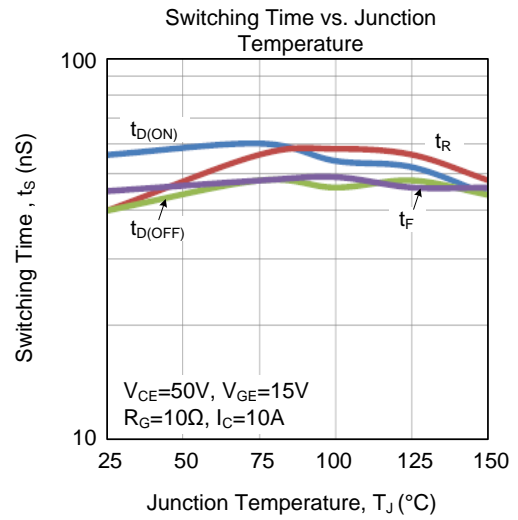
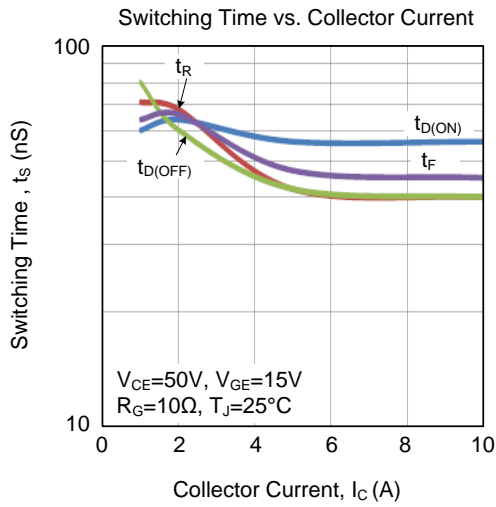
TYPICAL CHARACTERISTICS



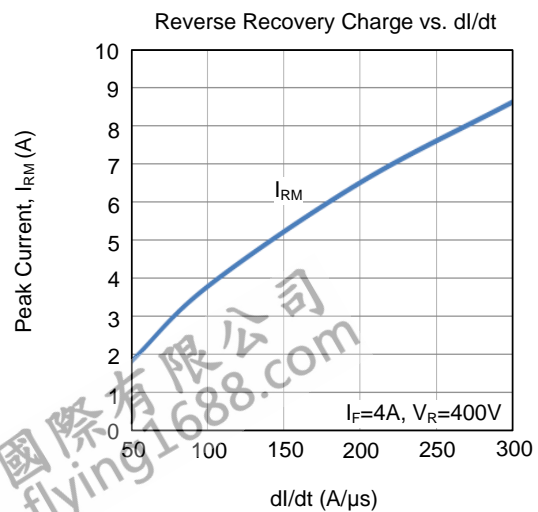
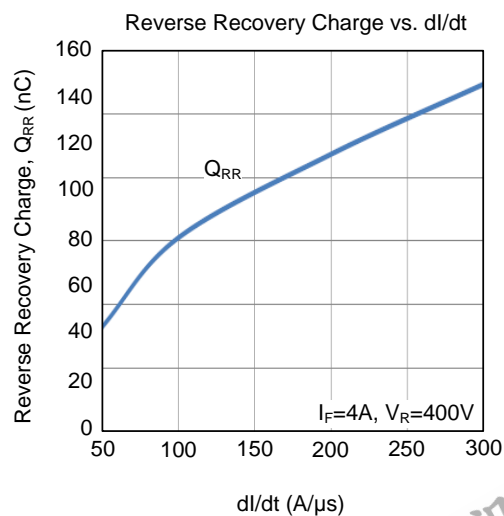
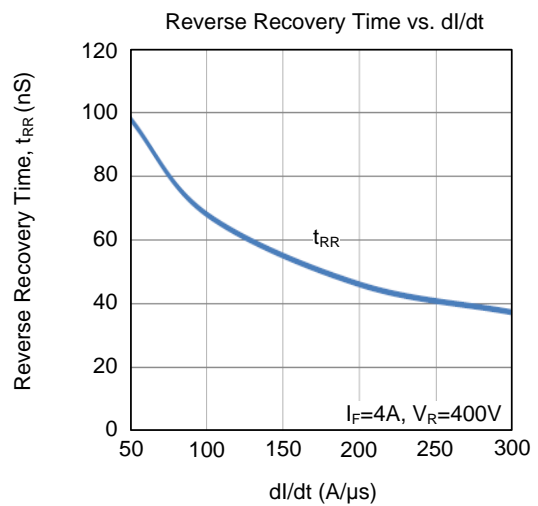
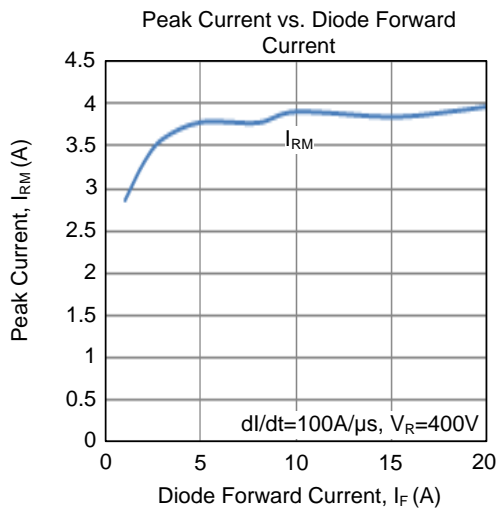
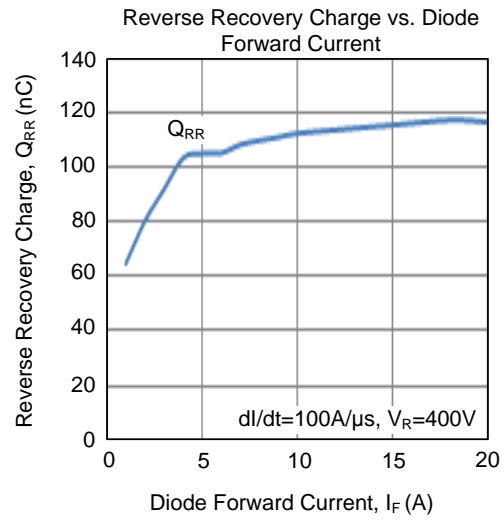
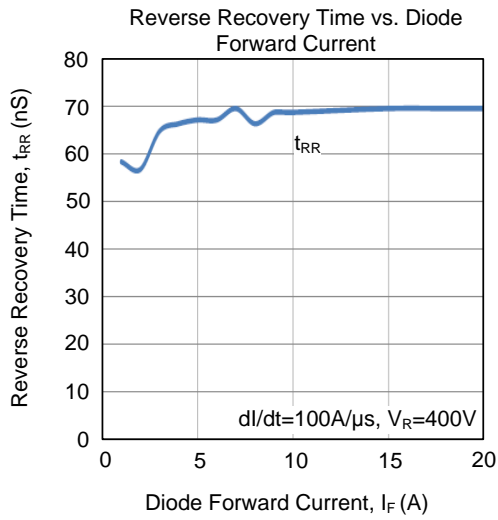
■ TYPICAL CHARACTERISTICS (Cont.)



TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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