



UGN70R180

POWER MOSFET

GALLIUM NITRIDE (GaN) ENHANCEMENT-MODE POWER TRANSISTOR

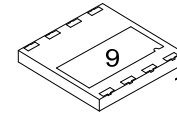
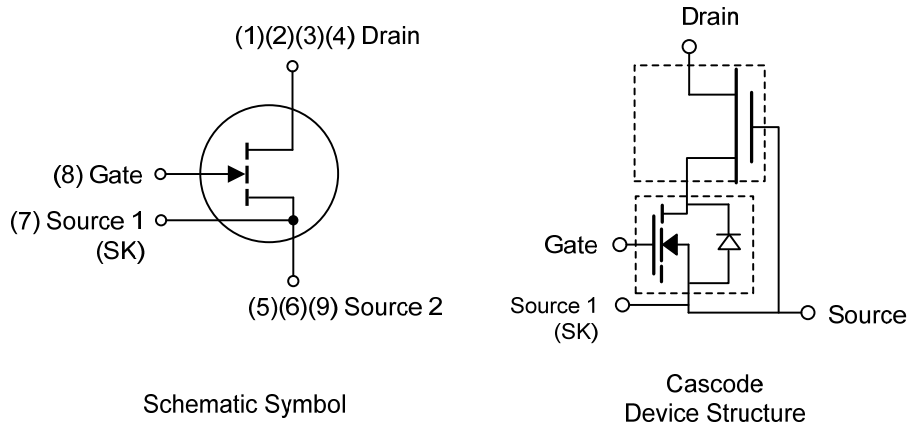
DESCRIPTION

The UTC **UGN70R180** is an enhancement mode GaN HEMT power transistor. Provides high breakdown voltage, high current and high operating speed which is suitable for high power applications.

FEATURES

- * $R_{DS(ON)} \leq 225 \text{ m}\Omega$ @ $V_{GS}=12\text{V}$, $I_D=4.0\text{A}$
- * Easy to use, compatible with standard gate drivers
- * Excellent $Q_G \times R_{DS(ON)}$ figure of merit (FOM)
- * Low Q_{RR} , no free-wheeling diode required
- * Low switching loss

SYMBOL



DFN8080-8

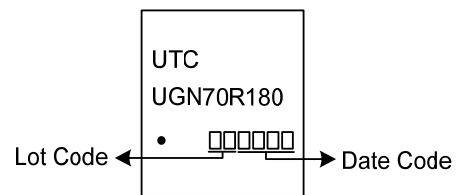
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment									Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	9	
UGN70R180L-K08-8080-R	UGN70R180G-K08-8080-R	DFN8080-8	D	D	D	D	S2	S2	S1	G	S2	Tape Reel

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

UGN70R180G-K08-8080-R		(1) Packing Type	(1) R: Tape Reel
		(2) Package Type	(2) K08-8080: DFN8080-8
		(3) Green Package	(3) G: Halogen Free and Lead Free L: Lead Free

■ MARKING



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

PARAMETER			SYMBOL	RATINGS	UNIT
Drain-Source Voltage (T _J =-55 ~ +150°C)			V _{DSS}	700	V
Transient Drain to Source Voltage (Note 2)			V _(TR) DSS	800	V
Gate-Source Voltage			V _{GSS}	±20	V
Drain Current	Continuous	T _C =25°C	I _D	10.4	A
		T _C =100°C		6.5	A
	Pulsed width:100μS (Note 2)	T _C =25°C	I _{DM}	31	A
		T _C =150°C		23	A
Power Dissipation			P _D	37	W
Operating Temperature			T _C	-55 ~ +150	°C
Junction Temperature			T _J	-55 ~ +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. Off-state, spike duty cycle D < 0.01, spike duration < 2μs.

■ THERMAL DATA

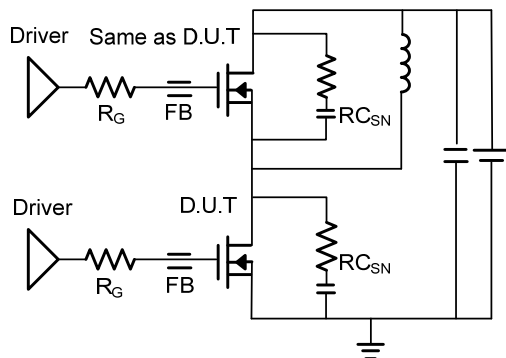
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ _{JA}	50 (Note)	°C/W
Junction to Case	θ _{JC}	3.4	°C/W

Note: Device on one layer epoxy PCB for drain connection (vertical and without air stream cooling, with 6cm²copper area and70μm thickness).

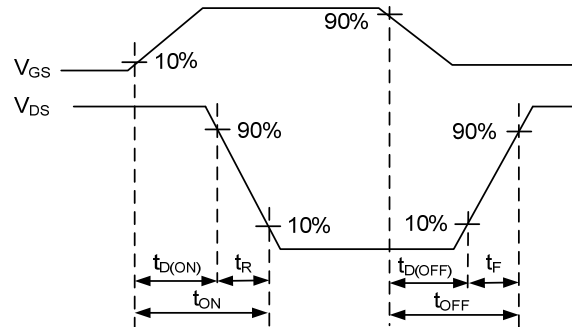
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Voltage		V _{DSS_MAX}	V _{GS} =0V	700			V
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V, I _{DSS} =250μA		1000		V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =700V, V _{GS} =0V		9	20	μA
			V _{DS} =700V, V _{GS} =0V, T _J =150°C		50		μA
Gate- Source Leakage Current	Forward	I _{GSS}	V _{GS} =20V			150	nA
	Reverse		V _{GS} =-20V			-150	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =500μA	3.0	4.0	5.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =12V, I _D =4.0A		180	225	mΩ
			V _{GS} =12V, I _D =4.0A, T _J =150°C		360		mΩ
DYNAMIC CHARACTERISTICS							
Input Capacitance		C _{ISS}	V _{DS} =400V, V _{GS} =0V, f=1.0MHz		506		pF
Output Capacitance		C _{OSS}			22		pF
Reverse Transfer Capacitance		C _{RSS}			0.8		pF
Effective Output Capacitance, Energy Related		C _{o(er)}	V _{DS} =0 ~ 400V, V _{GS} =0V		33		pF
Effective Output Capacitance, Time Related		C _{o(tr)}			79		pF
Output Charge		Q _{OSS}			32		nC
SWITCHING CHARACTERISTICS							
Total Gate Charge (Note 1)		Q _G	V _{DS} =400V, V _{GS} =0~12V, I _D =6.5A		15.8		nC
Gate-Source Charge		Q _{GS}			3.8		nC
Gate-Drain Charge		Q _{GD}			5.5		nC
Turn-On Delay Time (Note 1)		t _{D(ON)}	V _{DS} =400V, V _{GS} =0~12V, I _D =6.0A, R _G =47Ω		60		ns
Turn-On Rise Time		t _{tr}			12		ns
Turn-Off Delay Time		t _{D(OFF)}			80		ns
Turn-Off Fall Time		t _f			10		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS							
Drain-Source Diode Forward Voltage		V _{SD}	I _S =3.2A, V _{GS} =0V, T _J =25°C		1.3		V
			I _S =6.5A, V _{GS} =0V, T _J =25°C		1.9		V
			I _S =6.5A, V _{GS} =0V, T _J =150°C		2.7		V
Body Diode Reverse Recovery Time		t _{rr}	I _S =6.5A, V _{GS} =0V, V _{DD} =400V,		18		ns
Body Diode Reverse Recovery Charge		Q _{rr}	di/dt=1000A/μs		32		μC

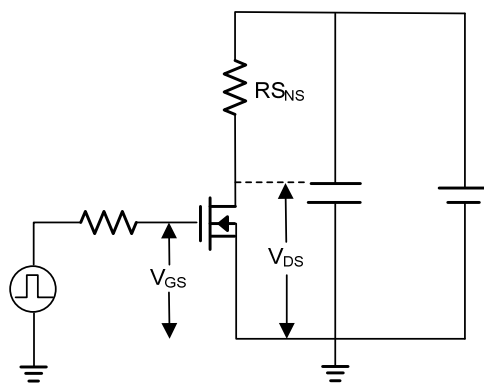
■ TEST CIRCUITS AND WAVEFORMS



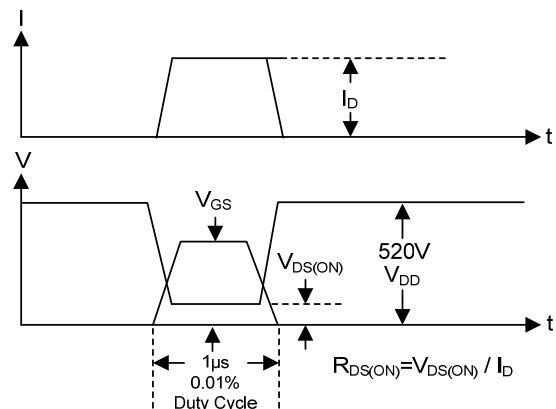
Switching Time Test Circuit



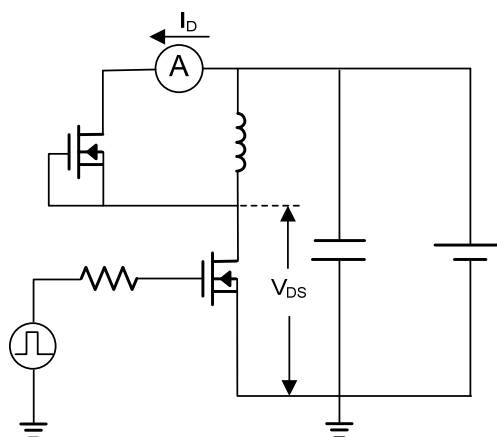
Switching Time Waveform



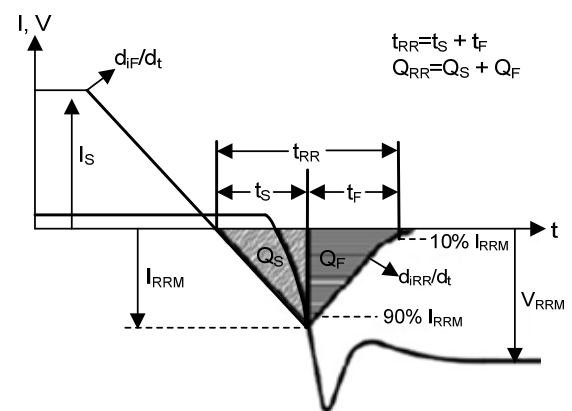
Dynamic $R_{DS(ON)}$ Test Circuit



Dynamic $R_{DS(ON)}$ Waveform

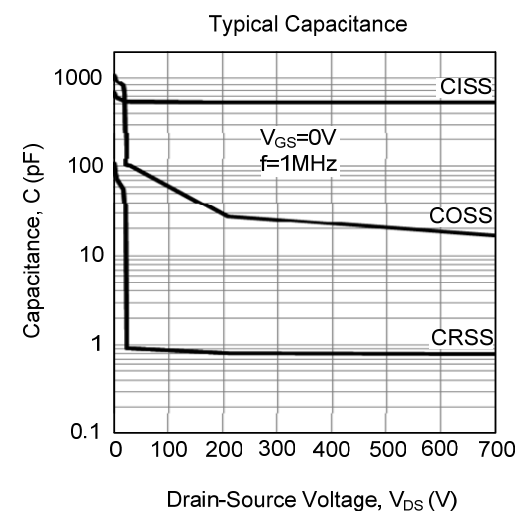
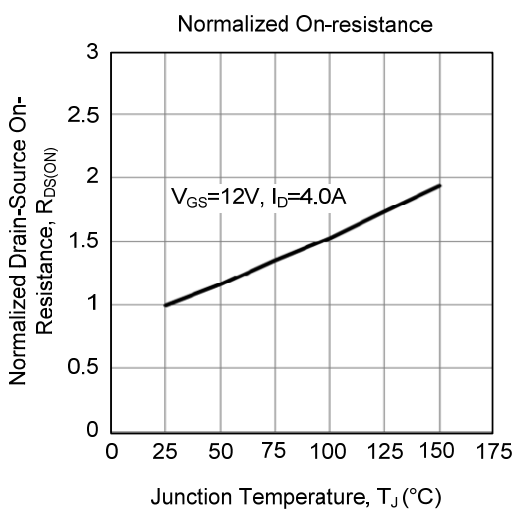
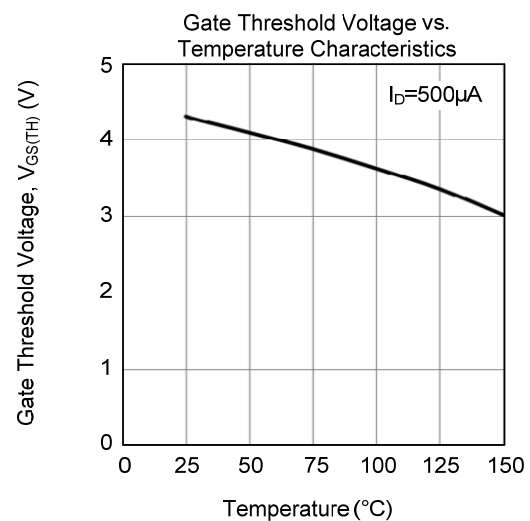
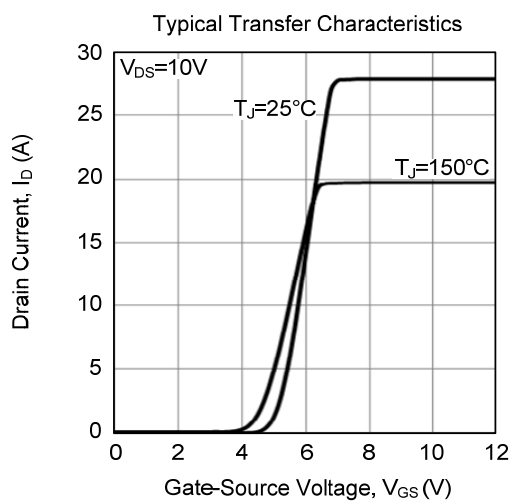
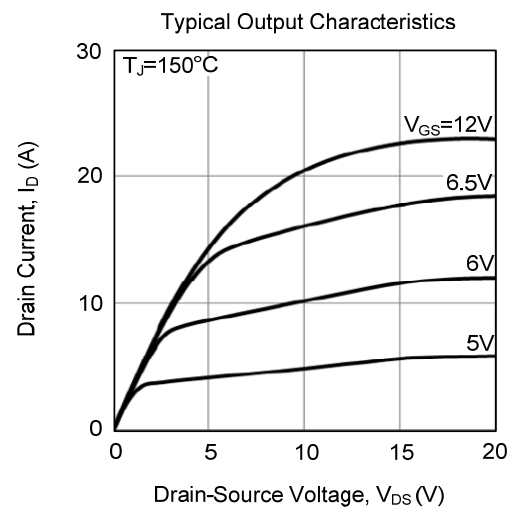
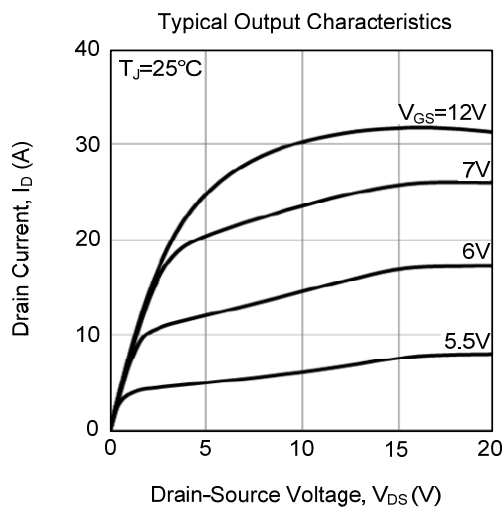


Diode Characteristic Test Circuits

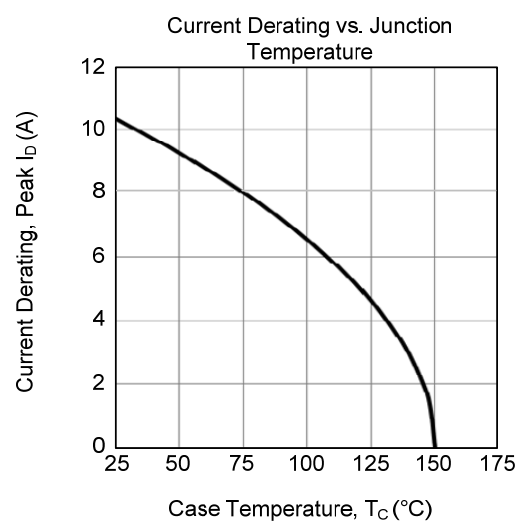
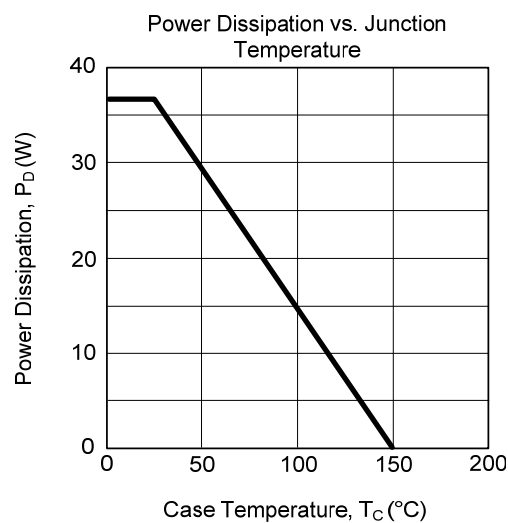
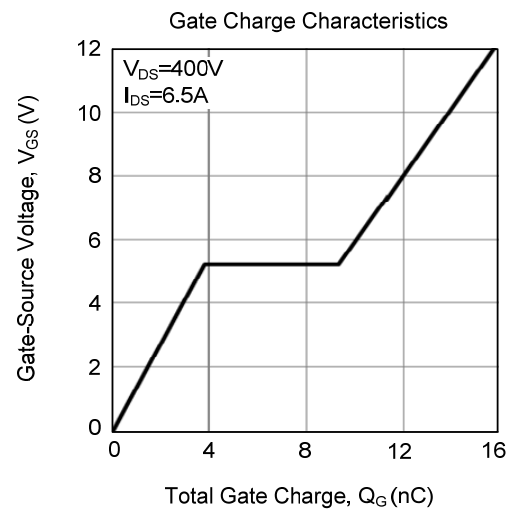
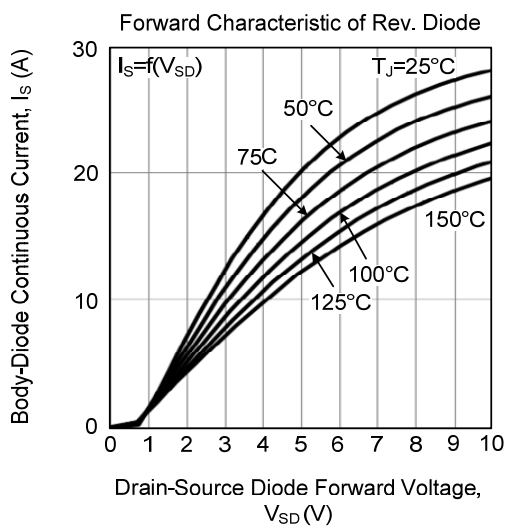
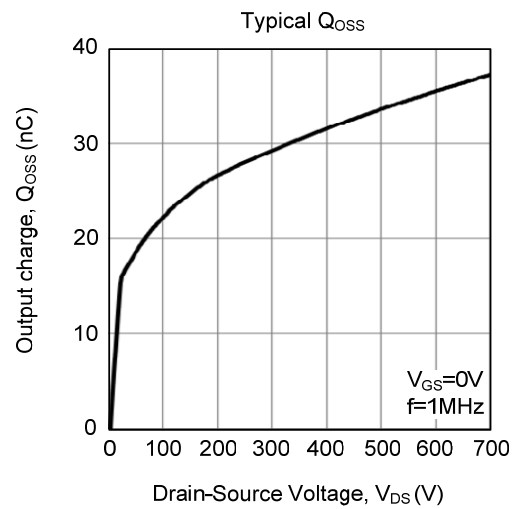
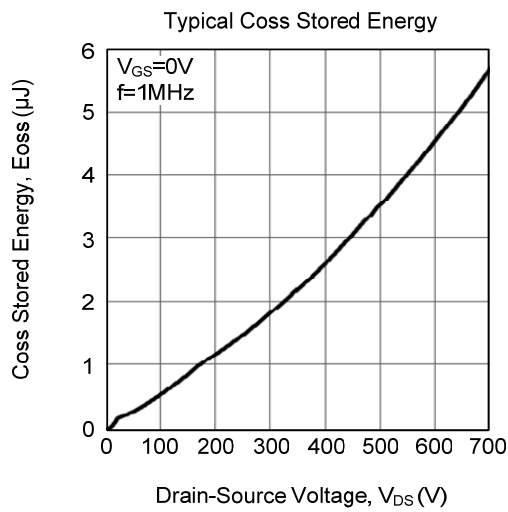


Diode Recovery Waveform

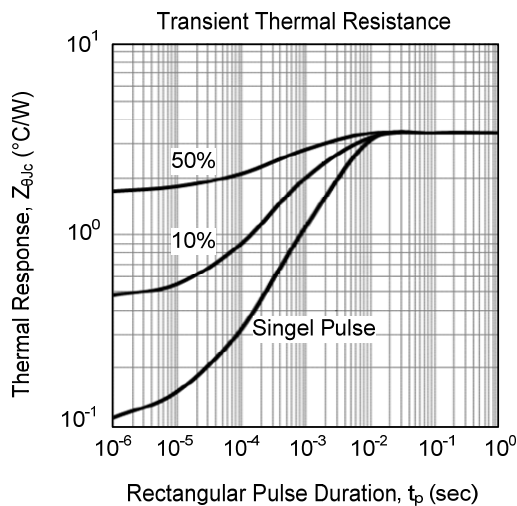
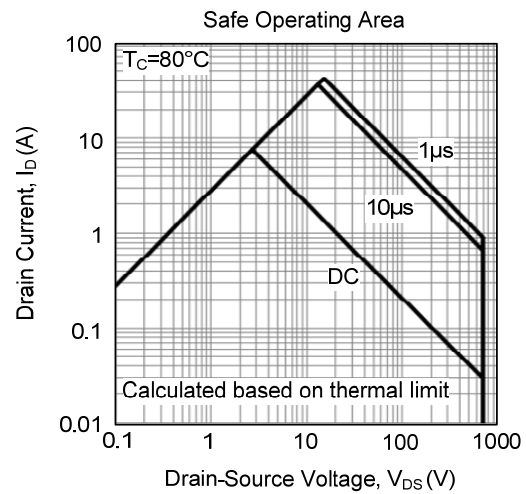
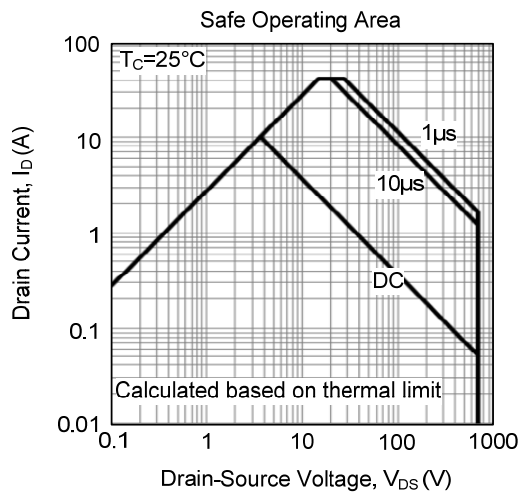
■ TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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