



UT5003

Power MOSFET

DUAL ENHANCEMENT MODE (N-CHANNEL/P-CHANNEL)

DESCRIPTION

The **UT5003** can provide excellent $R_{DS(ON)}$ and low gate charge by using UTC's advanced trench technology. This device is suitable for use as a load switch or in PWM applications.

FEATURES

* N-Channel: 30V/7A

$R_{DS(ON)} = 27.5m\Omega @ V_{GS} = 10V$

$R_{DS(ON)} = 40m\Omega @ V_{GS} = 4.5V$

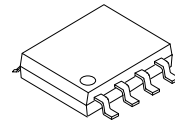
* P-Channel: -30V/-5A

$R_{DS(ON)} = 45m\Omega @ V_{GS} = -10V$

$R_{DS(ON)} = 80m\Omega @ V_{GS} = -4.5V$

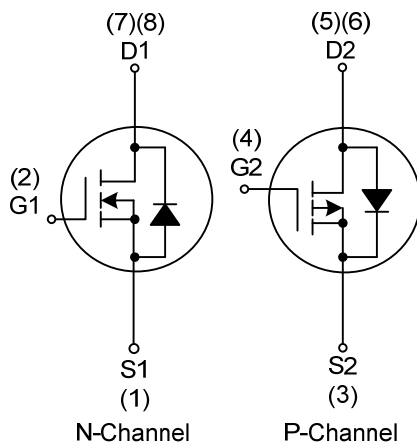
* Super high dense cell design

* Reliable and rugged



SOP-8

SYMBOL

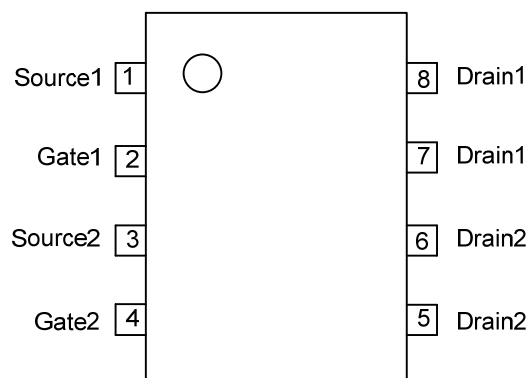


ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
UT5003L-S08-R	UT5003G-S08-R	SOP-8	Tape Reel

UT5003L-S08-R (1) Packing Type (2) Package Type (3) Lead Plating	(1) R: Tape Reel (2) S08: SOP-8 (3) G: Halogen Free, L: Lead Free
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■ PIN CONFIGURATION



■ ABSOLUTE MAXIMUM RATINGS ($T_A=25^{\circ}\text{C}$ unless otherwise specified)

N-Channel:

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current (Note3)	I_D	7	A
Pulsed Drain Current (Note3)	I_{DM}	20	A
Power Dissipation	P_D	2	W
Junction Temperature	T_J	+150	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	-55 ~ +150	$^{\circ}\text{C}$

P-Channel:

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current (Note3)	I_D	-5	A
Pulsed Drain Current (Note3)	I_{DM}	-20	A
Power Dissipation	P_D	2	W
Junction Temperature	T_J	+150	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	-55 ~ +150	$^{\circ}\text{C}$

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 (Note3)	θ_{JA}			62.5	$^{\circ}\text{C}/\text{W}$

■ ELECTRICAL CHARACTERISTICS ($T_A=25^{\circ}\text{C}$, unless otherwise specified)

N-CHANNEL

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250uA	30			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =24V, V _{GS} =0V			1	uA
Gate-Source Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250uA	1	1.5	2.5	V
Drain-Source On-State Resistance (Note2)	R _{DS(ON)}	V _{GS} =10V, I _D =7A		20.5	27.5	mΩ
		V _{GS} =4.5V, I _D =6A		30	40	mΩ
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{ISS}	V _{GS} =0V, V _{DS} =15V, f=1MHz		680		pF
Output Capacitance	C _{OSS}			105		pF
Reverse Transfer Capacitance	C _{RSS}			75		pF
SWITCHING CHARACTERISTICS						
Turn-ON Delay Time (Note2)	t _{D(ON)}	V _{DS} =10V, V _{GS} =10V, I _D ÷ 1A, R _G =3Ω		4.6	7	ns
Turn-ON Rise Time	t _R			4	6	ns
Turn-OFF Delay Time	t _{D(OFF)}			20	30	ns
Turn-OFF Fall Time	t _F			5	8	ns
Total Gate Charge (Note2)	Q _G	V _{DS} =0.5*BV _{DSS} , V _{GS} =10V, I _D =7A		14		nC
Gate-Source Charge	Q _{GS}			1.9		nC
Gate-Drain Charge	Q _{GD}			3.3		nC

■ ELECTRICAL CHARACTERISTICS(Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Drain-Source Diode Forward Voltage(Note2)	V_{SD}	$I_S=1A, V_{GS}=0V$			1	V
Diode Continuous Forward Current	I_S				1.3	A

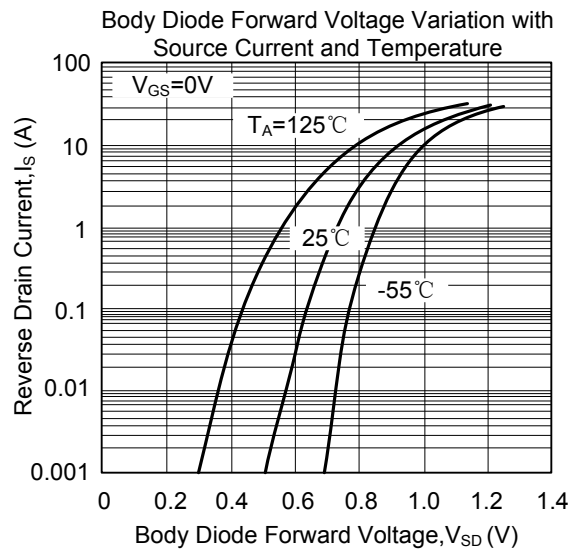
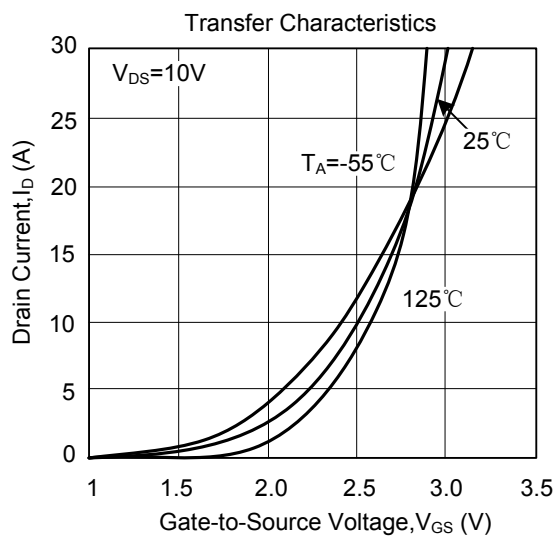
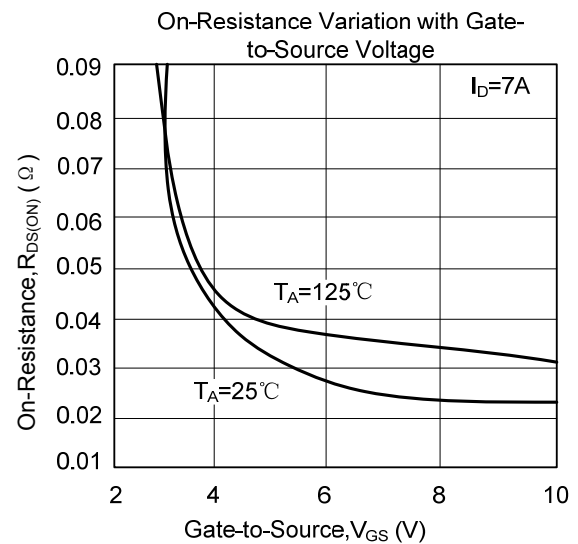
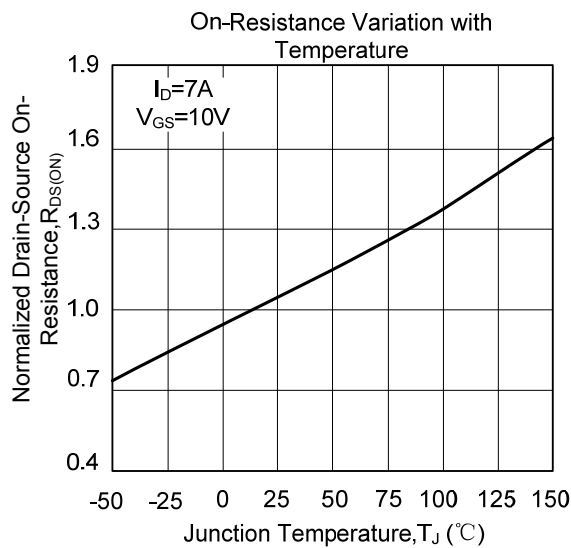
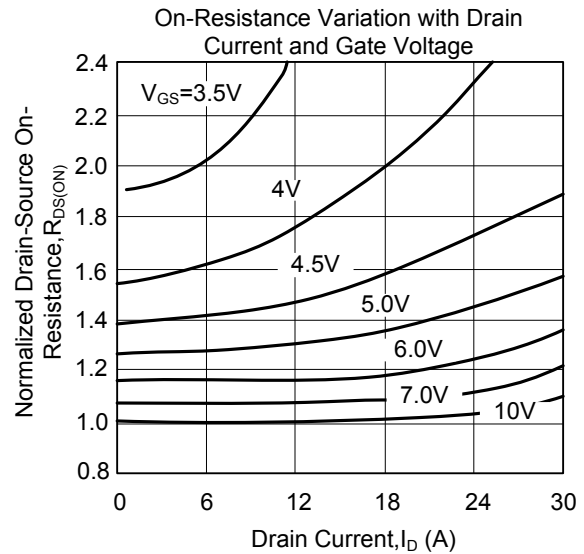
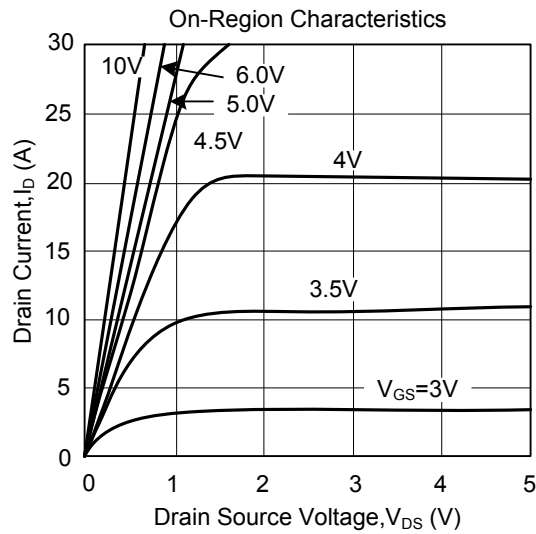
P-CHANNEL

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =-250uA	-30			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =-24V, V _{GS} =0V			-1	uA
Gate-Source Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =-250uA	-1	-1.5	-2.5	V
Drain-Source On-State Resistance (Note2)	R _{DS(ON)}	V _{GS} =-10V, I _D =-5A		37.5	45	mΩ
		V _{GS} =-4.5V, I _D =-4A		62	80	mΩ
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{ISS}	V _{GS} =0V, V _{DS} =-15V, f=1MHz		780		pF
Output Capacitance	C _{OSS}			145		pF
Reverse Transfer Capacitance	C _{RSS}			79		pF
SWITCHING CHARACTERISTICS						
Turn-ON Delay Time (Note2)	t _{D(ON)}	V _{DS} =-10V, V _{GS} =-10V, I _D ÷ 1A, R _G =3Ω		7.7	11.5	ns
Turn-ON Rise Time	t _R			5.7	8.5	ns
Turn-OFF Delay Time	t _{D(OFF)}			20	30	ns
Turn-OFF Fall Time	t _F			9.5	14	ns
Total Gate Charge (Note2)	Q _G	V _{DS} =0.5*BV _{DSS} , V _{GS} =-10V, I _D =-5A		15.1		nC
Gate-Source Charge	Q _{GS}			2.1		nC
Gate-Drain Charge	Q _{GD}			4.0		nC
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Drain-Source Diode Forward Voltage(Note2)	V _{SD}	I _S =-1A, V _{GS} =0V			-1	V
Diode Continuous Forward Current	I _S				-1.3	A

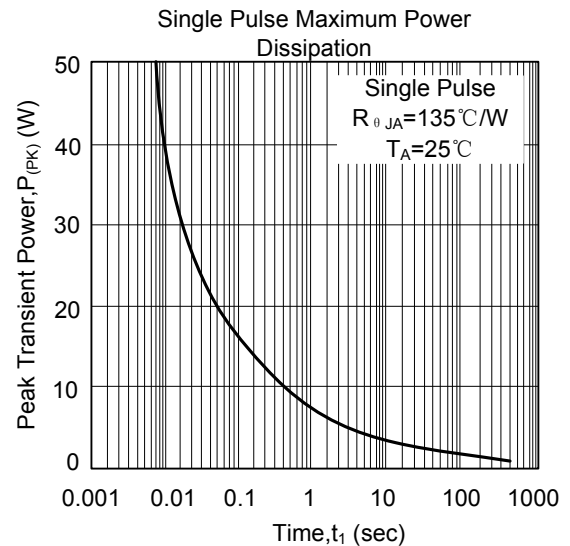
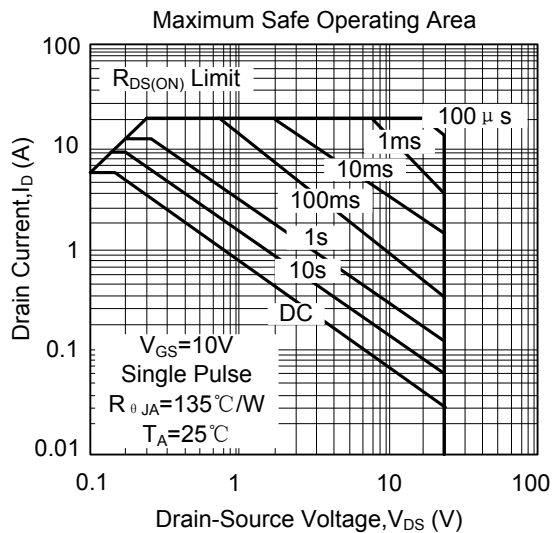
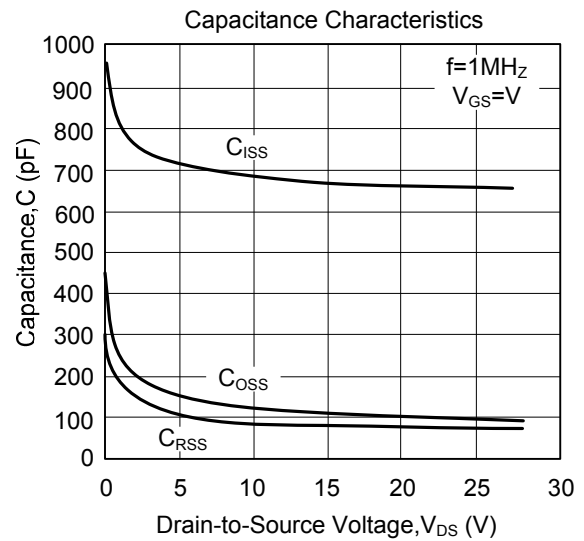
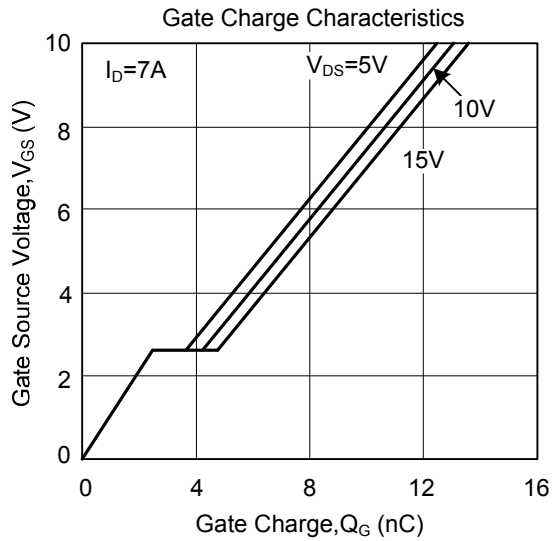
- Notes: 1. Pulse width limited by $T_{J(MAX)}$
 2. Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
 3. Surface Mounted on 1in² pad area, $t \leq 10sec$.

TYPICAL CHARACTERISTICS

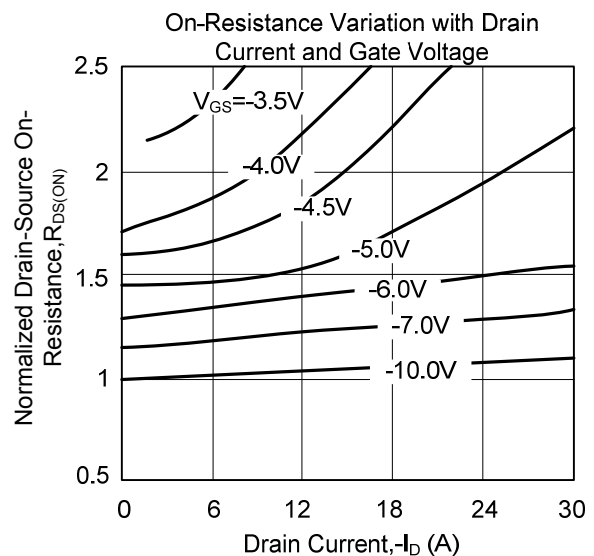
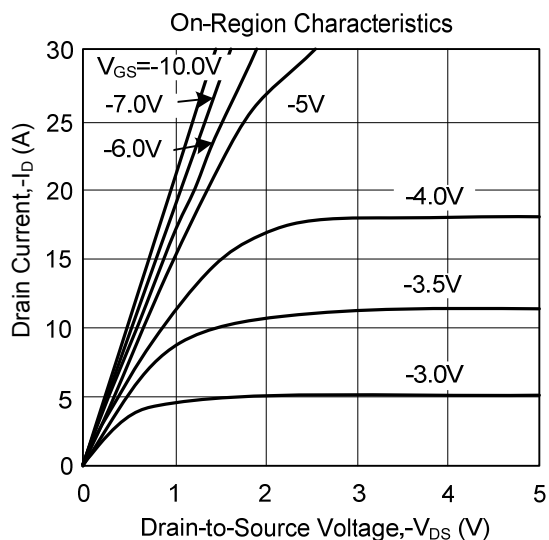
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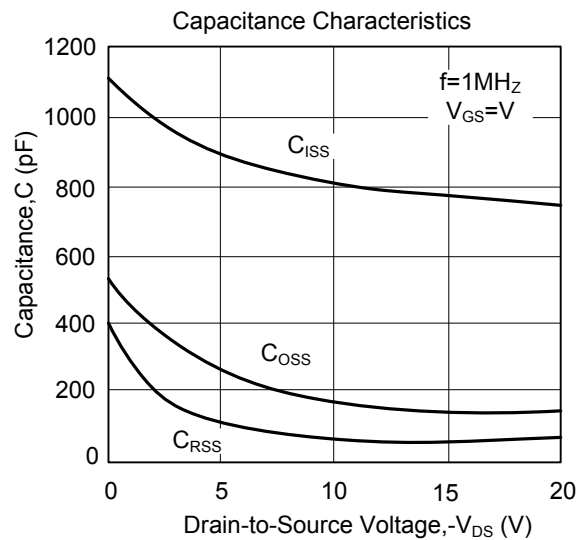
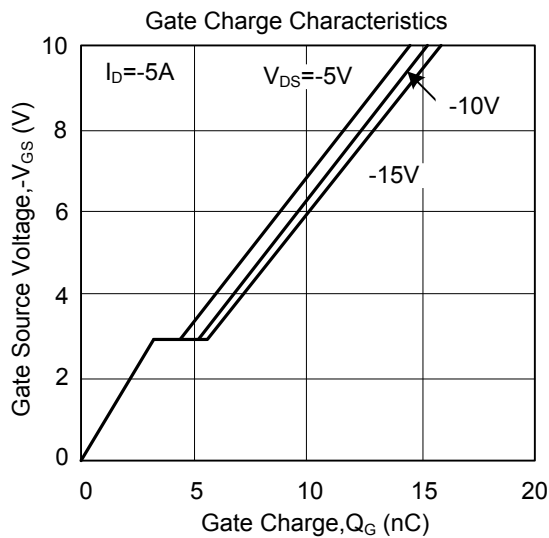
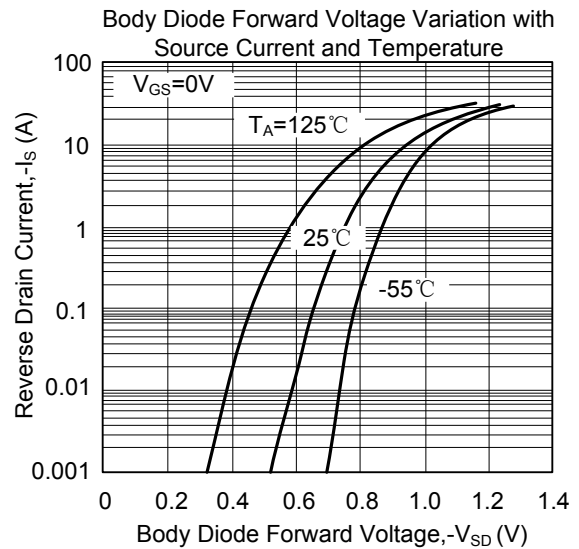
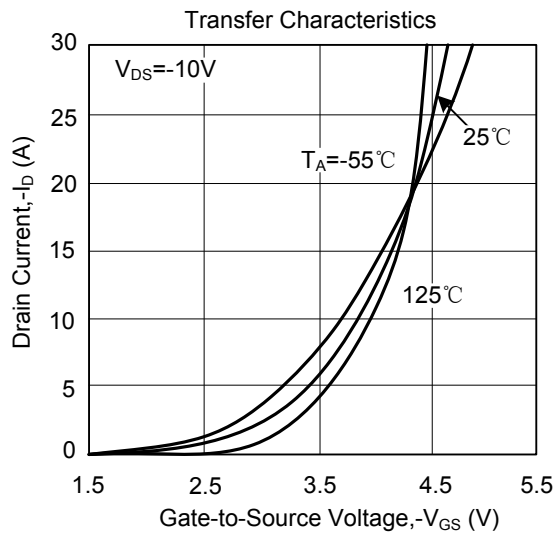
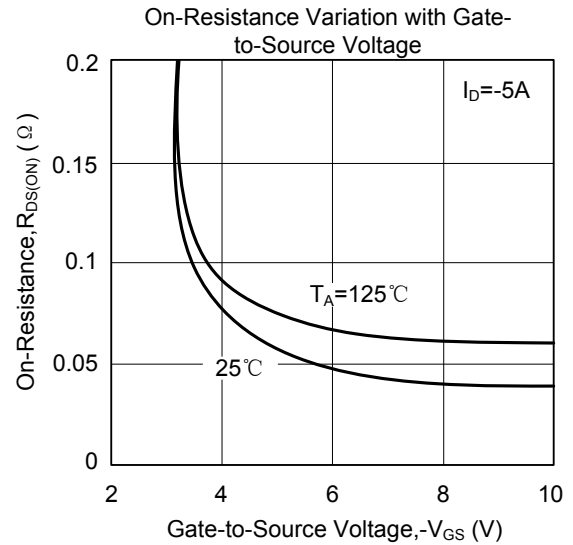
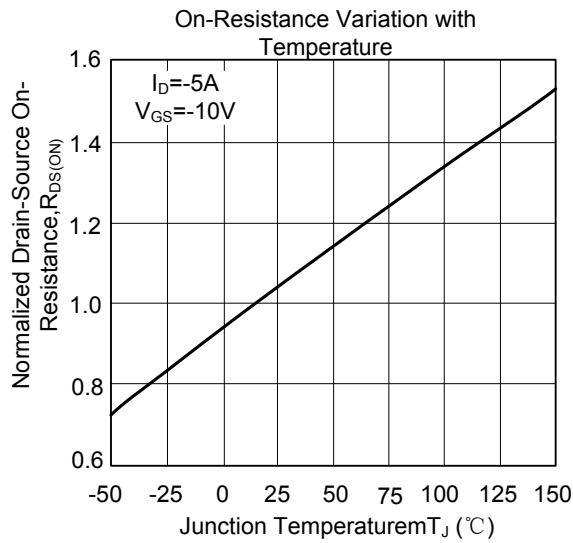
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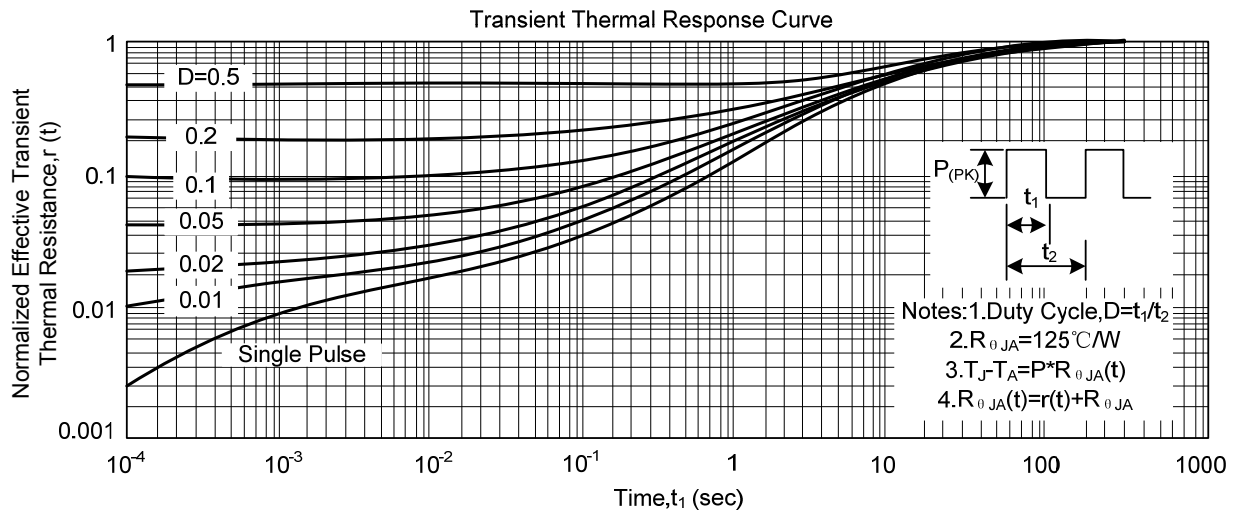
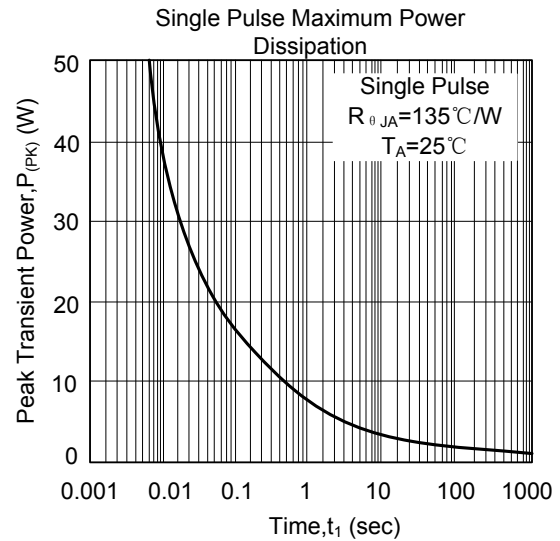
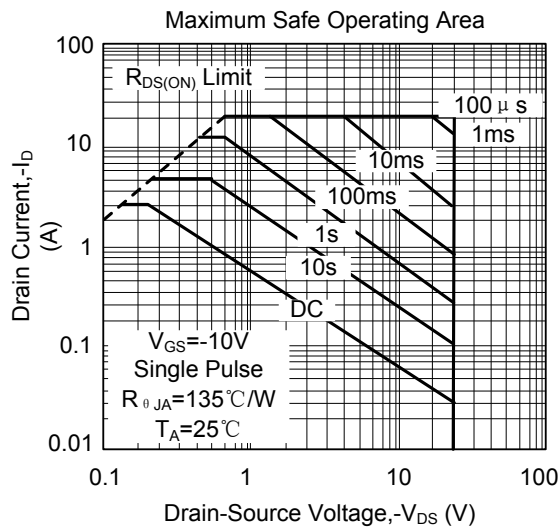
P-CHANNEL



TYPICAL CHARACTERISTICS(Cont.)



■ TYPICAL CHARACTERISTICS(Cont.)



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