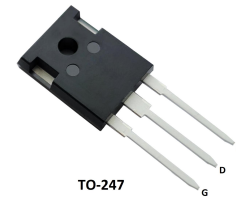


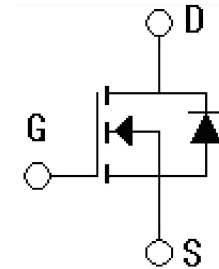
Features

- Optimized body diode reverse recovery performance
- Low on-resistance and low conduction losses
- Small package
- Ultra Low Gate Charge cause lower driving requirements
- 100% avalanche tested
- Improved dv/dt capability



Applications

- Power factor correction (PFC)
- Switched mode power supplies(SMPS)
- Uninterruptible Power Supply (UPS)



Absolute Ratings (T_C=25°C)

Parameter	Symbol		Value	Unit
Drain-Source Voltage	V _{DSS}		650	V
Transient Gate-Source Voltage	V _{GSM}		±30	V
Continuous Gate-Source Voltage	V _{GSS}		±20	V
Drain Current-continuous	I _D	T _C =25℃	38	A
		T _C =100℃	24	A
Drain Current-pulse (note 1)	I _{DM}		152	A
Single Pulsed Avalanche Energy (note 2)	E _{AS}		841	mJ
Avalanche Current (note 1)	I _{AR}		7	A
Repetitive Avalanche Current (note 1)	E _{AR}		3.9	mJ
Peak Diode Recovery dv/dt (note 3)	dv/dt		50	V/ns
Power Dissipation	P _D , T _C =25℃ Derate above 25℃		320	W
			2.56	W/℃
Operating and Storage Temperature Range	T _J , T _{STG}		-55~+150	℃
Maximum Lead Temperature for Soldering Purposes	T _L		300	℃

Electrical Characteristics($T_{CASE}=25^{\circ}C$ unless otherwise specified)

Parameter	Symbol	Tests conditions	Min	Typ	Max	Units
Off-Characteristics						
Drain-Source Voltage	BV _{DSS}	I _D =500μA, V _{GS} =0V	650	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =650V, V _{GS} =0V, T _C =25℃	-	-	3	μA
		V _{DS} =650V, T _C =25℃	-	-	100	μA
Gate body 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 =250μA	3	3.5	4.0	V
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =19A (note 4)	-	89	109	mΩ
Transconductance	g _{fs}	V _{DS} =20V, I _D =19A (note 4)	-	36.4	-	S
Dynamic Characteristics						
Input capacitance	C _{iss}	V _{DS} =50V, V _{GS} =0V, f=1.0MHz(note 5)	-	2800	3200	pF
Output capacitance	C _{oss}		-	97	-	pF
Reverse transfer capacitance	C _{rss}		-	1.5	-	pF
Switching-Characteristics						
Turn-On delay time	t _{d(on)}	V _{DD} =100V, I _D =9.0A, R _G =25Ω V _{GS} =10V	-	16	-	ns
Turn-On rise time	t _r		-	13	-	ns
Turn-Off delay time	t _{d(Off)}		-	71	-	ns
Turn-Off rise time	t _f		-	13	-	ns
Total Gate Charge	Q _g	V _{DS} =480V, I _D =38A, V _{GS} =10V (note 5)	-	45	55	nC
Gate-Source charge	Q _{gs}		-	15	-	nC
Gate-Drain charge	Q _{gd}		-	11.5	-	nC
Drain-Source Diode Characteristics						
Source-Drain Voltage	V _{SD}	I _{SD} =19A(note 4)	-		1.2	V

(Body Diode)						
Source-Drain Current (Body Diode)	I_{SD}	$T_C=25^{\circ}\text{C}$	-		38	A
Reverse recovery time	t_{rr}	$V_{GS}=0V, I_S=9.0A$ $di_F/dt=100A/\mu s$		180		ns
Reverse recovery charge	Q_{rr}			18		μC

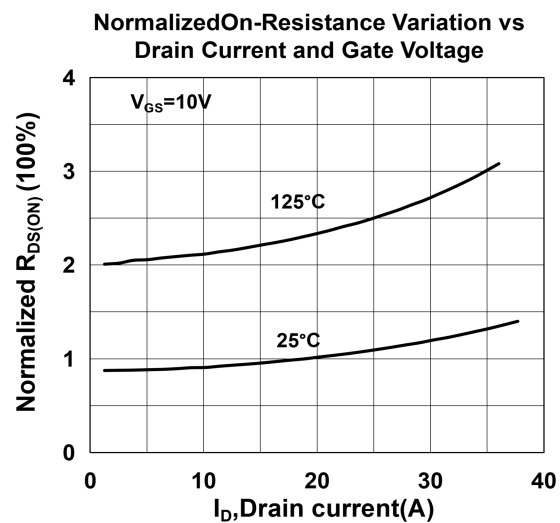
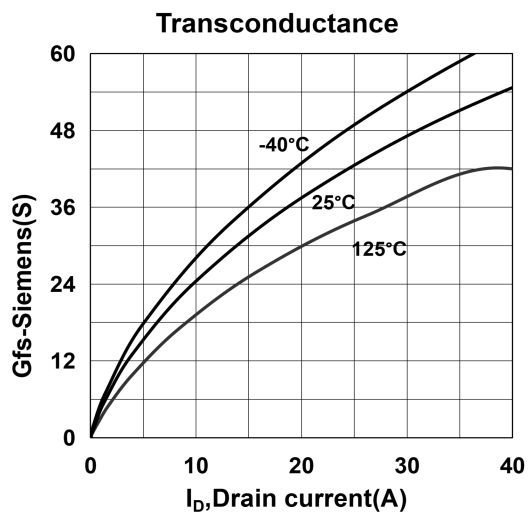
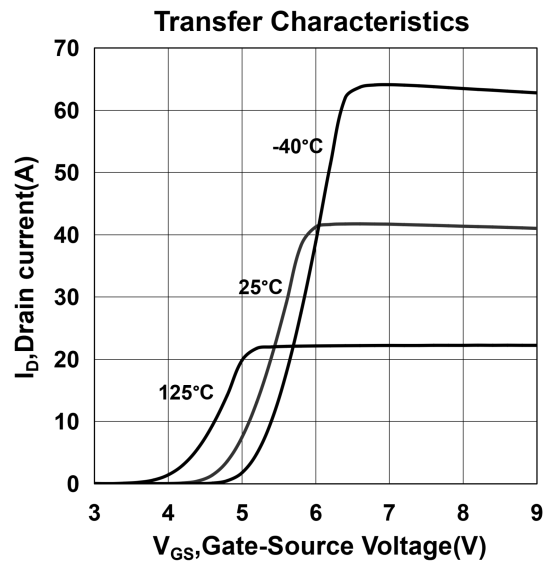
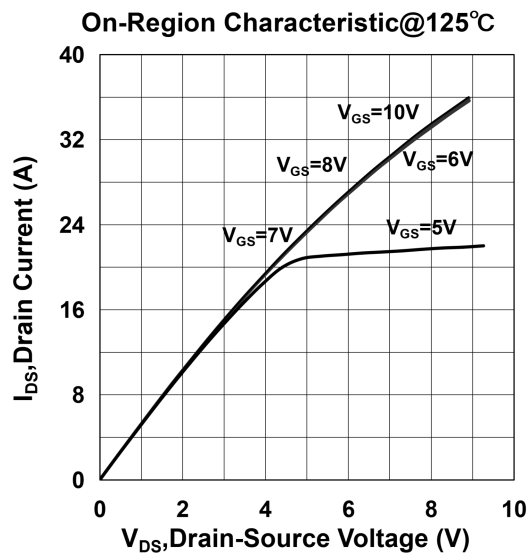
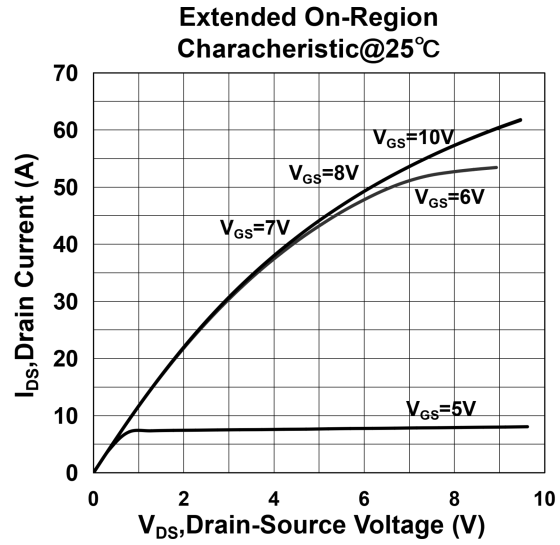
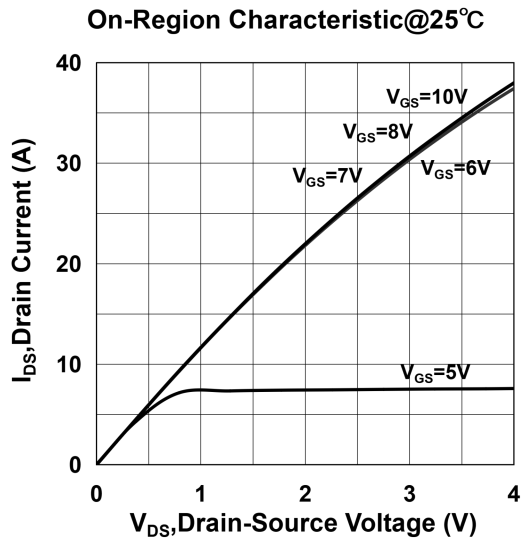
Thermal Characteristics

Parameter		Symbol	Value	Unit
Thermal Resistance, junction to Case, Max		$R_{th(j-C)}$	0.39	$^{\circ}\text{C/W}$
Thermal Resistance, junction to Ambient, Max		$R_{th(j-A)}$	62	$^{\circ}\text{C/W}$

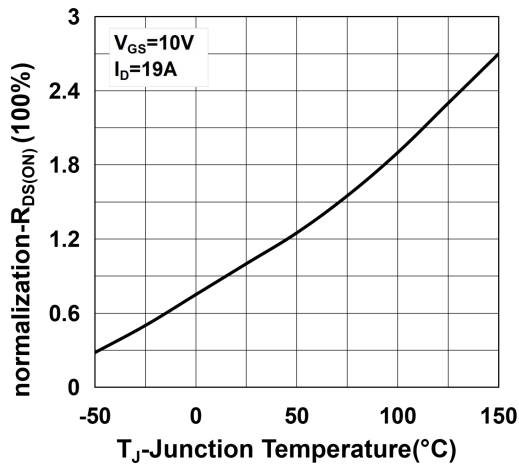
Notes:

- 1: Pulse width limited by maximum junction temperature
- 2: $L=2.0mH$, $I_{AS}=29A$, $V_{DD}=50V$, $R_G=25\Omega$, Starting $T_J=25^{\circ}\text{C}$
- 3: $I_{SD} \leq 100A$, $di/dt \leq 300A/\mu s$, $V_{DD} \leq BV_{DSS}$, Starting $T_J=25^{\circ}\text{C}$
- 4: Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$
- 5: Essentially independent of operating temperature

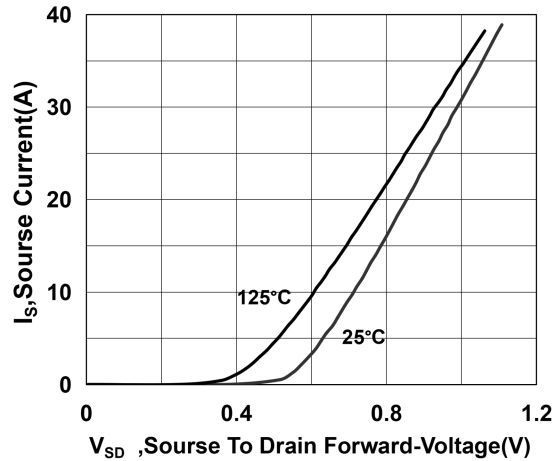
Electrical Characteristics



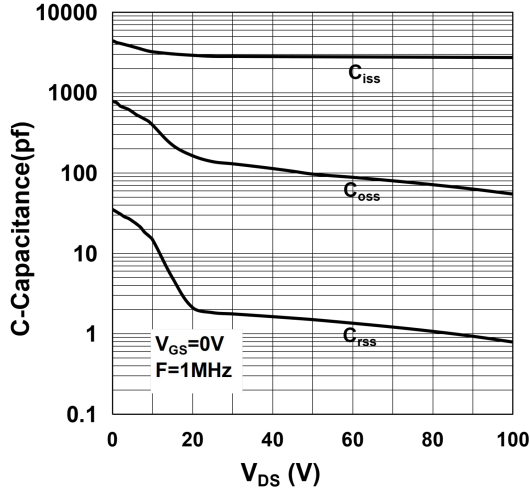
**Normalization On-Resistance
Variation vs Junction Temperature**



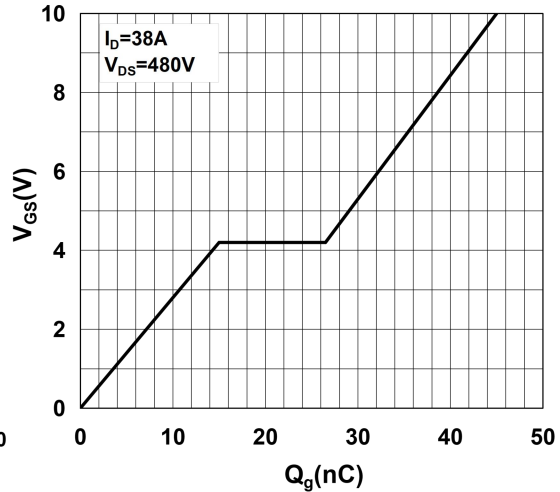
**Body Diode Forward Voltage Variation
with Source Current and Temperature**



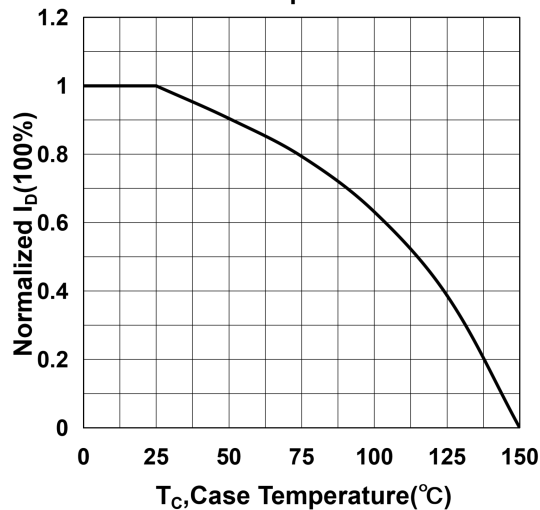
Capacitance



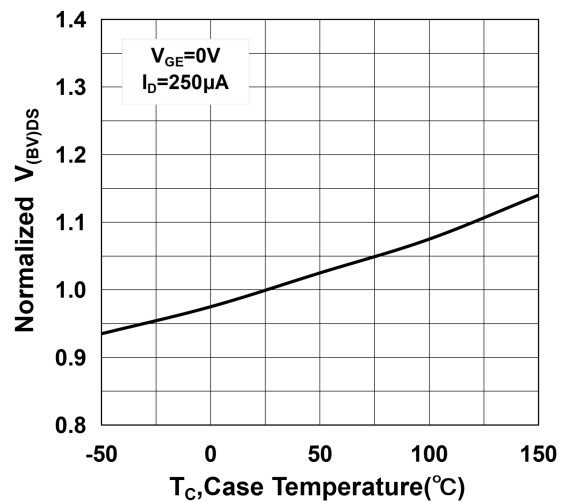
Gate Charge

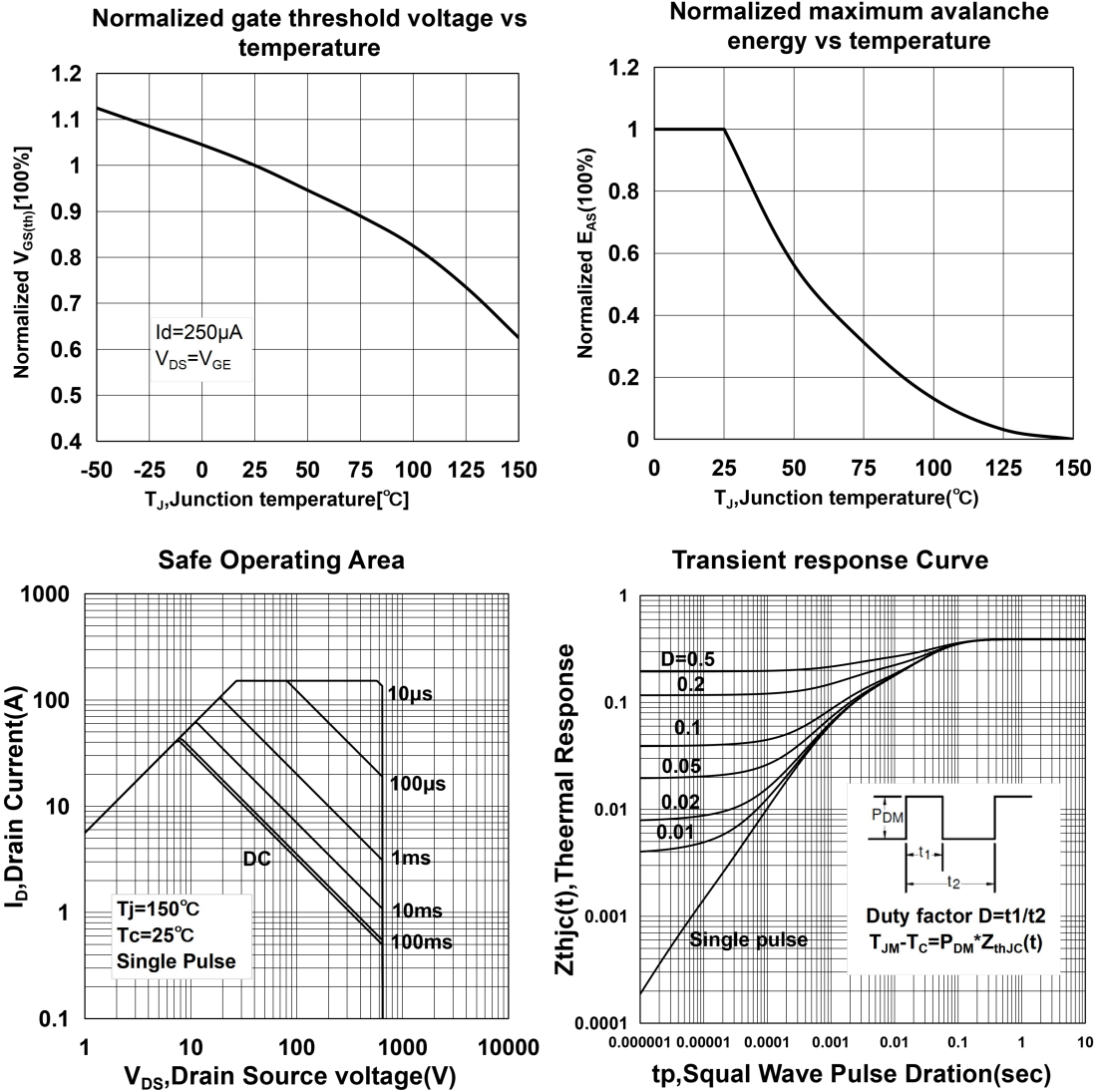


**Maximum Drain Current vs
Case Temperature**



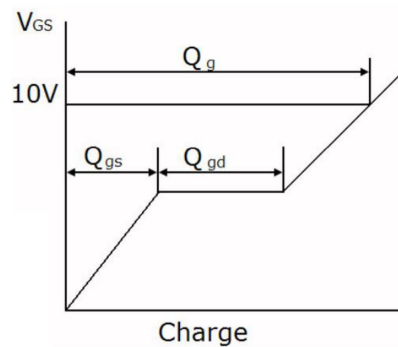
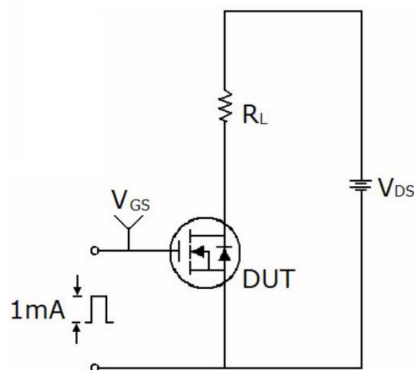
Normalized $V_{(BV)DS}$ vs temperature



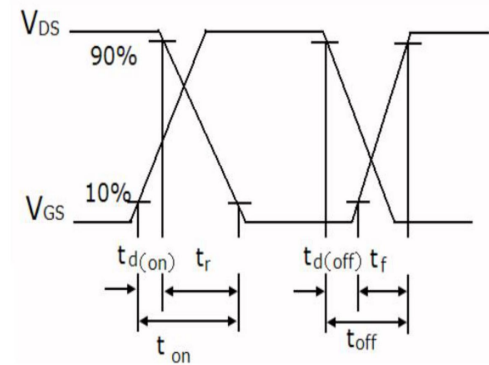
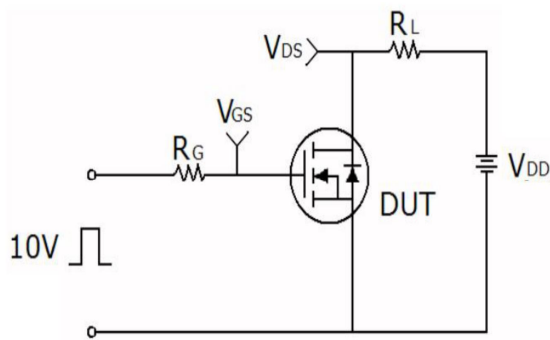


Test Circuit

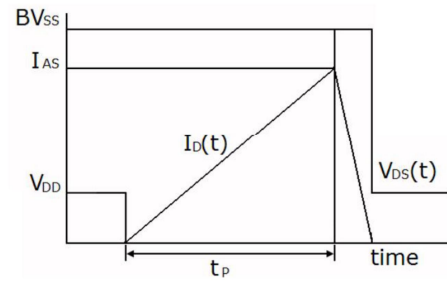
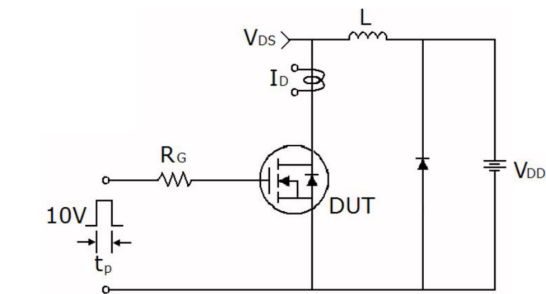
(1) Gate charge test circuit & Waveform



(2) Switch Time Test Circuit



(3) Unclamped Inductive Switching Test Circuit & Waveforms



Package Mechanical DATA

