40V N-Channel Power MOSFET

V_{DSS}	40V
I_D	336A
$R_{DS(ON)_Typ.}$ @V_{GS}=10V	0.93mΩ

DESCRIPTION：

·Fast Switching

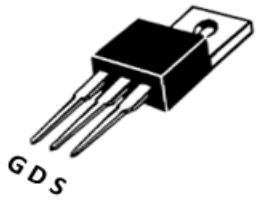
·Very low on-resistance

·Enhancement mode

·100% Avalanche Tested

·100% ΔVds Tested

·Halogen-free and RoHS-compliant



TO-220

TYPICAL APPLICATIONS：

·Load Switch

·PWM Application

·Power Management

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

Characteristic	Condition	Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current(1)	Tc=25℃ Tc=100℃	I_D	336 212	A
Pulsed Drain Current (2)		I_{DM}	1344	A
Avalanche Current(3)		I_{AS}	111	A
Avalanche Energy(3)		E_{AS}	616	mJ
Power dissipation	Tc=25℃ Tc=100℃	P_D	205 82	W
Junction & Storage temperature Range		T_J, T_{STG}	-55~+150	℃

Notes:1. Computed continuous current assumes the condition of T_{J_Max} while the actual continuous current depends on the thermal & electro mechanical application board design.

2.This single pulse measurement was taken under T_{J_Max}

3.This single pulse measurement was taken under the following condition [L = 0.1 mH, V_{GS} = 10 V, V_{DS} = 20 V] while its value is limited by T_{J_Max}

THERMAL CHARACTERISTICS

Characteristic	Condition	Symbol	Value	Unit
Thermal resistance,	Junction to Ambient Junction-to-Case	$R_{\theta JA}$ $R_{\theta JC}$	45 0.6	℃/W

ELECTRICAL CHARATERISTICS (at T_J = 25 °C, unless otherwise specified)

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage VGS = 0V, ID = 250uA	$V_{(BR)DSS}$	40			V
Zero Gate Voltage Drain Current VDS = 40 V, VGS = 0 V	I_{DSS}			1.0	uA
Gate-Source Leakage Current VGS = ±20V, VDS = 0V	I_{GSS}			100	nA
Gate-Source threshold voltage VDS = VGS, ID = 250uA	$V_{GS(th)}$	1.0	1.7	2.5	V
Drain-Source On-State Resistance VGS = 10V, ID = 20A VGS = 4.5V, ID = 50A	$R_{DS(on)}$		0.93 2.0	1.1 2.4	mΩ
Diode Forward Voltage IS = 20A, VGS = 0V	V_{SD}		0.8	1.0	V
Diode Continuous Current	I_S			336	A
Input capacitance f=1MHz, VDS=20 V, VGS=0 V	C_{iss}		9662		pF
Output capacitance f=1MHz, VDS=20 V, VGS=0 V	C_{oss}		4970		pF
Reverse transfer capacitance f=1MHz, VDS=20 V, VGS=0 V	C_{rss}		103		pF
Gate Resistance VGS = 0V, VDS= 0V, f = 1MHz	R_G		1.9		Ω
Total Gate Charge VDS= 20V, ID= 50A, VGS= 10V	Q_G		126		nC
Gate to Source Charge VDS= 20V, ID= 50A, VGS= 0 to 10V	Q_{GS}		23.8		nC
Gate to Drain Charge VDS= 20V, ID= 50A, VGS= 0 to 10V	Q_{GD}		11.6		nC
Turn-on delay time VDS= 20V, VGS= 10V, ID= 50A, R_{GEN}=3Ω	$td_{(ON)}$		16.8		ns
Rise time VDS= 20V, VGS= 10V, ID= 50A, R_{GEN}=3Ω	tr		33.6		ns
Turn-off delay time VDS= 20V, VGS= 10V, ID= 50A, R_{GEN}=3Ω	$td_{(OFF)}$		97.6		ns
Fall time VDS= 20V, VGS= 10V, ID= 50A, R_{GEN}=3Ω	tf		34.4		ns
Revers Recovery Time IF=50A, di/dt = 100A/us	Trr		57.6		ns
Revers Recovery Charge IF=50A, di/dt = 100A/us	Qrr		98		nC

Typical Performance Characteristics

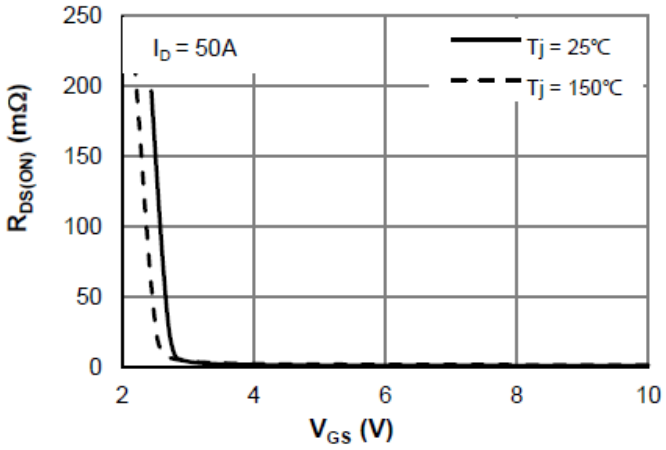


Figure 1. $R_{DS(ON)}$ vs. V_{GS}

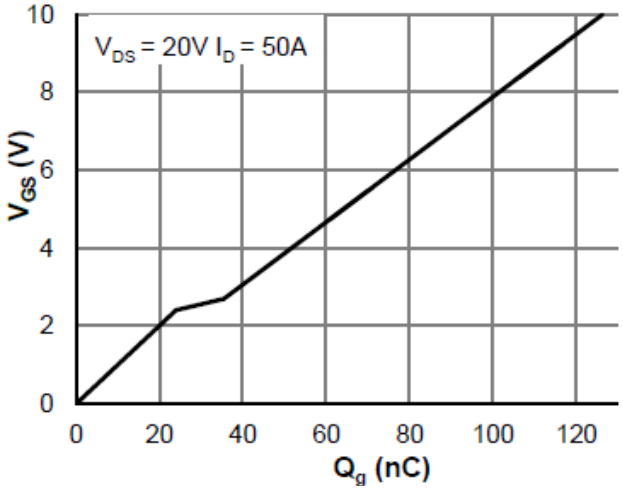


Figure 2. Gate Charge

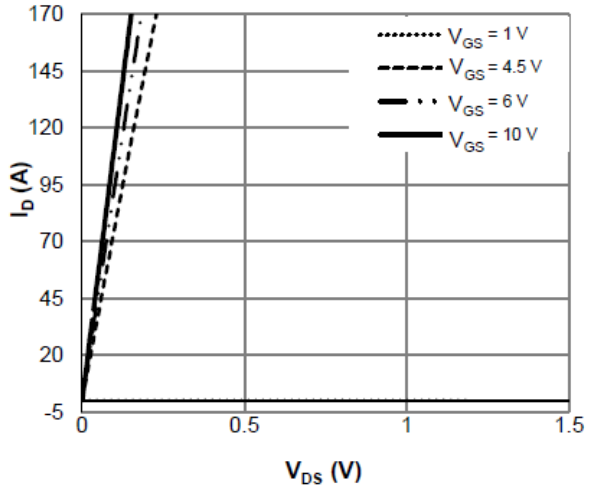


Figure 3. Saturation Characteristics

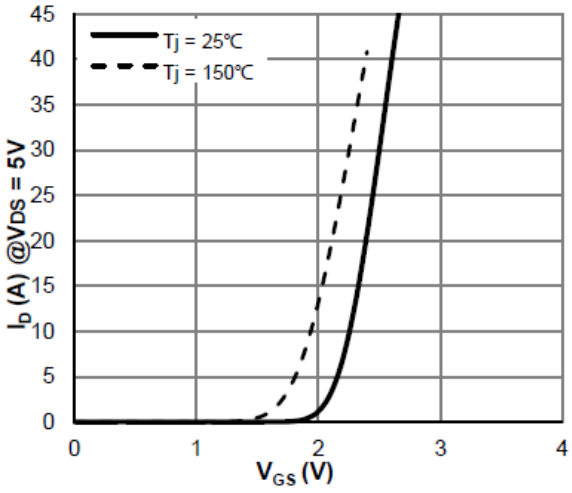


Figure 4. Transfer Characteristics

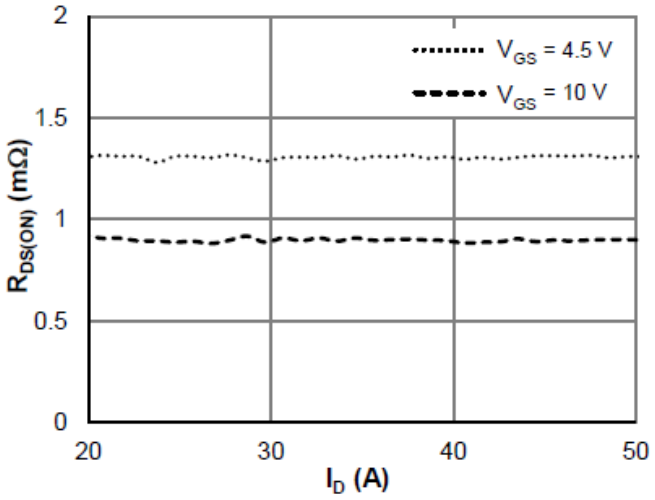


Figure 5. $R_{DS(ON)}$ vs. Drain Current

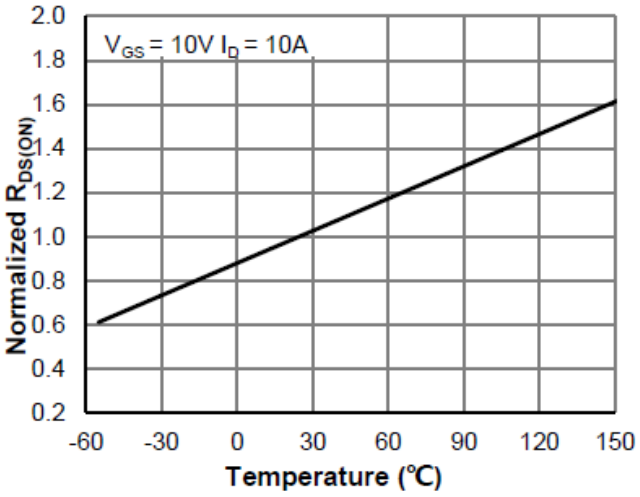


Figure 6. $R_{DS(ON)}$ vs. Junction Temperature

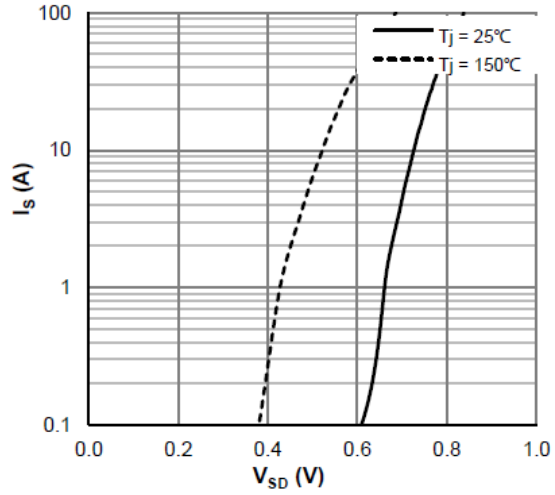


Figure 7. Body-Diode Characteristics

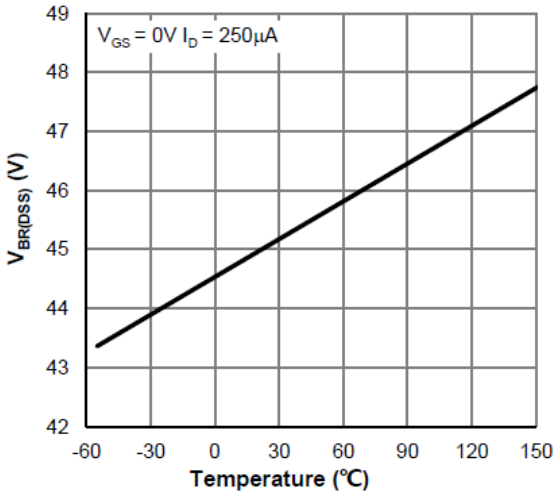


Figure 8. $V_{BR(DSS)}$ vs. Junction Temperature

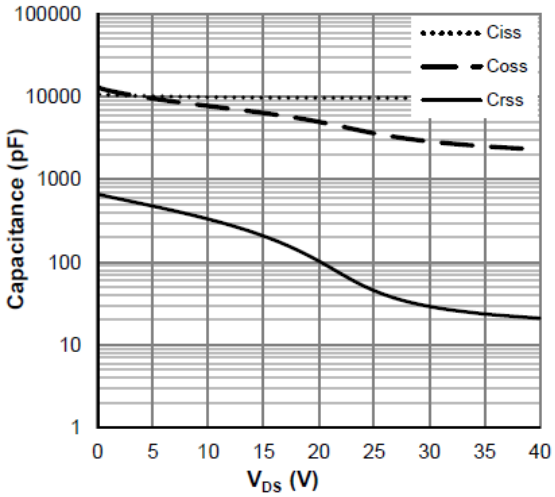


Figure 9. Capacitance Characteristics

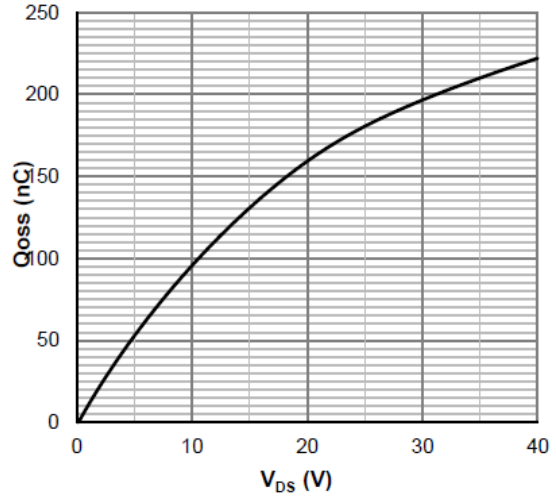


Figure10. Coss Stored Energy

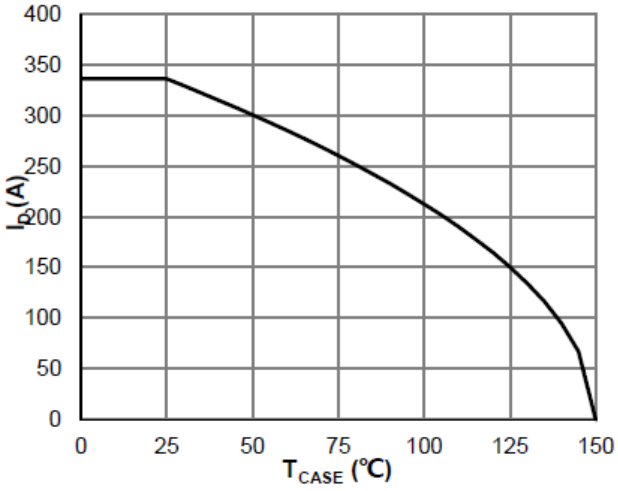


Figure 11. Current De-rating

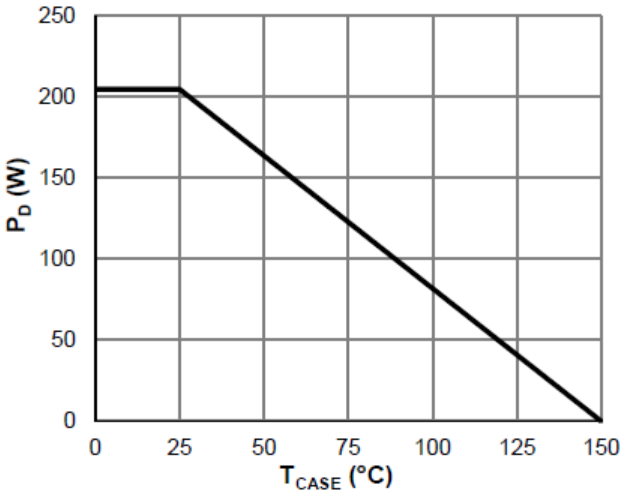


Figure 12. Power De-rating

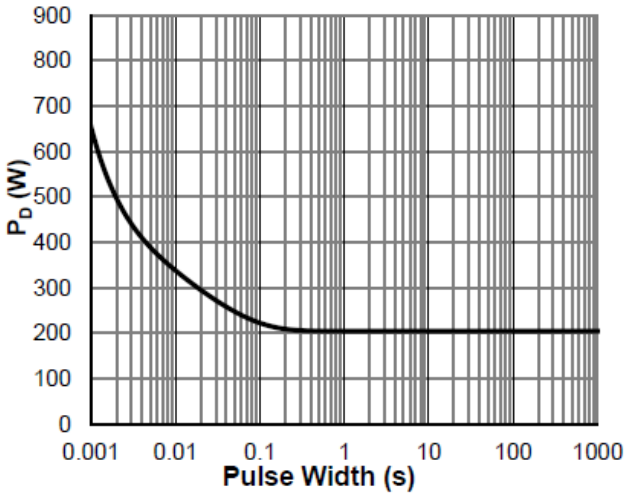


Figure 13. Single Pulse Power Rating, Junction-to-Case

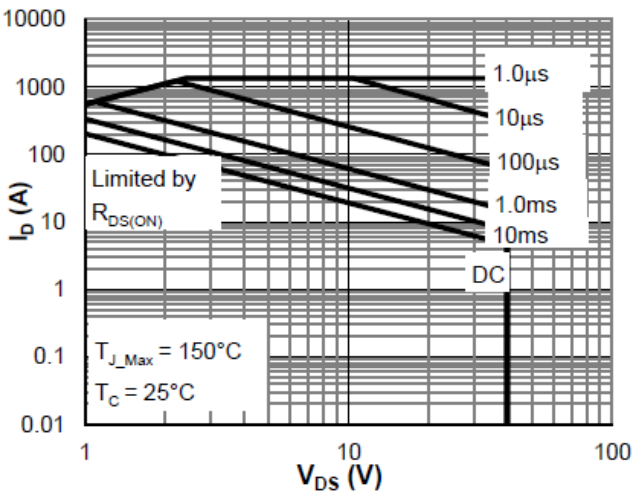


Figure 14. Maximum Safe Operating Area

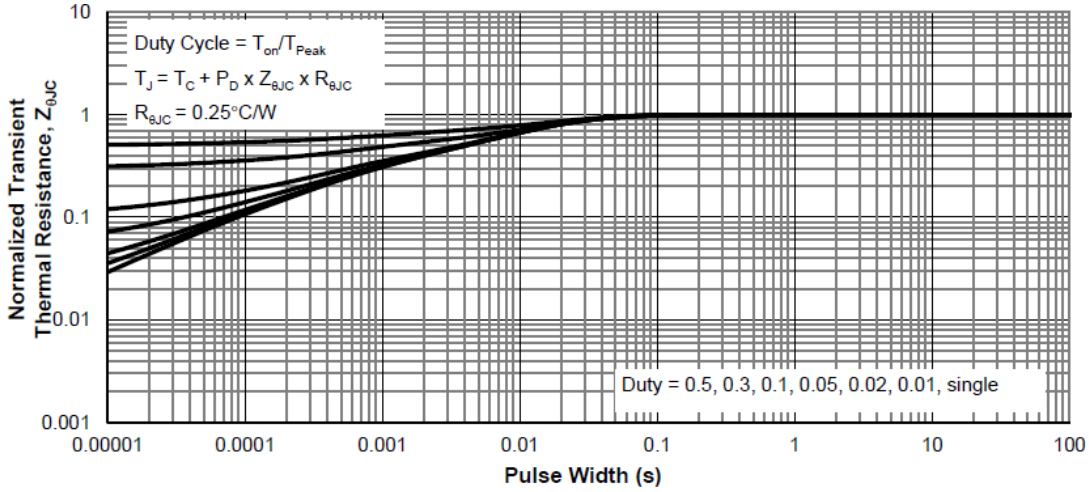
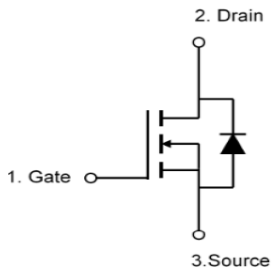
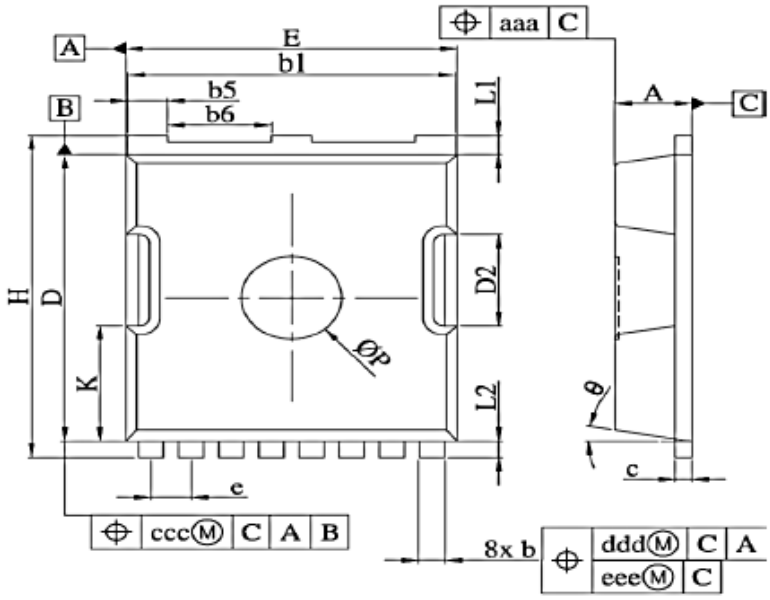


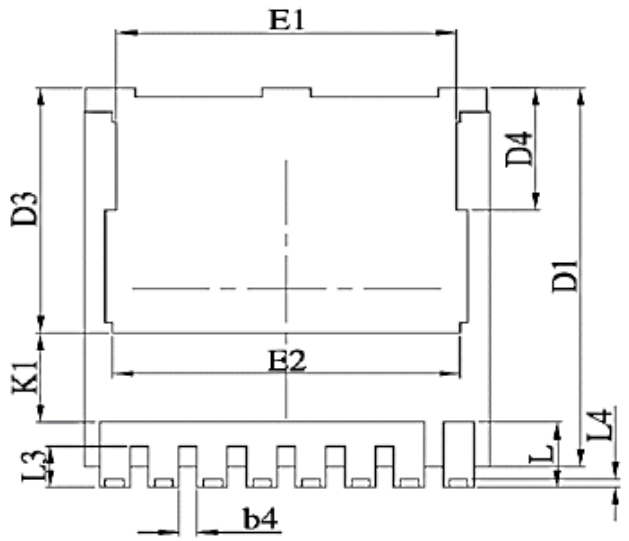
Figure 15. Normalized Maximum Transient Thermal Impedance

·Circuit diagram



·Package outlines : Dimensions in (mm)





SYMBOL	COMMON		
	MILLIMETER		
	MIN.	NOMINAL	MAX.
A	2.20	2.30	2.40
b	0.70	0.80	0.90
b1	9.70	9.80	9.90
b2	0.36	0.45	0.55
b3	0.05	0.100	0.35
b4	0.30	0.40	0.50
b5	1.10	1.20	1.30
b6	3.00	3.10	3.20
c	0.40	0.50	0.60
D	10.28	10.38	10.55
D1	10.98	11.08	11.18
D2	3.20	3.30	3.40
D3	7.00	7.15	7.30
D4	3.44	3.59	3.74
e	1.10	1.20	1.30
E	9.80	9.90	10.00
E1	8.20	8.30	8.40
E2	8.35	8.50	8.65
H	11.50	11.68	11.85
K	4.08	4.18	4.28
K1	2.45	---	---
L	1.60	1.90	2.10
L1	0.50	0.70	0.90
L2	0.50	0.60	0.70
L3	1.00	1.20	1.30
L4	0.13	0.23	0.33
P	2.85	3.00	3.15
θ	10° REF		
aaa	0.20		
ccc	0.20		
ddd	0.25		
eee	0.20		

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