

PM50502C

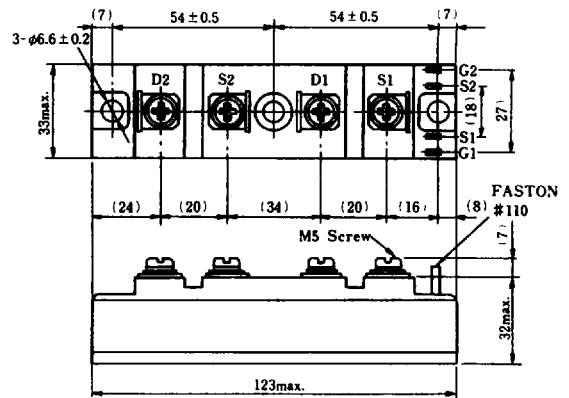
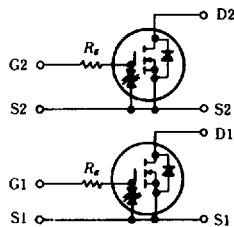
HITACHI/(OPTOELECTRONICS)

SILICON N-CHANNEL POWER MOS FET MODULE

HIGH SPEED POWER SWITCHING

■ FEATURES

- Equipped with Power MOS FET
- Low On-Resistance
- High Speed Switching
- Low Drive Current
- Wide Area of Safe Operation
- Inherent Parallel Diode between Source and Drain
- Isolated Base from Terminal
- Suitable for Motor Driver, Switching Regulator and etc.



(Dimensions in mm)

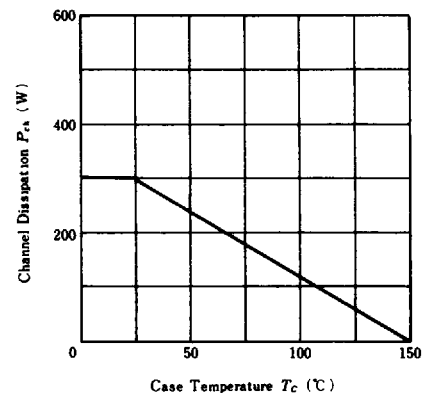
Symbol	Electrode	Terminals	Remarks
S 1	Source 1	M5 Screw	Power terminals
D 1	Drain 1	M5 Screw	Power terminals
S 2	Source 2	M5 Screw	Power terminals
D 2	Drain 2	M5 Screw	Power terminals
G 1	Gate 1	#110	Signal terminals
S 1	Source 1	#110	Signal terminals
G 2	Gate 2	#110	Signal terminals
S 2	Source 2	#110	Signal terminals

■ ABSOLUTE MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$) (Per FET chip)

Item	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	500	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current	I_D	50	A
Drain Peak Current	$I_{D(\text{peak})}$	100	A
Body-Drain Diode Reverse Drain Current	I_{DR}	50	A
Body-Drain Diode Reverse Drain Peak Current	$I_{DR(\text{peak})}$	100	A
Channel Dissipation	P_{CA}^*	300	W
Channel Temperature	T_{ch}	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	$-45 \sim +125$	$^\circ\text{C}$
Insulation Dielectric	V_{iso}^{**}	2000	V

*Value at $T_c = 25^\circ\text{C}$ **Base to Terminals AC minute

POWER VS. TEMPERATURE DERATING



■ ELECTRICAL CHARACTERISTICS ($T_a=25^\circ\text{C}$) (Per FET chip)

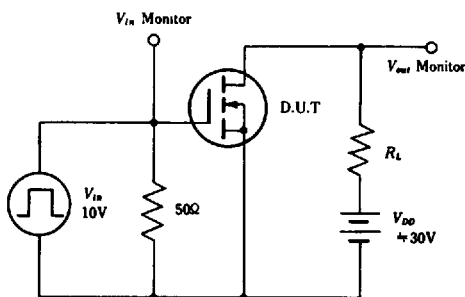
Item	Symbol	Test Condition	min.	typ.	max.	Unit
Drain-Source Breakdown Voltage	$V_{(BR)DS}$	$I_D=10\text{mA}$, $V_{GS}=0$	500	—	—	V
Gate-Source Leak Current	I_{GSS}	$V_{GS}=\pm 16\text{V}$, $V_{DS}=0$	—	—	± 50	μA
Gate-Source Breakdown Voltage	$V_{(BR)GS}$	$I_G=\pm 100\mu\text{A}$, $V_{DS}=0$	± 20	—	—	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=400\text{V}$, $V_{GS}=0$	—	—	1	mA
Gate-Source Threshold Voltage	$V_{GS(th)}$	$I_D=1\text{mA}$, $V_{DS}=10\text{V}$	1.5	—	4.0	V
Drain-Source Saturation Voltage	$V_{DS(sat)}$	$I_D=25\text{A}$, $V_{GS}=10\text{V}^*$	—	2.25	3.0	V
Static Drain-Source On State Resistance	$R_{DS(on)}$	$I_D=25\text{A}$, $V_{GS}=10\text{V}^*$	—	0.09	0.12	Ω
Forward Transfer Admittance	$ y_{fs} $	$I_D=25\text{A}$, $V_{DS}=10\text{V}^*$	25	40	—	S
Input Capacitance	C_{iss}	$V_{DS}=10\text{V}$, $V_{GS}=0$, $f=1\text{MHz}$	—	10250	—	pF
Output Capacitance	C_{oss}		—	3600	—	pF
Reverse Transfer Capacitance	C_{rss}		—	400	—	pF
Turn-on Delay Time	$t_{d(on)}$	$I_D=25\text{A}$, $V_{GS}=10\text{V}$, $R_L=1.2\Omega$	—	150	—	ns
Rise Time	t_r		—	700	—	ns
Turn-off Delay Time	$t_{d(off)}$		—	800	—	ns
Fall Time	t_f		—	600	—	ns
Body-Drain Diode Forward Voltage	V_{DF}	$I_F=25\text{A}$, $V_{GS}=0$	—	1.2	—	V
Body-Drain Diode Reverse Recovery Time	t_{rr}	$I_F=25\text{A}$, $V_{GS}=0$, $di_F/dt=100\text{A}/\mu\text{s}$	—	200	—	ns

* Pulse Test

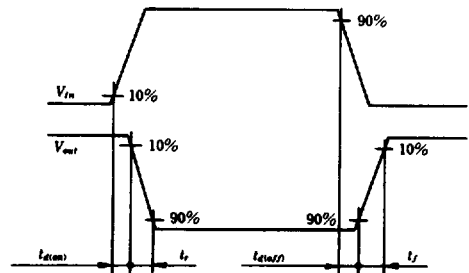
■ MECHANICAL CHARACTERISTICS

Item	Symbol	Condition	Rating	Unit
Fixing Strength	—	Mounted into main-terminal with M5 screw	15~20	kg·cm
	—	Mounted into heat sink with M6 screw	20~30	kg·cm
Weight	—	Typical value	300	g

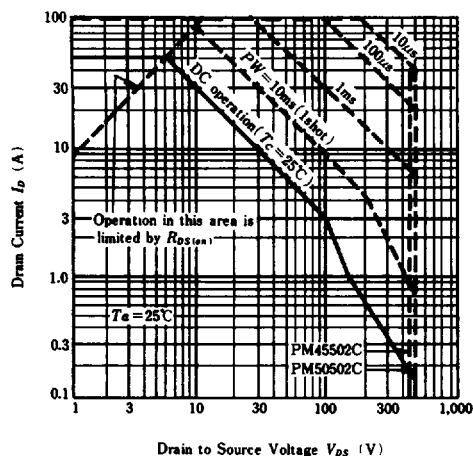
SWITCHING TIME TEST CIRCUIT



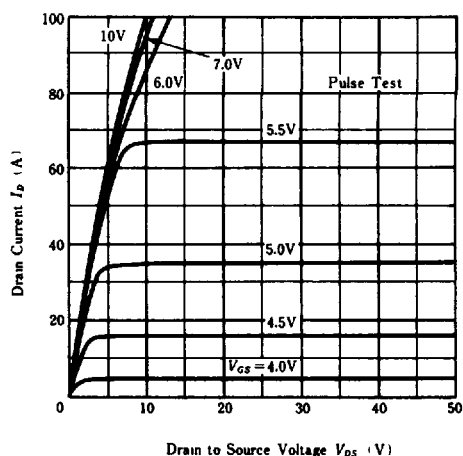
WAVEFORMS



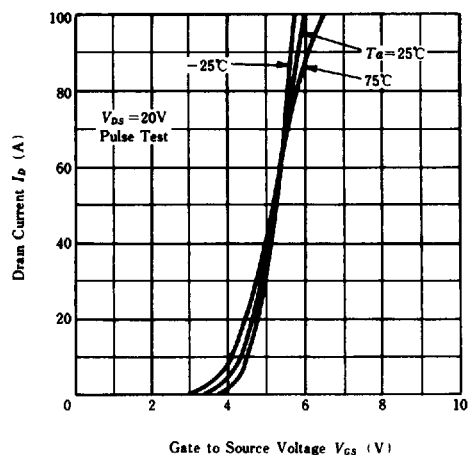
MAXIMUM SAFE OPERATION AREA



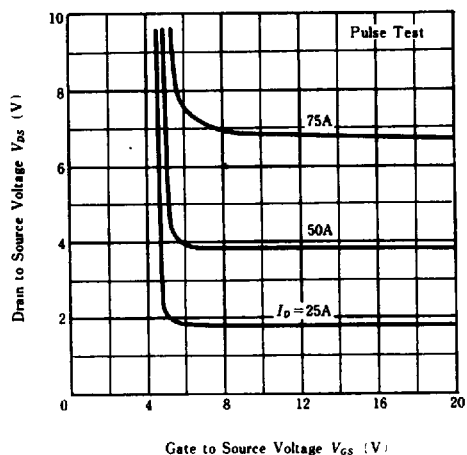
TYPICAL OUTPUT CHARACTERISTICS



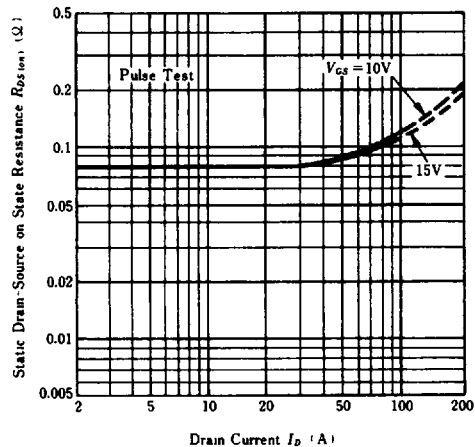
TYPICAL TRANSFER CHARACTERISTICS



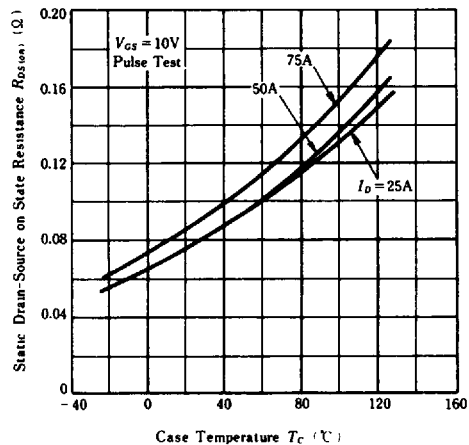
DRAIN-SOURCE SATURATION VOLTAGE VS. GATE-SOURCE VOLTAGE



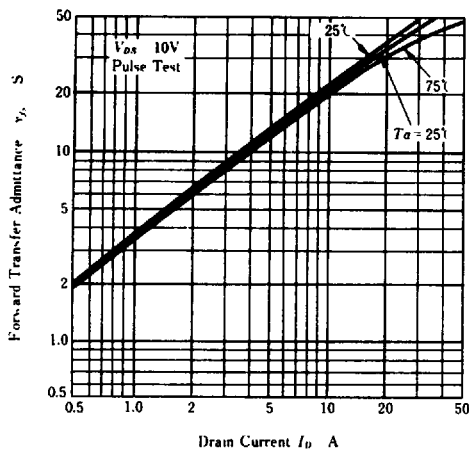
STATIC DRAIN-SOURCE ON STATE RESISTANCE VS. DRAIN CURRENT



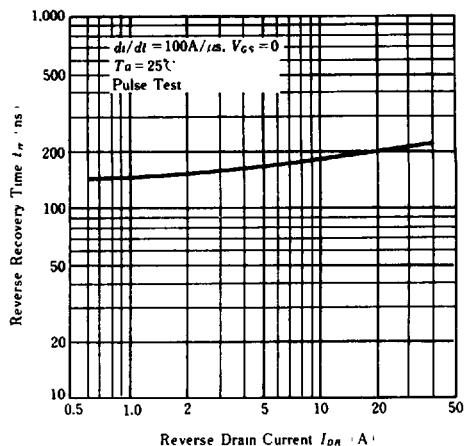
STATIC DRAIN-SOURCE ON STATE RESISTANCE VS. TEMPERATURE



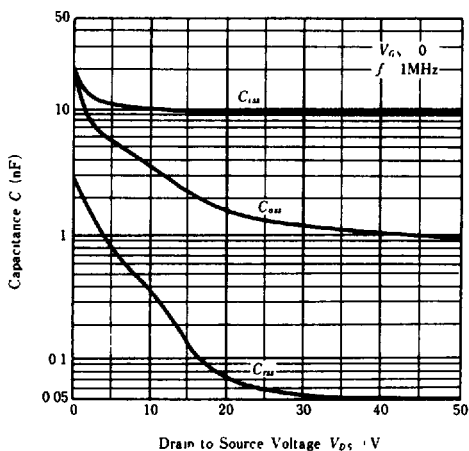
FORWARD TRANSFER ADMITTANCE VS. DRAIN CURRENT



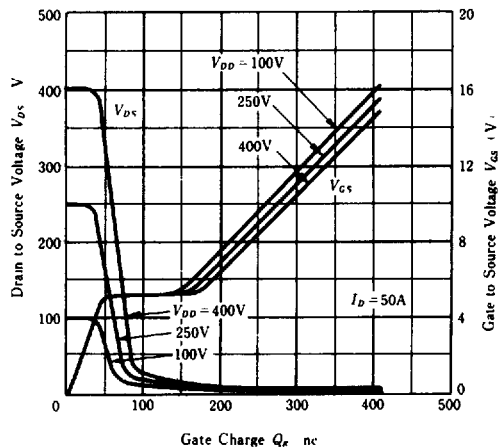
BODY DRAIN DIODE REVERSE RECOVERY TIME



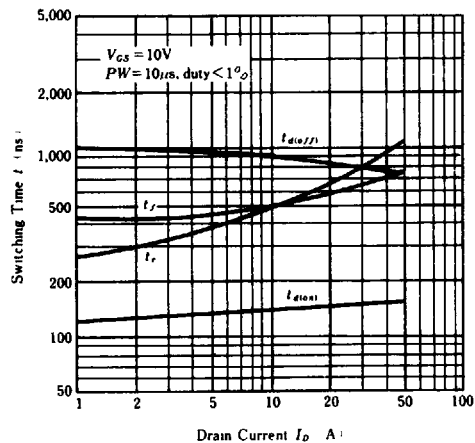
TYPICAL CAPACITANCE VS. DRAIN-SOURCE VOLTAGE



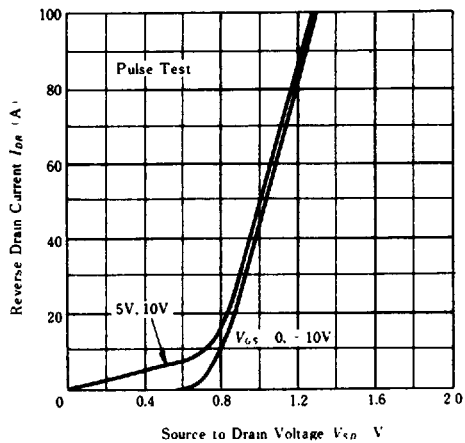
DYNAMIC INPUT CHARACTERISTICS



SWITCHING CHARACTERISTICS



REVERSE DRAIN CURRENT VS. SOURCE TO DRAIN VOLTAGE



HITACHI/(OPTOELECTRONICS)

NORMALIZED TRANSIENT THERMAL IMPEDANCE VS. PULSE WIDTH

